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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

FOR

APRIL 1955

59173

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Compiled by
DEPARTMENT MANAGERS

May 23, 1955

RICHLAND, WASHINGTON

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

APRIL 1955

GENERAL SUMMARY

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PRODUCTION OPERATION

KE Reactor was started up for production operation at 3:39 P.M. April 17, and at month end had achieved a maximum operating level of 1000 megawatts. The levels of both K Reactors continue to be limited to a maximum tube power of 500 kilowatts pending design and procurement of new front fact connectors.

KE and KW Reactors were shut down on April 25, when it was discovered that a section of the KE Reactor outfall line had broken loose from its anchor in the river bed. The line was blanked off, pending completion of repairs in progress at month end, and effluent flow from both reactors was diverted through the KW Reactor line. This incident resulted in a total of approximately 150 outage hours.

ENGINEERING TECHNOLOGY

In-pile experiments using a nitrogen gas atmosphere indicated that there will be no serious corrosion problems in using nitrogen in the pile atmosphere unless water is present in the liquid phase.

The KE Startup technical program was completed during the month. It was determined that a single channel containing a 50-50 mixture of steel and boron-steel balls would have 95 percent of the poison effectiveness of the all boron-steel channel. It was determined that sufficient control would be obtained by providing a 50-50 mixture in the K Piles.

Extensive emergency work was done on the east line of the 100-K Effluent Lines by Minor Construction after this 84-inch steel pipe moved from its bed in the river on April 25. A diver was employed to inspect the lines, and a break around about 3/4 of the circumference of the east line was found about 350 feet from shore. The reactors were returned to service on April 28, and plans for repairing the line have been completed.

PERSONNEL AND SERVICES

Dr. Norwood was elected a director of the Industrial Medical Association, a professional organization with some three thousand physician members.

The AEC Award of Honor was presented to the General Electric Company for the outstanding safety record of operating 9,437,211 man-hours without a disabling injury to any employee achieved during 1954.

STAFF

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

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HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
APRIL 30, 1955

<u>DEPARTMENT</u>	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>4-30-55</u>	<u>3-31-55</u>	<u>4-30-55</u>	<u>3-31-55</u>	<u>4-30-55</u>	<u>3-31-55</u>
<u>Counsel</u>	3	3	2	2	5	5
<u>Operations Research Study</u>	6	6	1	1	7	7
<u>Employee & Public Relations</u>						
General	8	8	8	8	16	16
Salary & Wage Administration	11	11	11	11	22	22
Personnel Practices	15	14	39	41	54	55
Education & Training	6	6	33	35	39	41
Emp. Comm. & Pub. Rel.	10	10	42	41	52	51
Union Relations	5	5	-	1	5	6
Aux. Oper. & Plant Prot.	115	115	802	803	917	918
Community	84	84	335	336	419	420
Health & Safety	52	51	189	194	241	245
<u>Engineering Department</u>						
Engineering Administration	37	39	87	86	124	125
Advance Engineering	9	9	1	1	10	10
Design	179	181	122	123	301	304
Project	187	196	168	163	355	359
File Technology	231	231	147	146	378	377
Separations Technology	164	167	88	85	252	252
<u>Manufacturing Department</u>						
General	21	21	8	8	29	29
Reactor	301	299	1 365	1 356	1 666	1 655
Separations	295	289	1 604	1 562	1 899	1 851
Metal Preparation	106	103	546	544	652	647
Transportation	44	43	448	448	492	491
Purchasing & Stores	59	55	207	206	266	261
Electrical Utility	16	15	74	75	90	90
<u>Financial Department</u>						
General	9	9	2	3	11	12
Budgets & Measurements	4	4	5	4	9	8
Contract Cost	23	24	92	97	115	121
General Accounting	9	9	59	63	68	72
Property Accounting	15	15	46	43	61	58
Auditing	13	14	2	2	15	16
SF Accountability	10	10	28	27	38	37
Personnel Accounting	9	9	51	49	60	58
Procedures & Computing	28	29	52	49	80	78
<u>Radiological Sciences Department</u>						
General	5	5	-	-	5	5
Records & Standards	27	27	163	163	190	190
Biophysics	53	53	70	69	123	122
Biology	32	34	39	38	71	72
Engineering	6	6	1	1	7	7
Adm. & Communications	3	3	5	5	8	8
Grand Total	<u>2 210</u>	<u>2 212</u>	<u>6 942</u>	<u>6 889</u>	<u>9 152</u>	<u>9 101</u>

AREA PERSONNEL DISTRIBUTION
APRIL, 1955

	<u>100-B 100-D 100-F 100-H 100-K 101</u>		<u>200-E 200-W 300</u>		<u>700-1100-3000</u>	
	<u>Area</u>	<u>Area</u>	<u>Area</u>	<u>Area</u>	<u>Area and</u>	<u>Total</u>
<u>Engineering Department</u>						
Exempt	25	64	-	41	311	807
Other	9	26	2	20	224	613
Total	<u>34</u>	<u>90</u>	<u>2</u>	<u>61</u>	<u>535</u>	<u>1 420</u>
<u>Manufacturing Department</u>						
Exempt	61	55	71	55	119	842
Other	268	301	310	288	685	4 252
Total	<u>329</u>	<u>356</u>	<u>381</u>	<u>343</u>	<u>804</u>	<u>5 094</u>
<u>Financial Department</u>						
Exempt	-	-	-	1	110	120
Other	-	-	-	-	308	337
Total	<u>-</u>	<u>-</u>	<u>-</u>	<u>1</u>	<u>418</u>	<u>457</u>
<u>Employee & Public Relations</u>						
Exempt	22	6	7	3	224	306
Other	49	44	87	35	905	1 459
Total	<u>71</u>	<u>50</u>	<u>94</u>	<u>38</u>	<u>1 129</u>	<u>1 765</u>
<u>Radiological Sciences</u>						
Exempt	2	-	34	2	13	126
Other	5	-	42	16	22	278
Total	<u>7</u>	<u>-</u>	<u>76</u>	<u>18</u>	<u>35</u>	<u>404</u>
<u>General</u>						
Exempt	-	-	-	-	9	9
Other	-	-	-	-	3	3
Total	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>12</u>	<u>12</u>
Total Exempt	110	125	112	102	786	2 210
Total Other	331	371	441	359	2 147	6 942
Grand Total	<u>441</u>	<u>496</u>	<u>553</u>	<u>461</u>	<u>2 933</u>	<u>9 152</u>

MANUFACTURING DEPARTMENT
MONTH OF APRIL 1955

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METAL PREPARATION SECTION

A net production of 364 tons of acceptable slugs, including 17 tons of cored slugs, was achieved in April. This production was 100 percent of the official forecast.

The canning yield for the solid and cored slugs was 79 and 71 percent respectively with a composite yield of 79 percent. The major causes for rejection were bad welds, poor bonds, and marred surfaces. The bad weld reject rate reflecting the occurrence of dimples in the weld bead was 5 percent for the month. Investigation of the problem was continuing at month end.

Receipts of the regular uranium solid and cored slugs increased over the scheduled requirements to the extent that the bare slug inventory at month end was equivalent to approximately a two weeks supply.

There were no autoclave failures in April.

REACTOR SECTION

The total and plutonium input production were 101 percent of the official forecast respectively. The reactor time operated efficiency was 73.1 percent in April, significantly lower than the 83.6 percent in March, as the result of a two week horizontal rod replacement outage at DR Reactor, a process tube leak testing outage at F Reactor, cushion chamber difficulties at B Reactor, KW and KE Reactor outages associated with the failure of the KE effluent outfall line, and outage time resulting from 11 ruptures at C Reactor.

The plutonium output production was 37 percent greater than forecast as the result of discharging extra quantities of low concentration metal to meet 200 Area requirements, and to compensate for an increase in metal cooling time because of the iodine emission problem. Tonnages of low and high concentration metal discharged were 284 and 54 respectively.

During April, established maximum reactor power levels, excluding enrichment burnout, were increased a total of 60 megawatts, notwithstanding the rising river water temperature. An increase of 25 megawatts at C Reactor resulted from an increase in the allowable tube exit water temperature limit from 100°C to 105°C. F Reactor gained 35 megawatts in maximum level as the combined result of long term reactivity gains and flattening pattern adjustments that

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permitted more nearly the attainment of the maximum benefits allowed by the tube exit water temperature limit. KE Reactor was started up for production operation at 3:39 p.m. April 17, and at month end had achieved a maximum operating level of 1000 megawatts. The levels of both K Reactors continue to be limited to a maximum tube power of 500 kilowatts pending design and procurement of new front face connectors.

A total of 13 ruptured slugs occurred during April with eleven at C and two at D Reactor. Among the ruptures were one J slug, six regular uranium slugs and six uranium production test pieces that included such types as cored, powder metal compact, and bonded and unbonded with point closures. Total outage time at both reactors attributed to ruptures was 234 hours.

Twenty-six reactor scrams occurred during April. Of these, 15 at C, D, F, and KE Reactors were caused by normal Panellit system variables. Six Beckman scrams occurred for the following reasons: One at C Reactor from a failure to by-pass a Beckman while resetting the trip point; one at D Reactor from a short circuit in a clock on the instrument circuit; one at F Reactor from the by-passing of three Beckmans at one time; one at D Reactor from un-bypassing a Beckman on bucking voltage while at full scale; one at KE Reactor from failure to reset the trip point while coming up to level; and one at KW Reactor from an unexplained rise in power level. To date, the cause of this unexplained rise has not been determined, although the presence of air in the process water system is considered to have been a contributing factor.

KE Reactor was manually scrammed when an incorrect rod movement caused a period increase during start-up. KW Reactor was scrammed twice as the result of the KE-KW Reactor high pressure cross-tie valve opening when water pressure at KE Reactor was reduced. One scram each at B and KW Reactors resulted through the Beckman interties as the result of Beckman scrams at C and KE respectively. The total outage time attributed to these scrams was 137.4 hours.

One process tube leak occurred at F and following tube replacement, the water collection rate returned to normal.

Horizontal rod work during April, in addition to the DR Reactor rod replacement, included the replacement of a rod and thimble at H Reactor with a thimbleless rod, the removal without replacement of one rod at D Reactor, and the removal from service of a rod suspected of leaking at B Reactor.

KE and KW Reactors were shut down on April 25, when it was discovered that a section of the KE Reactor outfall line had broken loose from its anchor in the river bed. The line was blanked off, pending completion of repairs in progress at month end, and effluent flow from both reactors was diverted through the KW Reactor line. This incident resulted in a total of approximately 150 outage hours.

The U-233 input production was 4 percent below forecast as the result of a low operating efficiency at C Reactor. The balance of the enriched thorium loaded tubes at C and H Reactors was 111 and 50 respectively.

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SEPARATIONS SECTION

All of the official forecast production quotas for the month were exceeded with the exception of the T Plant production of low ngs plutonium which was only 66 percent of forecast. The T Plant was operated at low rates throughout most of April in order to increase the decay time for the feed material and to permit tests involved in the analysis of the I-131 stack emission problem. At month end all dissolvers were in full operation, and while the iodine problem was not resolved, sufficient control was being maintained over the dissolution process to keep the average emission rate below one curie per day.

The Redox Plant was shut down on April 9 to divert the plant capacity back to high concentration material and to permit the tie-in of the new Final Product Concentration Facility. Following the start-up on April 14, considerable difficulty was experienced throughout the remainder of the month with high plutonium waste losses. Subsequent reworking of the waste resulted in rates being reduced below 9 tons/day for a considerable portion of the month. At month end the production forecast had been exceeded by 21 percent; however, high waste losses were continuing to be a problem.

The TBP Plant production was 109 percent of the forecast. Operating rates continued to be low during the month because of dilute feed from the nearly depleted metal waste inventories in the 200 East Area tanks and the limited feed concentrator capacity. Around April 22, one of the two feed concentrators was found to be leaking and was taken out of service. Work on a spare feed concentrator section was in progress at month end.

The UO_3 plant operation was normal with production being limited only by the availability of feed material.

The Isolation Building experienced no difficulty in processing the small amounts of low ngs material from Redox and T Plants. The new Purification and Reduction Tasks in the Metal Fabrication Facility were put into production during the latter part of April. A number of start-up difficulties associated with new equipment did not prevent the plant from making its forecast production of fabricated parts.

The West Area Waste Evaporator operated during the month on TBP waste with a 54.6 percent volume reduction. The East Area Evaporator remained in a standby condition.

During April, the rate of removal of metal waste was low with effort being concentrated on small heels in several tanks. On April 29, sluicing was started in a full cascade containing one year old waste.

GENERALPersonnel

On Roll April 1, 1955
Net Increase
Total on Roll April 30, 1955

5024
70
5094

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J. E. Maider

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

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MANUFACTURING DEPARTMENTPATENT REPORT SUMMARY
FOR
MONTH OF APRIL, 1952

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

INVENTORTITLE

A. K. Hardin, Reactor Section	Front Face Crossheader
R. D. Schilling, Reactor Section	Check Valves
	Document HW-34312

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

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TOP SECRET

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May 5, 1955

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION

I. RESPONSIBILITY

In view of the similarity of work performed in the 3717 Building Shops and the Technical Shops of the 300 Area, these facilities were consolidated April 1, 1955. The Machine Shop formerly located in the 3717 Building has been moved to the 328 Building when space is available. The craft labor and supervision will continue as the Fabrication Unit, Metal Preparation Section, with the Technical Shops Supervisor responsible for manpower levels, job priorities, and financial control.

II. ACHIEVEMENTA. Operating Experience

April March Year
To Date

1. Statistics

Total Acceptable Slugs Canned (Tons)	364	421	1587
Composite Canning Yield (%)	79	79	78
Efficiency (%) (Canning Through Put)	94	94	94
Forecast Achievement (Current Commitment)	100	114	105
Net Acceptable Solid Slugs (Tons)	347	404	1516
Slugs Returned from Reactor (Tons)	2.67	3.33	16.49
Canning Yield (%)	79	79	79
Net Acceptable Cored Slugs (Tons)	17	17	71
Slugs Returned from Reactor (Tons)	.14	0	.14
Canning Yield (%)	71	75	71
Autoclave Failure - Solid (No./M)	.00	.00	.01
Autoclave Failure - Cored (No./M)	.00	.00	.00
Acceptable C-4 Slugs Canned (Pieces)	2308	806	4036
Acceptable Pb-Cd Slugs Canned (Pieces)	0	1131	7624
Acceptable 10-66 Slugs Canned (Pieces)	0	46	46

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Metal Preparation Section

1. Statistics - continued

	<u>April</u>	<u>March</u>
Average Steam Generated (M lbs/hr)	42.7	56.7
Maximum Steam Generated (M lbs/hr)	60.0	90.0
Total Steam Generated (M lbs)	30 725	42 234
Coal Consumed (Tons)	1 947	2 658
Sanitary Water from 3000 Area (Million Gals.)	51.0	55.0
Total Water from 3000 Area (Avg.Rate-GPM)	1 183	1 233

2. Activities

A net production of 364 tons of acceptable finished slugs was attained in April, essentially 100 percent of forecast. Seventeen tons of this total were cored slugs. Three canning lines were operated on a two-shift, minimum relief basis throughout the month.

The composite yield continued at 79 percent in April. The major causes for rejection were bad welds, poor bonds, and marred surfaces. The bad weld reject rate, reflecting primarily the occurrence of dimples in the weld bead, remained at five percent during April.

Approximately 2900 enriched uranium - aluminum alloy reject slugs were accumulated and prepared for shipment to Oak Ridge during the month.

Shipments of regular uranium solid and cored slugs were received as scheduled during the month. Bare slug inventory had increased to approximately a two-weeks' supply and canned slug inventory had increased to approximately a one-month supply at month-end.

Studies over a long period of time indicate some correlation between depression-type weld rejects and the impurity content of the canning baths as measured by the percentage of lead present. In an effort to improve this dimple defect experience, a test was initiated on April 18, wherein one canning line was started with virgin metal. The lead content of the canning bath will be controlled to less than 20% for at least 30 days. The incidence of depression rejects for the test line will be compared with that for the control lines.

An SF Material Accountability Manual was issued during April. This manual outlines SF material transfer procedures for the production streams in a continuous flow rather than the former individual lot or cart basis. Transfer procedures for both internal and off-site shipments are included.

No autoclave failures occurred during the month.

In view of possible aluminum shortages, cap and can inventories have been increased to approximately four-month's supply.

For description of all non-ferrous metals in the Metal Preparation Section, see Appendix B, Section 1, Chapter 1, Part 1.

The following controls and procedures were adopted by the Section effective April 1, 1955.

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2. Activities - continued

A vendor evaluation order for 100,000 caps and 100,000 cans has been placed with the Reynolds Aluminum Company. This is the result of continued efforts to find a second vendor for component parts.

3. Special Operations

A total of 1,458 enriched uranium-aluminum alloy slugs were canned by the hot press procedure during April with a yield of approximately 60 percent. A deposit of carbon scale on the surface of the canned slugs, which could not be readily removed by acid etching, was the major cause for rejection. The substitution of water soluble oil as a die lubricant essentially eliminated the occurrence of carbon scale at month-end.

As reported last month, the 300 Area inventory of processed enriched uranium-aluminum alloy slugs was etched in chromic acid to remove any possible deposits of iron which might cause localized corrosion under in-pile conditions. Similar inventories at the reactors will be etched at an early date.

By machining the uranium inserts from each end, 3,478 cored slugs were recovered during April.

The lay-up of graphite for the Physical Constants Test Reactor in the 305-B Building was completed during the month. Fabrication of the control equipment for positioning the fuel elements and the control rods is nearing completion. Installation of this equipment, the electrical wiring, and instrument equipment in the building is approximately 50% complete. It is expected that this reactor will be ready for operation early in June.

4. Schedule Variance

Acceptable canned slug production was essentially 100 percent of forecast.

B. Equipment Experience

1. Operating Continuity

The canning line efficiency was maintained at 94 percent during April, which was the same as experienced in March.

2. Inspection, Maintenance and Replacement

The induction furnace used in the canning area, which failed in March due to cracked refractory, was returned to service during the month. Experience gained in re-starting this furnace pointed out that pre-heating the channels with an external heating source prior to charging with molten metal is necessary.

A warning system designed to alert personnel at the moment power outages occur on canning induction furnaces has been partially installed and will be completed upon receipt of material on order. The fuse failures in the induction furnace power circuits reported last month, prompted this action.

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2. Inspection, Maintenance and Replacement - Continued

A housing failure on one of the 2000-pound hydraulic pump units used in the hot press canning operation occurred during April. This is the second failure of this type since these units were installed in January. Since this appears to be a weakness in the design of the pump cylinder casting, the vendor is being contacted regarding possible re-design.

Studies are continuing in an effort to find a more suitable thermowell material for the canning furnaces. The original silicon-carbide thermowells, although acceptable from a corrosion standpoint, were fragile and easily broken resulting in considerable instrumentation down-time. The steel wells currently in use require frequent re-coatings to inhibit corrosion. A number of different metals have been tried but none has proved satisfactory.

C. Improvement Experience

1. Production Tests

PT-313-47MT "Cored Slugs from Extruded Blanks and Rolled Rods" (HW-33109)
A total of 17 tons of finished cored slugs was produced with a yield of 71 percent. Bad welds and poor bonds continue as the major causes for rejection.

A supplemental test was issued for processing approximately 3,000 cored slugs using pressed aluminum plugs. The slugs have been counterbored with the required undercut and the plugs fabricated for processing early next period. Plans are being made to process a corresponding number of slugs with crimped plugs as soon as components are received from Fernald.

Approximately 18 tons of cored slugs were shipped to D pile for charging in high power factor tubes. In addition, five tubes in the same pile were charged alternately with measured drilled and extruded cored slugs on March 30.

PT-313-53MT "Effect of Slug Heat Treating Modifications Upon In-Pile Stability of Slugs" (HW-35590)

Work was started and essentially completed during this period on the preparation of slugs heat treated by a modified process. Approximately 130 tons of as-rolled slugs were heat treated twice the normal cycle in chloride salt and cooled in air for specified time intervals prior to quenching in salt brine. Only a limited number of control samples remain to be processed.

Although the test covers a wide range of delay times (35 to 80 seconds) between heat treating and final quenching, laboratory tests have indicated the optimum delay time falls between 43 and 50 seconds. Delay times in this range produce a more uniform macro-structure random grain orientation and lower residual stresses in the finished slugs.

2. Process Tests and Revisions

Cost control charts showing the labor costs per slug for each canning crew were placed in effect during the last week in April. The provision of the daily cost information on these charts enables the supervisor to quickly pinpoint out-of-control conditions.

Installation of a safety device to prevent accidental opening of the blow-off valve was completed on all autoclaves by Minor Construction during the month.

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2. Process Tests and Revisions - continued

A revised method for unloading railroad cars which was devised through the work simplification technique, was placed in effect late in April. Following a few minor revisions, the new method should result in faster car unloading.

An evaluation was completed on 25,000 bare slugs which were directly turned to the specified diameter rather than centerless ground. The evaluation was based on surface and dimensional characteristics, canning performance, and metallurgical properties. This type of slug has been accepted as standard production material. The Feed Material Production Center will routinely produce slugs by this method and they estimate significant annual savings in their operation as a result of this change.

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

Unit costs for direct labor are expected to remain the same as the previous month.

2. Material Variance

Direct material costs will remain essentially the same as the previous month. A slight gain in yield will reflect a slight decrease in Unit costs.

3. Other Costs

Other costs are expected to increase approximately .024 per unit over the previous month as a result of a 14 percent decrease in production.

E. Plant Development and Expansion

1. Project Status

Project CA-514 "Expansion of 300 Area Production Facilities"
Project authorized funds total \$5,900,000. Project costs plus commitments by General Electric Company total \$4,309,285 as of April 15, 1955. Construction is 87% complete as of April 30, 1955. The demolition of block partitions and portions of the floor slab in the old portion of the 313 Building has been completed. The floor slab has been re-poured and acid-proof brick is presently being installed. The general building lighting in the old portion of the building is nearing completion.

The two slug pickle machines have been accepted from Construction and are being tested and adjusted. The two sleeve cleaning machines have been positioned and the piping, electrical and ductwork is nearing completion. The overhead conveyor system in the canning area is complete except for the powered kick-off devices. Re-designed ventilation equipment for the canning area has been fabricated and is being installed. Impending hot weather has necessitated an overtime schedule for the sheetmetal work. It is expected

1. Project Status - continued

that three lines will be equipped by May 16 and the work completed by June 20. Two automatic quench machines have been modified and are in operation. Other machines will be modified as materials are available.

Additional experiments relative to the high noise level of the Acme-Gridley cut-off machines are being conducted. A sound barrier will be installed in an attempt to overcome this problem. The glass phenolic collet liners for this equipment show promise of acceptance. Additional experiments with this material will continue.

A study is being made to determine what modifications are necessary to handle the excessive amount of condensate occurring in the autoclave operation.

The general and supporting facilities are approximately 89% complete.

Modification of the 3706 Building is complete except for a few minor items. This is primarily painting and tile-laying.

Project CG-610 - "Replacement of Existing 313 Building Roof"

Project authorized funds total \$55,000. Detailed design is 75% complete. Construction starting date is contingent upon the progress of Project CA-514. Present conditions indicate that the starting date will be in May, 1955. Completion is planned for October 1, 1955.

Project CG-590 - "Fly Ash Collection Equipment-384 Building"

Estimated cost \$38,000. Scoping and preliminary design are complete. Approval has not yet been received from the Commission. The estimated cost of the project has increased slightly due to a new interpretation of the Davis-Bacon Act which states that construction forces must perform the tie-in work on the related equipment.

Project CG-614 "Hanford 4X Program - 300 Area Production Increase"

Project authorized funds are \$130,000. Scoping is complete and design is 90% complete. The present estimated cost is \$340,000. The 3707-D Change House modifications will be done by Minor Construction forces and the 313 Building and 352-A sub-station installation will be done by Plant Maintenance Forces.

Project CA-601 "General Grounds Improvement - 300 Area"

Estimated cost is \$96,000. Scoping and preliminary design are 85% complete. The project proposal has been transmitted to Washington, D.C. by the Commission and is awaiting authorization.

Project ER-A-3113 "Development of an Independent Water Supply"

The Company has concurred with the Commission's recommendation that action on this proposal be postponed until the incorporation of Richland and subsequent water rates can be accurately determined.

Project ER-A-3118 "300 Area Fence Replacement" (\$26,000)

The final proposal is currently being routed within the Company for approval.

"Production Area Maintenance Facility"

Estimated cost \$31,000. Scoping and preliminary design are complete. Project proposal preparation is 60% complete.

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2. Plant Engineering

A cost comparison study was made of various operating arrangements for the 313 Building production facilities at the completion of project CA-514. Considered in this analysis were the influencing factors on cost by: number of canning lines, shifts, days per week, and relief methods used to obtain the desired production. Expected personnel requirements for both the operating and service functions under the various arrangements were projected. A chart was prepared for use in production scheduling which shows the comparative cost of operating methods.

F. Significant Reports Issued

1. Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-36024	Monthly Report, New Fuel Element Production Program, March 1955	W. A. Blanton	4-1-55
HW-36025	Monthly Report, Process Sub-Section, Metal Preparation Section, March 1955	E. W. O'Rourke	4-1-55
HW-36195	General Analytical Control Program I, Uranium Metal, January 1 to Feb. 28, 1955 Mallinckrodt Chemical Works	P. R. Anderson	4-13-55
HW-36196	General Analytical Control Program I, Uranium Metal, January 1 to Feb. 28, 1955 National Lead Company of Ohio	P. R. Anderson	4-13-55
HW-36314	Report of Uranium Accountability in Metal Preparation for the Quarter Ending 3-31-55	W. G. Tews	4-21-55
HW-36120	Monthly Report, Operations Sub-Section Metal Preparation Section, March 1955	W. W. Windsheimer	4-7-55

2. Non-Routine

HW-36230	Directly Turned Uranium Slugs	S. M. Gill	4-14-55
HW-36353	Interim Report of the Long Preheat-Short Submerge Canning Test	J. E. Gackle	4-25-55

III. PERSONNEL

A. Organization

The Production Maintenance Unit, Power & Maintenance Sub-Section, was established April 1, 1955. J. A. Cowan was appointed Superintendent. This unit assumed responsibility for all maintenance work within the 303 Area. Through the addition of this Unit, improved maintenance service to the production area,

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A. Organization - continued

better control of contamination within the Area, and supervisory shift coverage will be provided. A project proposal is being prepared to provide a maintenance shop within the 303 Area.

B. <u>Force Summary</u>	<u>Start of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Operations	198	194	-4
Power & Maintenance	333	340	+7
Process	101	102	+1
Projects & Personnel	<u>13</u>	<u>15</u>	<u>+2</u>
Section Total	647	653	+6

C. Safety Experience

No major, sub-major or near-serious incidents occurred in the Section. A high number of minor injuries involving foreign particles in eyes was attributed to the heavy winds during this period.

Outside safety shower lights located in the vicinity of the 313 Building were disconnected from the roadway lighting circuit and wired into the emergency lighting circuit of the 313 Building.

D. Radiation Experience

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

E. Personnel Activities1. Visits and Visitors

E. W. O'Rourke visited the Aluminum Company of America, Edgewater, New Jersey and the Savannah River Plant, Augusta, Georgia to discuss uranium quality control.

S. M. Gill visited Augusta and Cincinnati to discuss uranium quality control.

W. A. Blanton attended the AEC Metallurgy Information Meeting at the Oak Ridge National Laboratory. He also visited the National Lead Co. in Cincinnati to become acquainted with their metal production and fabrication facilities.

C. E. Frantz visited the Pacific Oerlikon Company in Tacoma to provide assistance on fabrication problems relative to canning process equipment.

T. W. Gore visited the Boeing Airplane Company and the Owens-Corning Glass Company in Seattle for consultation on noise reduction problems and to obtain information on types of acoustical materials.

K. V. Stave conducted "Follow-up Interviews" in Seattle for employment candidates as a part of the Company's Technical Recruitment Program.

F. E. Peck and R. E. Anderson attended the Man Management Course in Yakima.

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2. Meetings

Forty-eight safety and security meetings and 74 round table and information meetings were held for exempt and non-exempt members of the Section. Two meetings on Work Simplification Training were conducted with twenty persons attending. Eight exempt members attended Training & Development programs at W-10.

An introductory meeting to the Section's Leadership and Self-Development Conference was held April 22 for all exempt personnel.

A short movie depicting the economic structure of our government and free enterprise "It's Everybody's Business" was shown to members of the Section.

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Richland, Washington
May 5, 1955

MANUFACTURING DEPARTMENT
REACTOR SECTION
MONTHLY REPORT
APRIL, 1955

I. RESPONSIBILITY

On April 18, the Reactor Section assumed responsibility for the operation and maintenance of water and sewage facilities at White Bluffs. Previous to this date these facilities had been operated by Kaiser Engineers.

II. ACHIEVEMENT

A. Operating Experience

Total and plutonium input productions were 101.1 and 101.2 per cent of forecast, respectively. Reactor time operated efficiency was 73.1 per cent in April, significantly lower than the 83.6 per cent of March as the result of a two-week rod replacement outage at DR Reactor, outages at KE and KW Reactors associated with the Building 1904 outfall lines, a process tube leak testing outage at F Reactor, continued cushion chamber problems at B Reactor, and outage time resulting from 11 ruptures at C Reactor. All of these items are discussed in detail in later portions of this report.

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A. Operating Experience (Continued)

Thorium input production was four per cent below forecast as the result of a low operating efficiency at C Reactor. Production charged to thorium irradiation at C and H Reactors was 6.3 and 3.2 per cent, respectively.

Plutonium megawatt day output production was 137.5 per cent of forecast as the result of discharging greater than forecast quantities of low concentration material from B, D, and F Reactors in order to meet 200 Area requirements, and to compensate for an increase in metal cooling time from 90 to 105 days.

During April, goal concentration of material discharged remained the same, base goal plus 300 megawatt days per ton at all reactors except D Reactor where a pilot program at a concentration of base goal plus 400 megawatt days per ton is in progress, and at C Reactor which continued to produce low concentration material at 43 per cent of goal. Tonnages of low and production concentration material discharged during April were 284 and 54, respectively. The latter figure includes six tons discharged from D Reactor at essentially base goal plus 400 megawatt days per ton.

During April, established maximum reactor power levels, excluding enrichment burnout, were increased a total of 60 megawatts, 25 at C Reactor and 35 at F Reactor. These increases resulted, in spite of rising river water temperatures, from the following factors: at C Reactor, from an increase in allowable effluent water temperature of 5C to 105C, and at F Reactor, as the combined result of long term gains and flattening adjustments permitting more nearly maximum attainment of benefits allowed by the effluent water temperature limit. KE Reactor, which started up on April 17, as described under activities, had at month end achieved a total maximum power level of 1000 megawatts.

Thirteen confirmed slug failures occurred in April, all at C and D Reactors as detailed below.

	<u>C</u>	<u>D</u>	<u>Total</u>
Eight-Inch Regular	5	1	6
Production Test	5*	1*	6
"J" Material	1		1
Total	11**	2	13

*Two each at C Reactor from:

PT-105-570-A "Irradiation of Cored Uranium Slugs"

PT-105-576-A "Irradiation of Powder Metal Compact Slugs"

One at C Reactor from:

PT-105-584-A "Unbonded and Mechanically Bonded Slugs with Point Closures"

One at D Reactor from:

PT-105-588-A "Irradiation of Extruded Cored Slugs"

**In addition, one PT-105-577-A "Irradiation of Solid and Cored Hot Pressed Fuel Elements," slug was found broken in the discharge chute.

A. Operating Experience (Continued)

1. Statistics

Operating statistics are summarized in the table on Page 4.

2. Activities

KE Reactor was started up for production operation at 3:39 p.m. April 17. Operating levels were limited by a 500 kw tube power limit necessitated by use of the present type pigtails, the questionable integrity of which presents potential hazards to the reactor at higher levels. Prior to start-up, technical tests, including the reactivity tests associated with the charging of flattening and enrichment materials, were completed April 1, and were followed by comprehensive testing of all vital reactor components to insure satisfactory operation.

DR Reactor was shut down on April 18, for a two week extended horizontal rod replacement outage in connection with Project CG-558 "Reactor Plant Modifications for Increased Production." At month end, rod installation was complete, and acceptance tests were in progress. Additional reactor work accomplished during this outage included installation of venturis or orifices in all process tubes, replacement of 168 galvanized nozzles with aluminum nozzles, replacement of all Panellit gages with adjustable type gages, and random inspection of Van Stone flanges which in general were found to be in good condition.

Water plant work accomplished during the DR Reactor rod outage included, installation of a new Building 181-D pump, relocation of electrical lines and switchgear, and relocation of the main process sewer between Buildings 105-D and 190-D.

At month end, operation at B, DR, F, and H Reactors is limited by temporary outlet water limits as specified in Process Standard 105-A-040, "Process Tube Outlet Water Temperature Limits - Trip Before Instability." D Reactor continues to operate under limits established by Production Test 105-546-A, "The Effect of Helium on D Pile Distortion." C Reactor continues to operate under the limits of Production Test 105-548-E, "C Pile Graphite Burnout Experiment." KE and KW Reactors are operating in accordance with limits established by Document HW-36180, "Process Change Authorization RP-21, KE Reactor Start-Up and KW Reactor Limitations."

Charge-discharge activities in April associated with major irradiation programs included discharge of 48 J-Q tubes

HW-36440

1. Statistics

	B	C	D	DR	F	H	KE	KW	Total or Average
Reactor Time Operated									
Efficiency (%)	87.3	66.3	79.5	50.1	64.5	91.1	63.9	77.3	73.1
Reactor Outage Time (Hrs)									
Plutonium Production	91.2	149.7	85.7	359.1	207.2	54.1	115.6	144.3	1206.9
Critical "W" Power	0.3	0.5	38.2	0.3	29.6	-	-	19.0	87.9
Special Irradiations									
and Tests	-	92.2	24.0	-	19.0	10.0	-	-	145.2
Total	91.5	242.4	147.9	359.4	255.8	64.1	115.6	163.3	1440.0
Reactor Unscheduled									
Outage Time (Hrs)	91.5	242.4	109.9	0.3	128.9	-	115.6	163.3	851.9
Metal Discharged (Tons)	42.4	144.2	9.5	34.4	62.3	45.4	-	-	338
*Water Quality (Turbidity ppm)									
Raw Water - Average	14	17	21	19	19	16	12	13	
Raw Water - Maximum	35	48	51	40	47	39	32	29	
Process Water - Average	0.004	0.004	0.004	0.004	0.005	0.005	0.002	0.004	
Process Water - Maximum	0.005	0.005	0.006	0.006	0.006	0.009	0.005	0.005	
Water Pumped (MM Gals)									
Bldg. 190 to reactor	1832	2730	2104	1071	1473	2108	2016	4687	18021
Bldg. 182 to 200 Areas			343						343
Bldg. 181	5270		4095		1778	2455	2101	4962	20661
Steam Generated (MM Lbs)	161		200		113	114	11	26	625
Coal Consumed (Tons)	10212		12781		7281	6831			37105
Oil Consumed (Gals)							105420	271700	377120

* Beginning with the April report, water quality will be reported in ppm turbidity in line with the establishment of the microphotometer as the primary method of determining residual iron through turbidity measurements by Process Standard - Reactor Cooling Water 183-A-010, "Aluminum Sulfate Coagulant Addition."

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A. Operating Experience

2. Activities (Continued)

with recharging of only three of these tubes with J-Q material. The month end balance of J-Q tubes at C and H Reactors under the major J-Q program was 111 and 50, respectively.

The shipment of "J" material from DR Reactor to Arco, Idaho, continued until April 25, at which time the shipping schedule was interrupted by a truck breakdown. Shipments are expected to begin again early in May. In April, 28 casks containing 3920 pieces were shipped.

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

	<u>Tubes</u> <u>Charged</u>	<u>Tubes</u> <u>Discharged</u>	<u>Casks</u> <u>Shipped</u>
Production Tests	21	33	4
Mint (flattening)	6	1	0
Chemical 10-66	0	1	0
Rala	0	5	2
Total	27	40	6

B. Equipment Experience

Twenty-six reactor scrams occurred during April. Of these, 15 at C, D, F, and KE Reactors were caused by normal Panellit system variables. Six Beckman scrams occurred as the result of these reasons: One at C Reactor from failure to by-pass a Beckman while resetting the trip point; one at D Reactor from a short circuit in a clock on the instrument circuit; one at F Reactor from by-passing three Beckmans at one time; one at D Reactor from un-bypassing a Beckman on bucking voltage while at full scale; one at KE Reactor from failure to reset the trip point while coming up to level; and one at KW Reactor from an unexplained rise in power level. To date, the cause of this unexplained rise has not been completely resolved, although the presence of air in the process water system is considered to have been a contributing factor.

KE Reactor was manually scrammed when an incorrect rod movement caused a period increase during start-up. KW Reactor was scrammed twice as the result of the KE-KW Reactor high pressure cross-tie valve opening when water pressure at KE Reactor was reduced. One scram each at B and KW Reactors resulted through the inter-ties as the result of Beckman scrams at C and KE Reactors, respectively. The total outage time attributed to these scrams was 137.4 hours.

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B. Equipment Experience (Continued)

Two Critical "Y" power conditions, resulting from the malfunction of equipment at McNary Dam, caused eight unscheduled outages and 87.9 hours of outage time during the month. All reactors, except H and KE which were not operating, were shut down as a result of this condition on April 11. The DR and KW Reactors were again shut down due to this condition on April 12. Minimum outages were required at D, F, and KW Reactors due to their inability to resume operation at the conclusion of the "Y" condition.

F Reactor was shut down on April 18, for a leak testing program as the result of abnormal collection rates. During the testing of all process tubes, one tube leak, eight rear flange leaks, and 55 rear Van Stone leaks were found and corrected. By month end, water collection rates had returned to normal. Total outage time required for testing was approximately 100 hours.

B Reactor was shut down on April 16 for approximately 55 hours to remove additional obstructions from the cushion chamber. An inspection of the cushion chamber at D Reactor revealed that timbers and steel plates had washed loose. These were removed, and repairs are planned during the D Reactor rod outage.

KE and KW Reactors were shut down on April 25, when it was discovered that a section of the KE Reactor outfall line had broken loose from its anchor in the river bed. The line was blanked off, pending completion of repairs in progress at month end, and effluent flow from both reactors was diverted through the KW Reactor line. This incident resulted in a total of approximately 150 outage hours.

At KW Reactor, all front face pigtails were checked during the month for evidence of extrusion, with no extrusion being noted.

A section of the 100-K Area effluent water crib wall was breached on April 3, apparently as the result of overflow when the flow to the crib exceeded the crib seepage capacity. The breach was repaired by Minor Construction forces.

Horizontal rod work during April, in addition to the DR Reactor rod replacement, included: removal of No. 5 rod and thimble at H Reactor, and replacement with a thimbleless rod; removal without replacement of No. 5 rod at D Reactor; and removal from service of No. 6 rod at B Reactor when water was detected running down the near side of the reactor.

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B. Equipment Experience (Continued)

Panellit gage reliability checks at six reactors during April revealed 25 faulty trips as detailed below.

<u>Reactor</u>	<u>High Trips</u>	<u>Low Trips</u>	<u>Misc.</u>	<u>Total</u>
C	1	1	0	2
D	0	0	0	0
DR	1	4	0	5
F	7	1	0	8
H	2	8	0	10
KW	0	0	0	0
Totals	<u>11</u>	<u>14</u>	<u>0</u>	<u>25</u>

The average of approximately four trip failures per reactor represents a small upward trend for the first time in seven months.

On April 5, the No. 2 10,000 HP motor at Building 190-KW failed during a routine pump start-up as the result of a slip ring flash-over. Repairs to the motor, principally to the wires connecting the brushes to the liquid rheostat, were completed on April 21.

C. Improvement Experience

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

PT-105-567-A (Preliminary Irradiation of J-Q Columns)
Most of the tubes originally charged under this test at H Reactor reached an exposure during April approximately equivalent to 1520 megawatt days per ton for uranium tubes which is 87 per cent of the requested goal. The irradiation of tubes proceeded without incident.

PT-105-579-A (Quantity Irradiation of J-Q Columns)
Forty-eight J-Q tubes were discharged at C Reactor with only three tubes recharged J-Q. The month end balance of J-Q tubes at C and H Reactors under this test was 111 and 50, respectively.

PT-105-548-E (C Pile Graphite Burnout Experiment)
PT-105-546-E (The Effect of Helium on D Pile Distortion)
These Production Tests continued without incident at C and D Reactors during April to study graphite conditions.

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C. Improvement Experience (Continued)PT-105-8-MR
Supp. A

(Uranium Charging During Reactor Operations)
Installation of the five-tube facility authorized by this test was completed at C Reactor early in April. Five tubes of regular uranium were successfully discharged and four were recharged during reactor operation. The fifth tube was not recharged with uranium because of failure of the outlet water thermocouple.

Four revised Process Standards - Reactor were approved and issued during April. These were standards titled "Process Tube Outlet Water Temperature Limits - Trip Before Instability," "Reactor Atmosphere - Composition," "Graphite Temperature Limits," and "Handling of Irradiated Enriched (U-235) Slugs." The most significant changes accomplished by these revisions were the raising of the tube outlet water temperature limit at DR Reactor to 105 C as the result of the installation of venturis and Panellit gages with reduced spans which provide greater protection against abnormal tube flows, and the limiting of carbon dioxide concentrations at the K Reactors to a maximum of 75 per cent to control heat transfer characteristics of the reactor and prevent slug melting in the event of complete failure of a front face pigtail.

The report of invention indicated below was submitted during April.

InventorInventionA. K. Hardin
R. D. Schilling

"Front Face Crossheader
Check Valves," Document
HW-34312.

D. Events Influencing Costs

During April, Reactor Section costs were adversely affected by decreased production and increased maintenance costs. Influencing the latter item were the process tube leak testing program at F Reactor, the extensive maintenance work accomplished at DR Reactor during the horizontal rod replacement outage, and maintenance work associated with the start-up of KE Reactor. Total Reactor Section costs were increased significantly in April as the result of inclusion of KE Reactor operating costs.

Reactor Section costs were beneficially affected by an indicated \$43,000 net decrease in essential material costs. Although filter plant chemical costs showed a seasonal increase of \$14,000, decreased coal costs of \$57,000 due to

D. Events Influencing Costs (Continued)

the DR Reactor outage, resulted in the net decrease.

Preliminary estimates indicate that both plutonium irradiation and total irradiation unit costs will be approximately eight per cent higher than March costs as the combined result of the factors mentioned above.

The new record low unit costs which were tentatively forecast for March were not achieved as the result of greater than anticipated maintenance costs resulting primarily from anthrafil replacement at filter plants and Building 190-C pump repairs.

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 W. K. MacCready dated 4/20/55.

CA-431 (100-C Plant)

Western Gear Company has promised completion of the C Reactor horizontal rod shipment by approximately June 10. Efforts continue to achieve an earlier date so that the rods may be installed during a combined B-C Reactor outage coinciding with B Reactor horizontal rod replacement.

CA-512 (100-K Plant)

Technical Section personnel assumed operating responsibility for Building 1706-KE during April. The first shipment of replacement resistance thermometer bulbs has arrived for use on an interim basis until bulbs meeting specifications can be developed. Since start-up on March 11, 63 bulbs have failed. One row of original bulbs has been replaced with interim bulbs to evaluate performance under operating conditions. Samples of Hamlin, Inc., mercury switches that appeared to meet the requirements of the coordinate light system proved to be unsatisfactory. Additional switches will be procured, and when satisfactory, 400 will be evaluated in operation on the pressure monitor system prior to complete replacement of present switches. Construction of the interim effluent crib was completed, and consideration is being given to using the crib on a permanent basis if analyses of test results and wind borne contamination aspects prove to be favorable.

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E. Plant Development and Expansion1. Project Status (Continued)

- CG-558 (Reactor Plant Modifications for Increased Production)
The revised project proposal has been approved by the local Atomic Energy Commission office, subject to schedule approval by the Washington office. The DR Reactor horizontal rod replacement and Water Plant modification work accomplished during the extended outage beginning April 18, is summarized under "Activities." Poison column control facility ball valve production was started, with delivery of the first shipment promised June 10. Production and shipment of pressure monitor gages was stopped in April because of unsatisfactory brass tubing connecting elbows. The remainder of the gages will be made with steel elbows.
- CG-553 (Outlet Tube Temperature Monitor Systems - High Speed Electric Transcribers - 105-D, DR, and F)
An inspection of the transcribers revealed that the null balance detectors were functioning satisfactorily. No further project-sponsored modifications are planned, and a Project Physical Completion Notice was issued.

2. Plant Engineering

A number of engineering and development studies were active in the Section during April. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in Document HW-36575. Several items of interest are reported below.

A radical new method of fabricating perforated aluminum dummies from flat pre-punched aluminum plate, which is subsequently rolled into a tubular shape, has been proposed by a potential vendor. Compressive strength tests show that this new type dummy compares favorably with the present dummy. Significant savings are possible as the result of dummy fabrication in this manner. Approximately 100 dummies of this type are on order for further testing.

A study was made of the Building 165-K pumping system to determine the possibility of significant amounts of air entering the process water system, significantly upsetting the reactivity balance of the K Reactors. Such a situation is considered to be a possible cause for the unexplained power rise at KW Reactor in April as described under "Equipment Experience." It was concluded that significant amounts of air can enter the system under certain, rather improbable, conditions. To minimize this possibility, it

E. Plant Development and Expansion

2. Plant Engineering (Continued)

was recommended that additional bleed-off vents be installed in each pump discharge line. Investigation of the over-all problem is continuing.

A new method of loosening process tubes stuck in graphite is being studied. The method employs a series of grooved steel pieces connected by short lengths of bar stock. An air hammer applies torque to the assembly, with the force being applied to one grooved steel piece at a time. The force travels down the chain of grooved steel pieces only as the tubing becomes loosened at each individual piece. Tubes which resisted a direct axial thrust of 7000 pounds were successfully loosened with this equipment.

F. Significant Reports

1. Routine

Monthly operating reports issued for March were:

HW-35891-A	Reactor Section	W. K. MacCready	4/7/55
HW-36092	Operations Sub-Section	J. H. Warren	4/1/55
HW-36130	Process Sub-Section	O. C. Schroeder	4/1/55
HW-36089	Projects and Personnel Development	F. A. R. Stainken	4/1/55
HW-36063	Radiation Monitoring Sub-Section	P. C. Jerman	4/4/55
-	Maintenance Sub-Section	E. E. Weyerts	4/5/55
HW-36061	Power Sub-Section	J. C. McLaughlin	4/5/55

Other routine reports issued during April included:

HW-36313	"Monthly Progress Report, Reactor Section Expansion, April, 1955"	J. P. Langan	4/22/55
-	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	F. A. R. Stainken	4/20/55
HW-36182 RD	"Reactor Section Savings and Improvement Report, January to March, 1955"	W. K. MacCready	4/12/55
HW-36026	"Reactivity Balance and Associated Data - Period March, 1955"	R. E. McGrath	4/1/55

2. Non-Routine

HW-35656	"Initial Operation of The K Reactors"	W. K. MacCready	3/7/55
HW-36013	"Operational Aspects of the KW Reactor Activation"	D. S. Lewis	4/1/55
HW-35734	"Pigtails for K Reactors"	W. K. MacCready	3/11/55
Con.Undoc.	"KW and KE Interim Operating Limit"	W. K. MacCready	4/15/55
HW-34855	"Process Test MR-105-27, Reactor Purge With Five Per Cent Chromic Acid Solution"	A. K. Hardin	2/2/55
		R. H. Gay	

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F. Significant Reports2. Non-Routine (Continued)

HW-36197 "General Instructions for Operating
Suppressor and Related Equipment -
Hanford"

HW-35928 "Large Capacity J-Shipping Casks"

N. V. Starkebaum 4/18/55
J. W. Sowards 3/25/55

III. PERSONNELA. Organization

There were no appointments in the Reactor Section during April.

Studies are in progress to determine manpower requirements for the operation of White Bluffs facilities. At month end, one Power Sub-Section operator was assigned during the day shift.

B. Force Summary

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Operations	369	371	2
Maintenance	608	614	6
Projects & Personnel			
Development	42	44	2
Power	487	483	- 4
Process	67	69	2
Radiation Monitoring	82	82	0
Section Total	1657	1665	8

Changes during January included 18 transfers into the Section, 10 transfers out of the Section, 11 new hires, nine terminations, no reactivations, and two deactivations.

C. Safety Experience

There were no Major Injuries in the Reactor Section during April. One Sub-Major Injury No. 275, occurred at KW Reactor on April 18, when a Radiation Monitor Journeyman incurred a fractured toe when a paraffin filled moderator weighing seven pounds fell four feet from a shelf and struck his foot.

D. Radiation Experience

There were no Class II Radiation Incidents in the Reactor Section during April. One Class I Radiation Incident, No. 442-R, occurred at the 100-D Area burial ground on April 20, when a Maintenance Sub-Section rigger, who was pulling a wire attached to a thermopile assembly being unloaded from a cask, jumped across the burial trench through a radiation field of 20 r/hr in order to achieve an improved pulling position when the assembly became stuck part way out of the cask. This incident is reported in detail in Document HW-36441.

E. Personnel Activities

C. W. Botsford, W. E. Cawley and J. E. Robb of the Process Sub-Section and S. L. Nelson of the Operations Sub-Section attended the 1955 Conference on Nuclear Engineering at the University of California at Los Angeles during April 27 to 29. Mr. Cawley presented a paper on a boron fluoride control rod, Mr. Robb one on the practical aspects of power reactor hydraulics, and Mr. Nelson one on the heat recovery system at 100-K Area.

J. D. McCullough of the Projects and Personnel Development Sub-Section and J. R. Crabbe of the Process Sub-Section visited the plant of Panellit, Inc., at Skokie, Illinois, on April 14 and 15, to observe pressure gage inspection techniques and gather information which would aid maintenance operations at Hanford.

G. V. R. Smith and R. D. Miller of the Projects and Personnel Development Sub-Section attended a course on "Human Relations in Man Management and Supervision" sponsored by the Yakima Chamber of Commerce and the Pacific Northwest Management Association in Yakima, Washington on April 27.

H. A. Kramer of the Maintenance Sub-Section attended the annual meeting of the Western Snow Conference at Portland, Oregon during April 13 to 15.

Twenty-nine showings of the film "It's Everybody's Business" in all of the 100 Areas were attended by approximately 520 Reactor Section and other 100 Area employees.

Seven members of Reactor Section supervision attended the first presentation of the Job Methods Improvement course

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E. Personnel Activities (Continued)

conducted by the Education and Training Section. Four two-hour sessions are included in the course.

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

Richland, Washington
May 5, 1955

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
APRIL, 1955

I RESPONSIBILITY

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

II ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	<u>April</u>		<u>March</u>	
	<u>Normal</u>	<u>Acid Wash</u>	<u>Normal</u>	<u>Acid Wash</u>
Charges started in Canyon Bldgs.	44	0	56	4
Charges completed in Conc. Bldgs.	44	0	56	1
Special charges - Conc. Bldgs.		9		18
Charges completed-Isolation Bldg.		87		213
Average Waste Losses, %		3.2		4.3
Special charges-Isolation Bldg.		21		23
Material balance, %		101.5		103.9
Yield through Process, %		98.3		99.6
Average cooling time (days)		90		119
Minimum cooling time (days)		75		64

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b. Redox OperationsDECLASSIFIED
WITH DELETIONS

	<u>April</u>	<u>March</u>
Equivalent charges started	265.7	133.9
Charges completed	229.0	127.8
Tons Uranium delivered to storage	187.5	245.4
Average Production Rate per operating day, Tons	7.8	8.6
Average Daily Operating Rate for the month, Tons	6.3	7.9
Average yield, %		
Uranium	97.9	98.8
Plutonium	100.8	100.2
Total Waste Loss, %		
Uranium	0.90	0.46
Plutonium	1.31	0.82
Average cooling time, days	147	82
Minimum cooling time, days	82	76
Percent down time	19.7	8.1

c. 231

	<u>T</u>	<u>S</u>	<u>Z</u>	<u>Total</u>
Batches started	49	47	11	107
Batches completed	50	47	11	108
Batches awaiting processing	3	0	0	3
Average yield, %	88.1	92.0	-	-
Average Recycle, %	9.3	6.2	--	-
Average Purity, %	96.4	96.4	-	--

d. 234-5 Operations

	<u>April</u>	<u>March</u>
Batches completed through Task II	111 (353.8)	0
Runs completed through Task III	44	0
Reduction yield, RM	97.1	0
Waste Disposal, units	7.9	0

e. UO₃ Operations

	<u>April</u>	<u>March</u>	<u>To Date</u>
Uranium drummed, Tons	342.49	367.10	9335.36
Uranium shipped, Tons	349.35	342.87	9293.75
Average cooling time, days (Redox)	147	90	
Minimum cooling time, days (Redox)	82	81	
Waste loss, %	0.02	0.02	

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f. TBP Operations

	<u>April</u>	<u>March</u>	<u>To Date</u>
Tons received from Metal Removal	151.12	169.79	5262.79
Tons shipped to UO ₃ Plant	146.14	165.05	5088.99
Average Production Rate per operating day, Tons	5.17	6.53	
Average Daily Operating Rate for the month, Tons	4.87	5.32	
Average yield, %	95.79	97.99	
Total Waste Loss, %	2.14	2.39	
Ratio Actual Waste Volume to Theoretical Volume, %	59	63	
Percent Down Time	5.83	15.05	

g. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	1 790	6 156
Filtered water pumped, gpm	513	1 000
Steam generated, lbs/hr	41 722	192 000
Maximum steam generated, lbs/hr	70 000	282 000
Total steam generated, M lbs.	30 039	138 479
Coal consumed, tons (est.)	1 803	8 272

h. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>April</u>	<u>March</u>
Metal Waste reserve storage capacity - T Plant	219	289
1st Cycle reserve storage capacity - T Plant	609	681
Metal Waste reserve storage capacity - B Plant	685	685
1st Cycle reserve storage capacity - B Plant	74	74
Redox Waste reserve storage capacity	939	1114

2. Activities

a. Redox Processing

A total of 187.6 tons of uranium were produced this month exceeding the production forecast by 7%. Considerable difficulty was experienced with high plutonium waste losses throughout the month and subsequent reworking of some of the waste forced rate reductions below 9.5 tons of uranium per day for considerable portions of the month.

Tests using an acid deficient flow sheet in the plutonium cycles resulted in several batches of high waste being received in D Cell at the beginning of the month. This forced a short building

a. Redox Processing (Continued)

shutdown to segregate waste and limited production during the post startup period to about 5 tons of uranium per day due to necessity of blending the rework material with normal head-end feed. Following processing of all rework material, rates were maintained at 7 tons of uranium per day, due to a partial plug in the D-12 tower, until the planned shutdown on April 9 to change over from low MWD to high MWD metal. During this shutdown, the new plutonium concentration building, 233-S was tied into the process stream.

Rates were raised to 9 tons of uranium per day following startup on April 14. Production was interrupted briefly (45 minutes) on April 15 due to loss of the organic head tank supply pump and again on April 16 when a 6 hour shutdown was necessitated by occurrence of high plutonium waste losses. Four batches of D-9 (salt waste) material had to be reworked after startup on April 16, keeping the production rate to a maximum of 6 tons of uranium per day for a two day period. On April 21, the electrical jumper to the new G-1 (organic surge tank) pump developed a ground which caused a twelve hour building shutdown while repairs were effected. Rates were brought to 9.5 tons of uranium per day following these repairs and were maintained until April 29 except for one hour outages on April 24 and April 27 due, in both cases, to failure of the organic head tank supply pump. On April 29 rates were reduced to 6 tons of uranium per day when unexplained persistently high plutonium waste losses made rate reduction appear advisable. These lowered rates were maintained through month end since the high waste losses continued to be a problem.

The 233 Building (plutonium concentration) was placed into operation on April 15, with no serious process difficulties encountered. It's throughput capacity is apparently well above the present canyon capacity. Contaminants, chiefly iron, have been of concern because of process difficulties in subsequent operations and an investigation is underway to determine the cause and elimination.

b. Metal Recovery1) TBP Processing

The TBP Plant operated continuously at a rate of 6 tons per day until April 27 when declining feed supplies, due to clean-outs of the 104-BX, 111-BY and 107-TX tanks, were experienced, forcing a rate reduction to 3.5 tons per day. It was necessary to shut down the second cycle operation for 42 hours in this period because of the feed problem. The commitment of 135 tons was exceeded by 11.14 tons.

2) UO₃ Processing

The UO₃ Plant operation was normal with production being limited only by the availability of feed material.

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2) UO₃ Processing (Continued)

Three tank truck batches of 60 percent UNH were shipped to the 300 Area for use in continuous calciner studies. Twenty-four full drums of UO₃ were returned from the 300 Area and this material was blended into regular production and shipped off-site.

3) Waste Metal Removal

During the month 104-BX tank was emptied and was being cleared at month-end for inspection. The 111-BY tank contained an estimated 10 ton heel and sluicing was resumed on April 28. Sluicing in 107-TX tank continued through April 29 when low pick-up prompted removal of equipment to 105-TX tank. 107-TX will be inspected for heel content. As a result of these changes the overall removal rate was adversely affected. Removal of new metal wastes began in UR tank farm from 101-UR tank on April 29.

c. T Plant Processing

The restrictions imposed by the problem of excessive I¹³¹ emission and the completion of Production Test 200-2, Supplement A, severely limited production during the month. Under these conditions the plant was able to produce approximately 60% of the schedule and 66% of the production commitment. Since the gross I¹³¹ emission on March 17 (90 curies), a controlled dissolver operation has been maintained in an effort to determine the source of the trouble. With this procedure in effect, the I¹³¹ emissions have averaged 1.5 curies per day. In addition to the iodine problem curtailing production rates, the completion of processing 16.7 short tons of special 300 MWD/T uranium metal for special tests in determining basis for predicting the irradiation level of uranium, also curtailed production rates.

d. Isolation and Metal Fabrication

The Isolation Building continued to process all low MWD/T material which, during the first part of April, was shipped from both the Redox and T Plant facilities. Production commitments were met without difficulty and since April 18th operation of the Isolation Building was limited to the day shift only. In addition to normal commitments 18 special runs of controlled 300 MWD/T material were processed and transferred to the Fabrication Building for conversion to Plutonium Oxalate and delivery to the Engineering Department for continuation of special studies.

The production commitment for the metal fabrication facility was met for the month of April, even though production was confined to the latter part of the month in order to permit completion of the new Task I and Task III facilities.

d. Isolation and Metal Fabrication (Continued)

Material to test the operating characteristics for the new Task I was provided by the 21 runs of sample can material which was set aside prior to the shutdown in January. A number of difficulties such as slow chemical additions, faulty agitation, leaking valves, and other problems similar to those encountered during the testing of new equipment were discovered and work was initiated toward their correction. Similar problems associated with the startup of new Task III equipment were revealed and largely corrected.

3. Special Operations

a. Waste Evaporators

The evaporation of TBP waste at the 242-T facility proceeded satisfactorily during the period with 295,625 gallons being processed with a 54.6 percent volume reduction. The 242-B facility remained in standby.

b. Plutonium Recovery, Metal Fabrication

During the latter part of the month plutonium recovery operations were resumed on a limited basis.

4. Schedule Variance

Redox production exceeded forecast by 7 percent while T Plant due to the I^{131} problem produced only 60 percent of its goal schedule. Production was maintained in the Isolation and Fabrication facilities as scheduled.

All production forecasts in Metal Recovery were exceeded, and nine carloads of UO_3 were shipped during the month.

B. Equipment Experience

1. Operating Continuity

Redox downtime amounted to 141 hours (80.4% operating efficiency) due mainly to changeover from processing low MWD to high MWD metal and the accompanying tie-in of the 233-S Building.

Lost time of approximately 42 hours on the second cycle-TBP operation was due to low feed supplies from the tank farms. 241-TXR was down 42 hours this month for 107-TX tank pump failure repairs, changing sluice nozzles and backflushing the 001 accumulator pump.

The majority of equipment problems in the Fabrication Building were related to the shakedown of the new facilities and the need for correcting equipment defects encountered in time to prevent interference with the production schedule. There were no equipment

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1. Operating Continuity (Continued)

failures which affected the meeting of commitments during the month of April, although start-up difficulties with Task I and Task II made it necessary to maintain a higher than normal backlog of material between Redox and Z Plant.

In T Plant, no lost time was accredited to equipment troubles, but potential processing time was reduced by the I^{131} problem and processing of special 300 MWD test material.

2. Inspection, Maintenance and Replacement

a. Cell Equipment Replacements - Redox

During a 98 hour shutdown starting April 8 for tie-in of the 233 Building, cell equipment replacements included jumpers for H-4 weight factor, H-7 agitator power, F-8 thermohm, and the LAW letdown valve that limited rates last month. Five jumpers and a valving system, that permit pumping H-1 to either F-7 or F-8, were installed in F cell. Three jumpers and a shortened G-1 pump were installed in G cell to permit decantation of the organic surge tank (G-1) to the organic still (G-3).

b. 3-5L Reactor Replacement - T Plant

The 3-5L dissolver was reactivated on 4-19-55 after having been out of service since 2-23-55 because of cooling coil leaks. During the sustained shutdown the cooling coils and silver reactor were replaced. The original silver reactor had been used to replace a defective reactor on the 4-5L dissolver in trying to solve the I^{131} emission problem.

C. Improvement Experience

1. Process Tests and Revisions

a. Iodine Emission

1) Redox

Upon the completion of the low MWD program and subsequent startup on well aged material, a noticeable drop in iodine emission from the stack was encountered. Efforts are being made to develop an effective program to determine what process variables affect the efficiency of the silver nitrate reactors, what the efficiency of the reactors is, where the emissions originate, and what control and indicating devices can be installed which will permit operation of the dissolvers in a satisfactory manner. The average I^{131} emission was 1.2 curies per day, however the average emission was less than 1 curie per day during the last half of the month.

2) T Plant

An intensive program was initiated to determine the cause of the high I^{131} emissions. The first step was to install additional samplers in the off-gas system to determine the source of the emissions. With these additional sampling points established, a program of controlled dissolver operation has been followed and dissolver operations were staggered to associate any iodine emission with specific processing conditions. Although a step by step check of dissolver operations indicated initially that the major I^{131} emission occurred during dissolving, recent data indicates high I^{131} emission during coating removal. Several changes in the dissolving procedures were initiated in an attempt to establish the source of the trouble. The concentration of the nitric acid charged at the beginning of dissolving was reduced from 60 to 50%, and the uranium metal was removed in three cuts instead of two until experience showed that the two cut procedure could again be used. Since adopting this procedure the I^{131} emission averaged 1.5 curies/day. It should be noted that during this period of controlled dissolving, the uranium metal cooling period increased from 75 days to 90 days, which decreases the total I^{131} present in the uranium.

b. Waste Scavenging - Metal Recovery

TBP in-process waste scavenging was continued without significant improvement. It was necessary to store approximately 700,000 gallons of scavenged supernatant for subsequent re-working or evaporation. Approximately 707,000 gallons of scavenged supernatant were satisfactory for disposal to the BY #3 cavern. The addition of calcium nitrate to the TBP waste was initiated in the plant late in the month. Laboratory results indicate that the formation of a calcium phosphate precipitate will reduce Sr^{90} activities by a factor of 2 to 6.

c. Pot Caking - UO_3

Some pot caking was experienced during the first week, requiring nitric acid dissolution treatment. The reason is believed due to a combination of somewhat higher sulfur content in the feed which, in combination with the sulfamic addition being added for higher reactivity, has produced this condition. Pot caking and reactivity tests will be continued.

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.

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D. Events Influencing Costs

Although 50 employees were added to the Section's roll during the month, the labor cost associated with this increase in personnel is expected to be more than offset by the reduced essential materials cost associated with the decreased production at T Plant, due to the lowered production encountered while correcting the I¹³¹ problems, and Redox due to downtime encountered while switching from high to low MWD material. Total Section costs are expected to be five percent lower in April as compared to March.

E. Plant Development and Expansion

1. Project Status

a. Project CA-513-A - Purex

Construction status at month end was 99.0 percent complete. Ready for operation date is estimated to be October 1. On April 13, all Blaw-Knox contractor personnel remaining in the 202-A Building were removed, leaving Minor Construction to complete the balance of construction work. It is anticipated that the AEC will transfer project administration responsibilities to General Electric Company (Engineering Department, Project Section) in the near future.

A through E Cells were made available to the Manufacturing Department for calibration and operability tests. The remainder of the canyon and the sample gallery are scheduled for completion of exception items early in May.

b. Project CG-598 - Vacuum Acid Fractionator - Purex

On April 16, the General Electric design portion of the project was 42 percent complete. Drawings pertaining to piping tie-in to 202-A Building were approved so that Minor Construction can complete this phase of the work.

The Lummus Company equipment design package was approved during April.

Overall project completion is scheduled for January, 1956. This late completion date will necessitate operation of the canyon fractionator at atmospheric pressure with consequent high equipment corrosion rates.

c. Project CG-613 - UO₃ Expansion

The design criteria for the overall expansion program has been approved by AEC. Previously authorized funds of \$340,000 for purchase of critical items has been spent and an additional

c. Project CG-613 - UO₃ Expansion (Continued)

\$1,100,000 has been authorized. Most of the additional funds will be consumed in the Struthers-Wells contract for calciners. Detail design work is approximately 2-3 weeks behind schedule for a March 1, 1956 project use date.

d. Project CG-535 - Redox, Phase II

The 233, final product concentration facility, was placed into operation on April 15. Although the silica gel facility has not been completed, work orders were issued to Minor Construction and plant forces to complete the exceptions so that the project as a whole could be closed out.

e. Project CG-496 - Recuplex

Minor Construction completed project work on April 1, and their portion of start-up items on April 11. Plant Maintenance forces assumed responsibility for maintaining the equipment and performing additional start-up modifications. Maintenance items most common during shakedown have been repairing leaks, repairing ruptured diaphragms in transfer valves, and rebalancing all agitators. The shakedown of Recuplex facilities with radioactive stand-in material is tentatively scheduled for the latter part of May or the first week in June, 1955.

f. Project CG-549 - Task I Reactivation

Acceptance of Task I facilities from Engineering, was made on April 4, and Task I equipment was activated with process material. Generally, the equipment is functioning satisfactorily. Improvement in the vessel agitation, improvement in the Reactor Vent System, installation of chemical feed pumps for control of feed rates, and improvement of boat station gaskets are in progress.

g. Project CG-551 - 234-5 Building Expansion

Shakedown of Task III equipment with process material continued during the month. Exceptions to the acceptance test of March 27, are in progress of being completed. Generally the equipment is operating satisfactorily and process data are being accumulated to establish the most efficient production flow and equipment characteristics. Final Inspection Facilities are occupied by Technical Personnel and have been satisfactory.

h. Project CG-603 - 4X Program

A revised project proposal, including all work necessary to rehabilitate B Plant on a standby basis, T Plant modifications and waste scavenging for the 200 East and West Areas was prepared and submitted to the AEC for information purposes only. An accompanying letter was attached to

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h. Project CG-603 - 4X Program (Continued)

the proposal recommending the cancellation of work for B Plant rehabilitation. However, informal notification has since been received to proceed with rehabilitation of B Plant as scoped, with the exception that the completion date is to be relaxed from September 1 to January 1, 1956. The revised project proposal is now being processed in the normal manner.

Rehabilitation of the B Plant by Minor Construction forces is continuing satisfactorily. It is estimated that the Part I portion of Project CG-603 is approximately 45% complete.

2. Manufacturing Engineering

a. Standards

With the completion of the labor standards for the T Plant Sub-Section the re-engineering of the operating manpower standards for the entire Section was concluded. A special report on this activity will be issued soon. The labor requirements for the 222-S and the 234-5 laboratories will be completed in May. The essential materials and the analytical service standards for the 234-5 Building were revised. Charts which illustrate standards and variances for manpower, essential materials, analytical service and steam during this fiscal year were completed.

b. Work Simplification

The Series #3 Work Simplification Program is 70% complete with improvements on 13 jobs already accepted out of the 39 different jobs under study.

c. Maintenance Cost Control

An evaluation of the preventive maintenance systems in use in all Separations plants has been started to determine their economic effectiveness. This is the first step in a long range program to improve cost control of all maintenance activities in the Section. Changes as required in the preventive program will be instituted, and a work measurement program will be established in all locations to provide a yardstick for the determination of maintenance performance. In view of its importance it is expected that all field Industrial Engineers will be assigned to this study for several months.

d. Engineering Assistance

1) Cask Car Study

Modification of one car to be used for test purposes has been

1) Cask Car Study (Continued)

delayed due to the inability of one vendor to supply parts at the requested date. A careful study of monitoring surveys has revealed the general mechanism of contamination. From this knowledge several means of temporary control are under consideration.

2) U Plant Vessel Vent Fan

An evaluation of the vessel vent fan system revealed inadequate liquid trapping facilities ahead of the fan inlet. A new large capacity header with a positive full flow seal pot was designed and fabricated for installation to eliminate all possibility of liquid contact with the fan.

3) Design and Drafting

New designs were completed on a seal pot and header system for 221-U vessel vent system, and a smoke generator for ventilation checking. Scope drawings are underway for a revised off-gas reactor and rejuvenating facilities. Progress continues on the as-built program.

e. Property Management

Responsibility for control of graphite fabrication equipment being held for the AEC in the 2101-M Building was relinquished to the Purchasing and Stores Section on April 22. Management of this function by the above Section can be accomplished more conveniently since operation of the spare parts inventory within the same building is under their jurisdiction with full-time personnel assigned.

F. Reports Issued1. Routine

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-36536	Separations Section Redox Plant Sub-Section Monthly Report - April, 1955	R.T. Jessen
HW-36514	Separations Section Metal Recovery Plant Sub-Section Monthly Report - April, 1955	T. Prudich
HW-36534	Separations Section T Plant Sub-Section Monthly Report - April, 1955	C.T. Groswith
HW-36483	Separations Section Z Plant Sub-Section Monthly Report - April, 1955	W.N. Mobley
HW-36498	Separations Section Analytical Control Sub- Section Monthly Report - April, 1955	L.M. Knights
HW-36516	Separations Section Radiation Monitoring Sub- Section Monthly Report - April, 1955	A.R. Keene

1. Routine (Continued)

<u>Number</u>	<u>Subject</u>	<u>Author</u>
Official Use Only	Separations Section Projects & Personnel Development Sub-Section Monthly Report - April, 1955	O.V. Smiset
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - April, 1955	C.P. Cabell
HW-36520	Separations Section Purex Plant Sub-Section Monthly Report - April, 1955	V.R. Chapman
HW-36065	Essential Materials Consumption for T Plant March 1955	G.E. Cooper
HW-36066	Essential Materials Consumption for TBP Plant March 1955	G.E. Cooper
HW-36067	Essential Materials Consumption for Redox Plant - March 1955	G.E. Cooper
HW-36068	Essential Materials ordered April 1 to April 30, 1955	D.E. Peterson
HW-36069	Essential Material Area Report to Cost and Purchasing, March 1 to March 31, 1955	G.E. Cooper
HW-36001	Separations Section Waste Status Summary, March 1955	D.E. Peterson
HW-36042	Separations Section Contact Engineering - 4X Program Monthly Report, March 1955	S.G. Smolen
None	Status of Projects, Informal Approval Requests, and Budget Items, April 1955	R.M. Shervem
HW-36272	Analytical Control Quality Report - April 15, 1955	L.M. Knights by D.T. Crawley
HW-36405	Separations Section Process Council Minutes	L.W. Finch

2. Non-Routine

HW-36425	Potential Nitrate Decomposition - High Level Waste Storage	C.R. Anderson
HW-33589	Manual of Standard Practices - 202-A Building	B.E. Clark, Jr. et al
HW-36077	Redox Process Discussion Meeting	O.F. Beaulieu
HW-36112	IL31 Emission Problem - Bismuth Phosphate Plant	W.G. Browne
HW-36138	Essential Material Flow Sheet of Precipitation Separations Process - April 1, 1955	W.G. Browne by H.W. Murray
HW-36396	Radiation Incident, Class I, No. 439	C.E. Davis
HW-36432	Radiation Incident, Class I, No. 444-C	C.E. Davis
HW-36299	Radiation Incident, Class I, No. 438	D.R. Koberg
HW-36452	Radiation Incident, Class I, No. 445-C	W.G. Westover
HW-36527	Radiation Incident, Class I, No. 449-C	D.R. Koberg
HW-36050	A Justification for Additional Waste Storage Tanks as Influenced by 25 MGS Product	D.E. Peterson
HW-36423	224-U Condensate Flash System	G.K. Carpenter
None	Analytical Service Standard for the UO ₃ Plant	R.H. Silletto

DECLASSIFIED**2. Non-Routine**

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-35857RD	Labor Standard for the 231 Building Operations Unit	V.P. Madsen
HW-35858RD	Labor Standard for the 234-5 Building Operations Unit	V.P. Madsen
HW-35859RD	Labor Standard for the Z Plant Services Unit	V.P. Madsen
HW-36296RD	Essential Material Standard for the 234-5 Building	R.H. Silletto
HW-36297RD	Analytical Service Standard for the 234-5 Building	R.H. Silletto

III PERSONNEL**A. Force Summary**

	<u>Start of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Redox Plant Sub-Section	233	232	-1
Metal Recovery Plant Sub-Section	304	291	-13
Z Plant Sub-Section	175	173	-2
T Plant Sub-Section	247	233	-14
Purex Sub-Section	137	203	/66
Power & Maintenance Sub-Section	326	326	0
Projects & Personnel Development	62	62	0
Analytical Control Sub-Section	185	203	/18
Radiation Monitoring Sub-Section	174	174	0
Section Total	1845	1899	/52

B. Safety Experience

There were no major or sub-major injuries in the Separations Section in April. At the close of the month, both 200 Areas had operated 549 days without a lost time injury, an outstanding achievement since it involves approximately 7,000,000 exposure man-hours.

C. Radiation Experience

Five Class I radiation incidents occurred and included: (1) an estimated millicurie of plutonium was spread in cell 2, 231-Z with no detected personnel contamination involved, following a boilover from a process kill in the OT-1 tank (No. 445-C); (2) plutonium contamination to the hands (50,000 d/m) and to the left jaw (1,000 d/m) of a 222-S laboratory assistant when subject employee failed to perform the prescribed survey of a process sample container (No. 438); (3) uncontrolled exposure to two process operators, less than the weekly permissible limit, while sampling at the 11-6 pH meter sample port in

C. Radiation Experience (Continued)

the 221-U canyon building without prescribed monitoring coverage (No. 439); (4) UO_3 powder contamination to the face and hair (5,000 d/m) of two process operators in the 224-U Building when an unexplained vapor emission occurred during routine calcining operations in pot No. 3, blowing a riser cap off, permitting the escape of a cloud of UO_3 powder (No. 444-C); (5) plutonium contamination to the hand and wrist (up to 10,000 d/m) of a supervisor in the 202-S sample gallery which was not detected for approximately one hour following the use of a pair of contaminated gloves (40,000 d/m) (No. 449-C).

Daily emission of I^{131} from the T and S Plant stacks averaged 1.5 and 1.2 curies respectively. The C-3 reactor in the 202-S Building was replaced last month and subsequent regeneration of the replacement reactor has resulted in controlled emissions of I^{131} . The primary source of I^{131} emissions in the 221-T Building has been defined as being the 3-5R dissolver system. Special samples are to be taken across the system to determine the efficiencies of the various pieces of equipment.

D. Personnel Activities

1. Personnel Programs and Training

During the month the training program activities were as follows:

<u>Program</u>	<u>Attendance</u>
<u>For Exempt Roll:</u>	
Supervisors Safety Training	18
<u>For Non-Exempt Roll:</u>	
Process Training Meetings	81
Orientation	52
GE Selection Evaluation	5 (4 P&M, 1 Purex Operations)
Nine-week Instrument Training	9
Radiation Monitoring	11

A seven-point supervisory training and development program was drafted for the Section and at month end it was being reviewed by each Sub-Section for acceptance or revision prior to its early adoption.

2. Procurement

At month's end there are requisitions for sixty non-exempt employees (thirty laboratory assistants, twenty craftsmen, and ten clerical personnel) on file with Employment. Fifty new employees were received during the month.

CLASSIFIED3. Visitations

P. J. Norderhus attended a conference in Seattle presented by the Industrial Sanitation Counselors on the subject of Work Standards for Sanitation Cost Control.

H. A. Moulthrop and L. M. Meeker attended a Man-Management Conference at Yakima, Washington on April 27th.

Mr. Walter J. Lindsey, from the AEC, Washington, D.C., visited the 234-5 Building on April 21, 1955. Production capacity and need for the RG Line were among the subjects discussed with him.

May 5, 1955

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

April, 1955

ACHIEVEMENT

Operating Experience

Power Statistics (See last page for details)

Plant Contract

Probable time of April Peak . . .	4:00 - 4:30 p.m., April 6
Telemetered Peak demand for April	176,000 KW
Probable energy consumption for April	95,233 MWH
Billing demand for April.	201,000 KW
Actual BPA Metered Peak demand for March.	149,864 KW
Actual BPA Metered energy consumption for March	90,809 MWH
Average Monthly energy consumption this FY	
through March.	74,884 MWH

BPA System

At 10:30 a.m. on April 11, system frequency momentarily dropped to 56 cycles with an attendant dip in voltage. Voltage returned to normal. The frequency came up to 57 cycles for five minutes; momentarily to 59.84, then back to 59.3 cycles for approximately 9 minutes before returning to normal. A critical "Y" condition was established for all areas at 10:32 a.m. and released at 10:48 a.m.

Again at 9:03 a.m. on April 12, system frequency dropped to 57.9 cycles. A critical "Y" condition was established at 9:04 a.m. in all areas. Frequency and voltage were normal again at 9:09 a.m. with indication from BPA that stability had been regained. The "Y" condition was released at 9:20 a.m. Again at 9:30 a.m., a system surge occurred and the frequency dropped to 58.8 cycles; after about one minute recovered to 59.4 cycles and at 9:34 a.m. was again normal. In this instance, no "Y" condition was established.

In each of the three instances, the McNary-Santiam and the McNary-Troutdale lines, carrying approximately 550 MW, relayed out of service. The reason was subsequently found to be due to blown fuse in a potential transformer circuit at Santiam station.

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BPA has been officially asked to indicate what additional system disturbances they expect from the current heavy line loading out of McNary.

HAPO System

On April 12, power to the Army Camp located southwest of 100-D was off for approximately two hours from 11:28 p.m. Primary fuses at the point of tap in 100-D were found blown.

The line near the camp had been faulted by a weather balloon being released by Army personnel. A high wind prevailing at the time blew the balloon against the conductors, forcing them together. Although weather balloons are released routinely at this location, it is highly improbable such an incident will reoccur. The balloons carry no metallic attachments that might cause arcing.

* * * * *

At 11:15 a.m., April 18, 1955, an Electrical Utility digger truck struck an overhead 26 pair telephone cable with its auger shaft as it crossed a road while digging a series of pole holes in the 100-B Area. Two telephone circuits were interrupted and the blow caused two wires of a 2300 volt electrical fence circuit line to swing together tripping the terminal breaker. Total damage amounted to \$125.00 repairs to the telephone cable.

* * * * *

On April 21 at 11:10 a.m., two fuses on the normal supply transformer bank at 184-B blew. Motors fed from the emergency circuit at 190-C were being started at the time. Loads were carried on the emergency generators until the fuses were replaced. Circuit breaker relay coordination is being checked by the area maintenance people. The possibility that the fuses had been previously fatigued is also considered as a partial cause.

* * * * *

At 5:32 a.m., April 30, one of the 13.8 KV circuits to 190-DR relayed out of service, and was restored to service at 5:35 a.m. The cause was due to a defective motor in 190-DR.

* * * * *

Excluding trouble originating on BPA system, there were no production losses from loss of power to Critical Loads during the month.

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HW-36440

Equipment Experience

At 12:36 a.m., April 25, a 2300 V aerial sectionalizing switch in the 300 Area was reported to be arcing. The condition was investigated and the switch was isolated by switching. No load was dropped. This was the second time this switch had given trouble within a year. It was replaced with one of better design recently removed from service in 100-B by Project CG-558.

Events Influencing Costs

Overtime hours expended were approximately 2.8% of the total hours worked. Attendance for the month was 97.1%.

The Power Contract billing from BPA increased approximately \$62,000 this month as the scheduled contract demand raised from 159,000 KW to 201,000 KW for 100-KE operational power. By contract schedule, the 201,000 KW level drops back to a 176,000 KW contract demand in July, 1955.

Plant Development and Expansion

On Project CA-586, the locations of control cable for the OCB at the 100-K Switching Station were surveyed to determine the available space in the tunnel between 100-KE and 100-KW. The 230 KV control panel for this breaker will be located in 165-KE. Design attention was directed to the possible need for a switching arrangement on what will be the infrequently used portion of the #3 - 230 KV line between the east end of Gable Mountain and the 100-K tap to insure proper carrier relaying.

* * * * *

The site clearance work (Project CG-558) in the vicinity of 190-D was completed.

Following the moving of the transformers and their reconnection by Minor Construction Forces at 190-DR, Substation Maintenance forces performed proof tests and restored them to service.

* * * * *

On April 7, personnel of this Section, formerly occupying offices in 2704-E, was moved to the new headquarters in 2101-M building. The schedule for the line and substation maintenance people and shops is dependent on modification of space in 2101-M building by plant forces.

* * * * *

HW-36440

BPA test equipment was brought to the plant from Ross substation at Vancouver by Transportation personnel preparatory to the performance of 13.8 KV and 4.16 KV staged fault tests at 100-KE.

* * * * *

ORGANIZATION AND PERSONNEL

Force Summary

April

Exempt Personnel	17
Dispatchers	5
Electricians	12
Linemen	21
Substation Operators	31
Secretary	1
Stenographer	1
Clerk	1
Storekeeper	1
Draftsman	<u>1</u>
	91

During the month, there was one addition to the exempt personnel and one lineman was removed from payroll because of illness.

Safety Experience

Two minor injuries occurred.

Radiation Experience

No incidents were reported.

Personnel Activities

A conference conducted by the Engineering and Operating Section of the Northwest Electric Light and Power Association in Spokane on April 13-15 was attended by L. H. Holden.

* * * * *

Es-4

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HW-36440

In addition to comments by the writer regarding the Section performance for the previous month; a film relative to Chest X-ray was shown at the monthly informative meeting.

* * * * *

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ELECTRICAL UTILITY SECTION

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

	ENERGY - MW HRS.		MAXIMUM DEMAND-KW		LOAD FACTOR-%	
	Last Month	This Month	Last Month	This Month	Last Month	This Month
230 System						
A-2 Out (100-B)	26530	25470	44200	46000	80.7	76.9
A-4 Out (100-D)	16010	14150	24700	26600	87.1	73.9
A-5 Out (100-H)	9230	9710	15500	15000	80.0	89.9
A-6 Out (100-F)	10185	7180	14800	14100	92.5	70.7
A-7 Out (100-KW)	16032	18096	47000	38500	45.8	65.3
A-8 Out (200 Area)	6290	5720	10500	10050	80.5	79.0
A-9 Out (100-KE)	1680	11280	13000	47500	17.4	33.0
TOTAL OUT	85957	91606	169700**	197750**	68.1	64.3
MIDWAY IN	87195	92502	145600*	172000*	80.5	74.7
115 KV System						
BB3-S4 Out (300 Area)	2504	2320	4400*	4336*	76.5	74.3
66 KV System						
B9-S11 Out (100-K)	144	90	400*	240*	48.4	52.1
B7-S10 Out (W. Bluffs)	345	261	900*	810*	51.5	44.7
Hanford Out	58	49	300**	300**	26.0	22.7
TOTAL OUT	547	400	1600**	1350**	46.0	41.2
HANFORD IN	536	411	1500*	1300*	48.0	43.9
Project Total						
230 KV Out	85957	91606	169700**	197750**	68.1	64.3
115 KV Out (300)	2504	2320	4400*	4336*	76.5	74.3
66 KV Out	547	400	1600**	1350**	46.0	41.2
TOTAL OUT	89008	94326	173900**	203436**	68.8	64.4
230 KV In	87195	92502	145600*	172000*	80.5	74.7
115 KV Out (300)	2504	2320	4400*	4336*	76.5	74.3
66 KV In	536	411	1500*	1300*	48.0	43.9
TOTAL IN	90235	95233	151500**	177636**	80.1	74.5

*Denotes Coincidental Demand
 ** Denotes Non-Coincidental Demand

Average Power Factor - 230 KV System 86.9

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MANUFACTURING DEPARTMENT
PURCHASING AND STORES SECTION
MONTHLY REPORT APRIL, 1955

Responsibility

During the month custody and accountability for several classes of material that are being retained at the request of AEC for possible future construction was accepted by the Spare Parts Unit. These materials include: graphite fabrication equipment in the 2101 Building approximating 380 line items valued at \$2,022,000; special electrical equipment approximating 50 line items valued at \$45,000 and other items of ore, punchings, etc. These materials are to be transferred on an as is, where is, no charge basis.

Effective April 15, 1955, Stores at the request of the AEC, assumed from Kaiser Engineers the responsibility for the warehousing and control of approximately 20,000 line items of motor vehicle and heavy mobile and construction equipment parts which are located at White Bluffs. These parts valued at approximately \$300,000 are being held for use in connection with the AEC Contingency Pool.

Achievements

An agreement was reached with Minor Construction whereby Stores would furnish complete or partial quantities of items covered by their purchase requisitions. This will eliminate many purchase orders for items which are available from General Supplies Inventory.

All operational spares for 100-K Area and Purex have now been received from Kaiser Engineers and Blaw-Knox respectively.

Twelve Spare Parts catalogues covering 21 different classes of material were distributed to the field. With the exception of Spare Equipment items and two Electrical Utility material accounts, all catalogues have been compiled. Distribution of the remaining catalogues will be made during the first two weeks in May.

In a meeting with Reactor Section Management on April 12, 1955, an agreement was reached to transfer the 100 Area Spare Parts from 1713-H Building, 100-H Area to 2101 Building, 200-E Area. The basis for this agreement, in part, was that the 200 East Area warehouse would be operated 24 hours a day, 7 days a week with one delivery per day being made to each of the 100 Areas.

Spare Parts Unit personnel together with all 100, 200 and 300 Area inventory records were moved from Central Stores to the 2101 Building, 200-E Area on April 30, 1955.

Reports covering the results of the warehousing survey conducted in the 100 and 300 Areas were prepared and reviewed during the month with the respective Manufacturing Section Managers and other interested personnel. Recommendations developed as a result of our findings were generally accepted. Report of findings covering the 200 Areas is complete and is to be reviewed with Separations Section personnel during the first week in May.

An evaluation of the 48 types of nails carried in the General Supplies Inventory under Caption 42 was completed. This resulted in a reduction of 13 types of nails and provided other refinements in stocking this type of item.

II-Achievements (Cont.)

Based on information furnished by each Department Manager, a complete new Declaration of Excess authorization file was established. This complies with the recommendation contained in the "Audit of Excess, Salvage and Scrap" report dated March 29, 1955.

A vendor has submitted a sample aluminum dummy formed from a flat sheet, as contrasted with the previous method of drilling aluminum tubing. An experimental order for 100 was placed, and the resulting dummies have proved to be about 5% stronger and, also, less expensive. Additional information is being gathered on these experimental dummies.

A special problem exists as to crossover castings on an order for process pumps for the 190 Buildings. The vendor is investigating new approaches to this problem and we have applied to the Business Defense Service Administration through AEC for a production directive. In addition the vendor has been formally notified that our delivery date is realistic and that they must take action to comply with the contract delivery schedule.

It has been necessary to call upon the Milwaukee Railroad to supply better coal cars in the movement of coal from Roundup, Montana to the Project. They have agreed to take the necessary action to have better cars in this service or to repair those they are now using.

Production difficulties in the 200-W "T" plant prevented the unloading of Essential Materials within the free time limit as provided in Demurrage Tariffs. Every effort was made to keep the demurrage charges to a minimum, however, charges in the amount of \$60 did accrue this month.

Notification has been received of a required nine month lead time in the procurement of army assault mask cannisters. As these cannisters are critical to operations, letters requesting usage forecasts were sent to the 100, 200, and 300 Area Managers. These letters brought out that a study is under way in regard to the fabrication of an adapter to be used on army masks which will enable the use of commercial type cannisters.

The job of restenciling Government-owned tank cars used in Nitric Acid movement was completed this month. All cars were reweighed and correct tare weights were also shown on these cars.

Status of Essential Material Contracts

Sodium dichromate - one contract is now in force with Wall-Western, Inc., for material manufactured by Mutual Chemical which is to be supplied in tank cars and bags. Another contract for dry material only, in drums, to be supplied by Irving M. Sobin Company, Inc., importers in Boston, Mass., has been referred to R. S. Bell for approval and signature.

Liquid aluminum sulphate - contract with General Chemical is in force.

Carbon dioxide - we are preparing inquiries for our requirements for the period October 1, 1955, through September 30, 1956.

II-Achievements (Cont.)

Nitric Acid - inquiries have been mailed for our partial requirements of approximately 10,000 tons for the period April 1, 1955, through May 31, 1956.

Tributyl phosphate - our present contract expires June 30, 1955, and we are endeavoring to get a forecast of requirements for the coming year.

Sulfamic acid - our inquiry to Van Waters and Rogers, Inc., the distributor for DuPont, the exclusive manufacturer, has been mailed. The resulting contract is expected to cover the period October 1, 1955, through September 30, 1956.

Ferrous ammonium sulphate - inquiries have been mailed to various companies for quotations on our requirements for the period October 1, 1955, through September 30, 1956.

Generally, Section activities remain at near-record highs with very little indication as yet of significant reductions in the near future. A succession of emergencies caused by field incidents seriously complicated the procurement picture. Worthy of special note is the number of purchase orders placed in April which reached an all-time high of 3076.

STATISTICS

	<u>February</u>	<u>March</u>	<u>April</u>	<u>FY to Date Average</u>
<u>Traffic Unit</u>				
<u>Savings</u>				
Rate reductions	\$ 4758	\$ 5882	\$ 2975	\$ 3313
Freight bill audit	1767	1885	1182	1606
Savings - September 1, 1946 to date - \$1,941,141.				
<u>Money recovered - claims</u>				
Loss, damage & overcharge	\$ 560	\$ 64	\$ 549	\$ 573
Ticket refund	596	1306	204	641
Money recovered - September 1, 1946 to date \$208,324				
<u>Work Volume</u>				
Travel requests	101	207	159	142
Reservations made	313	660	478	433
Expense accounts checked	165	157	216	197
Shipments traced	80	122	105	59
Quotations furnished -				
rates and routes	540	629	562	508
Freight bills approved	1396	1649	1577	1481
Amount	\$282,289	\$298,074	\$326,470	\$308,127*
Carload shipments received	823	885	1,011	922

*Data available for 5 months only.

II-Achievement --(Cont.)

Stores Sub-Section

	<u>February</u>	<u>March</u>	<u>April</u>	<u>FY to Date Average</u>
<u>General Supplies</u>				
Store orders processed	32,475	33,996	30,280	28,565
Value of issues	\$324,132	\$347,534	\$332,555	\$312,357
Line items in account	29,048	29,283	26,698	28,467
Back orders on hand	382	330	415	329
Out of stock items	241	203	203	201
Percent of line items out of stock	.8	.7	.7	.7

Spare Parts

Store orders processed	1,743	1,865	1,707	1,395
Value of issues	\$136,468	\$114,245	\$108,561	\$ 95,946
Line items in account	26,735	27,265	27,855	25,401
Back orders on hand	396	394	341	269
Out of stock items	273	280	254	257
Percent of line items out of stock	1.0	1.0	.9	1.0

Receiving

Shipments received	6,251	8,447	7,194	6,596
Receiving reports issued	5,106	7,604	6,549	5,759

Excess Material & Equipment

Received	\$118,070	\$192,736	\$124,496	\$159,615
Issued to Project	32,471	7,292	7,264	42,389
Shipped Off-Project	17,599	263,096	302,730	399,068

Revenue from scrap and surplus sales	\$136,899	\$ 19,544	\$ 20,505	\$ 18,904
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Requisitions screened	2,606	3,436	2,988	2,807
Items screened	8,690	11,631	8,550	8,645
Items furnished	374	643	758	332

Purchasing Sub-Section

Emergency requisitions received

Employee & Public Relation	1	6	1	2
Engineering	24	38	23	22
Manufacturing	54	80	61	55
Medical	1	7	1	5
Minor Construction	118	168	185	127
Radiological Sciences	3	3	2	2
Stores	116	145	123	111
Total	317	447	396	324*
Average per day	16.7	19.4	18.9	15.4

*Data available for 4 months only.

II-Achievement - (Cont.)

Purchasing Sub-Section (Cont.)

	<u>February</u>	<u>March</u>	<u>April</u>	<u>FY to Date Average</u>
<u>Total requisitions*</u>				
On hand start of month	816	914	1,047	882
Received	2,604	3,315	2,786	2,491
Placed	2,506	3,182	2,877	2,502
On hand end of month	914	1,047	956	871
*Do not include those assigned to AEC, viz:				
	530	612	472	478
<u>Number of purchase orders placed</u>				
General Supplies Unit	1,577	1,832	2,255	Breakdown
Process Equipment Unit	392	591	725	Not
Essential Material Unit	24	34	34	Available
Local Purchase	36	55	62	
Total	2,029	2,512	3,076	2,236
<u>Value of purchase orders placed</u>				
General Supplies Unit	\$555,419	\$608,554	\$722,227	Breakdown
Process Equipment Unit	334,282	951,663	856,873	Not
Essential Material Unit	488,798	1,059,440	644,981	Available
Local Purchase	298	392	439	
Total	\$1,378,797	\$2,620,049	\$2,224,520	\$1,994,821
<u>Purchase Order Alterations</u>				
Number	182	209	220	174
Gross value	\$ 96,234	\$ 70,768	\$158,839	\$100,190
<u>Expediting**</u>				
Orders on hand start of month	2,214	2,455	2,585	2,322
Orders received	2,027	2,817	2,530	2,224
Orders completed	1,786	2,087	2,553	2,187
Orders on hand end of month	2,455	2,585	2,562	2,359

**Data available for 6 months only.

Organization and Personnel

Organization - No Change

<u>Force Summary</u>	<u>3-31-55</u>	<u>4-30-55</u>	<u>Change</u>
Exempt	55	59	4
Non-Exempt	206	207	1
Total	261	266	5

III-Organization and Personnel (Cont.)

Safety Experience

The normal monthly safety and security meetings were held throughout the Section with 251 employees attending.

One minor injury was reported.

Personnel Activities

On April 27, 1955, Mr. Moffett attended Dr. Rosenstein's lecture on Human Relations in Man Management and Supervision at Yakima.

As reported last month a course in Blueprint Reading was offered to personnel in the Section. Twenty-eight employees enrolled from the Section and six from other Sections were admitted making a total of 34 compared to 15 originally estimated.

A special indoctrination school was held during the week of April 25 for our Liaison Representatives to acquaint these people, new to Purchasing, with our procedures, policies and concepts.

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TRANSPORTATION SECTION
MONTHLY REPORT
April 1955

DECLASSIFIED

Transportation Section personnel forces increased from 491 to 492 by two new hires, six transfers in, one reactivation - personal illness, six transfers out (includes the transfer of the Section Manager to Manufacturing General in February 1955), and two terminations.

Fiscal year to date costs through March are under the budgetary provisions by \$74,195 or 2.378% (Salaries - \$56,272; Materials - \$43,558; Other Costs + \$25,635). FY 1955 expenditures are \$2,002 or 0.066% more than those for the same period in FY 1954. The following indicates comparative costs by major service functions:

<u>Function</u>	<u>FY 1955 1st 9 mos.</u>	<u>FY 1954 1st 9 mos.</u>	<u>% of change from FY 1954</u>
Railroad	\$ 585,100	\$ 557,119	+ 5.02 %
Plant Bus	1,014,705	1,032,071	- 1.68 %
Heavy Equipment Maintenance	428,997	429,755	- 0.18 %
Light Equipment Maintenance	498,304	571,322	-12.78 %
Road Maintenance	86,891	100,758	-13.76 %

Developed unit cost data by major functions for the Schedule E Presentation on the FY 1956 Operating Budget. Comparative statistics were furnished for FY 1954 Actual, FY 1955 Estimated, and the FY 1956 Revised Budget. The Revised Budget for FY 1956 totals \$4,468,352 compared to \$4,194,698 in the FY 1955 Midyear Review. The increase of \$273,654 is primarily for higher average salary rates, a greater number of personnel in Bus and Rail Operations to serve the new production facilities, and six people for maintaining a new consolidated equipment pool as requested by the Commission. The completed budget does not include the \$160,000 in material and twelve additional Mechanics that had been indicated separately as a possible requirement for this program.

Equipment Control activities continue at a high level with efforts directed to supplying Plant needs wherever possible with equipment made available by completion of the construction program, either by addition or upgrade. Equipment now made available at the Portsmouth, Ohio, Atomic Energy Commission site is being procured and to date one 1500 h.p. locomotive, three D-8 tractors, three 7½ ton fork lift trucks, and nine 2 - 3 ton flatbed trucks have been requisitioned. This entire program will greatly reduce outlay of funds for equipment with the principal out-of-pocket expense being freight between the two sites.

The grading, marking, and fencing of the HOO Reserve Equipment Pool lot has been completed. To date approximately 75% of the 350 pieces of equipment designated for this pool has been moved into the lot by Construction contractors. The Commission has requested that 19 units of DC equipment be transferred to Transportation Section for control and maintenance. This constitutes an increase in inventory of HO coded equipment. The vehicles will remain in their present assignment to Commission personnel.

At the request of the Plant Accounting Unit a "Standard Commodity Classification" report was made on all HO coded automotive and construction equipment. This report includes equipment number, name, type, and size. Purpose of the report is to establish a standard method of classification by codes for all property at HAPO.

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OFFICIAL USE ONLY

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Transportation Section

Closed the work orders and expense codes for moving to the new Consolidated Transportation Facility. Expenditures totaled \$18,581 most of which were within-section charges.

Completed a comprehensive study on fuels, lubricants, and antifreeze following the recent physical inventory. This examination of records and practices provided explanatory information as to the variances and disclosed a number of shortcomings with respect to accountability. Several corrective measures have been developed and discussed with custodial personnel. Devised more positive controls to readily indicate errors and losses.

Furnished information and made records available to the AEC Audit Branch in connection with the audit of Motor Pool Operations completed by the Internal Audit Section on January 27, 1955.

Transportation Section experienced a Sub-Major Injury (No. 274) on 4/15/55 when a Serviceman received a chip fracture to his left great toe and second toe. The injury occurred at Central Stores as the employee was helping to unload a vendor truck of compressed gas cylinders. The hand truck being used struck a depression in the truck floor causing the cylinder to shift. The employee attempted to prevent the cylinder from falling, but it fell from the truck striking his foot. The employee was wearing safety shoes which no doubt precluded a more serious injury. The injury was coded to 1-5; and, as per recommendations of the committee, cylinder handling procedure is being studied.

The fourth and last remodeled fire truck was received from the vendor on April 13. Received thirty new Ford sedans as replacements. Received two 3,000 gallon stainless steel tank trailers to serve the Purex Facility. A truck has been acquired from the AEC Contingency Pool and is being readied for this operation.

Completed a utilization study on the 300 Area Motor Pool. Advised Area management of apparent abuses and suggested methods for improvement.

Commercial rail traffic during April increased by 19.5% over March due to the longer reporting month and higher coal receipts. The following recapitulation indicates the distribution of commercial cars handled:

<u>Carload Movements</u>	<u>-</u>	<u>Loads In</u>	<u>Empties In</u>	<u>Loads Out</u>	<u>Empties Out</u>
General Electric Co.		1018	13	14	987
Blaw-Knox		1	0	0	1
Kaiser Engineers		24	0	0	17
Thorn and Marble Co.		1	0	0	1
AEC - Kaiser (cement)		2	0	0	2
U. S. Army		<u>22</u>	<u>0</u>	<u>0</u>	<u>27</u>
		1,068	13	14	987

Railroad process service during April decreased by 13.6% over March due to continued production difficulties.

Railroad car movements including process service totaled 2,463 in April compared to 2,106 in March, 2,354 in February, and 2,288 in January.

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Transportation Section

Completed the major overhaul of the number one engine on locomotive 39-3719 which was begun in February.

Locomotive 39-3731 was removed from service to permit the reconditioning of traction motors and wheels. A portion of this work is being performed by the Northern Pacific Railroad Shops.

Maintenance of Plant railroad trackage during April required 6,971 man-hours.

The Plant Bus System transported 8.5% more passengers in April than in March due to the longer reporting month. The following statistics indicate the magnitude of service rendered:

Passenger Volume	162,041
Revenue - Bus Fares	\$ 8,102.04
Earnings - Transit Advertising (March)	\$ 107.19
Bus Trips	7,208.
Bus Miles - Passenger Carrying	199,168
Passenger Miles	5,275,435

The special Public Relations Training Program for Bus Drivers began April 25 and is being well received by personnel participating in the course.

Effective April 8 a new method for returning No. 2 Shift 300 Area personnel was adopted. These buses now load at the Area for designated shuttle routes. One Goethals and one Snow bus are routed directly "to home" with the remaining buses, one to each shuttle route, stopping only momentarily at the Terminal for 1100 personnel. This new practice expedites the "to home" service and eliminates the necessity of passengers having to transfer at the Bus Terminal. Comments from 300 Area personnel indicate that the revised service is being favorably received.

Pendleton and Hinkle, Oregon, off-reservation trips were re-routed beginning April 21 to utilize the new Umatilla toll bridge. This routing will save one hour driver time per trip and reduce wheelage costs an estimated \$500 per year.

After a series of tests, the valve sticking problem encountered during the past months in diesel buses and locomotives has largely been eliminated through a change to R.P.M. Delo heavy duty motor oil. This oil is now being stocked on a "no substitute" basis for use in all diesel powered equipment.

The Richland Bus System transported 5.2% more passengers in April than in March due to the longer reporting period. The following statistics indicate the volume of service rendered:

Total Passengers Including Transfers	12,655
Revenue - Bus Fares	\$ 739.34
Earnings - Transit Advertising (March)	\$ 4.87
Bus Trips	1,035.
Bus Miles - Passenger Carrying	5,485
Passenger Miles	31,561

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Transportation Section

Off-Plant chauffeured automobile trips (Company business and/or official visitors totaled 170 which were rendered to the following locations:

Benton City, Washington	6
Hinkle, Oregon	8
Kennewick, Washington	35
McNary Dam, Oregon	1
Pasco Washington	58
Pendleton, Oregon	26
Prosser, Washington	7
Spokane, Washington	4
Sunnyside, Washington	7
Walla Walla, Washington	1
West Richland, Washington	5
Whitstrand, Washington	1
Yakima, Washington	11

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

	<u>Gasoline</u>	<u>Diesel Fuel</u>	<u>50 Cetane</u>	<u>Kerosene</u>	<u>White Gas</u>
Stock at Start of Month	65,340	17,485	4,700	3,277	255
Received During Month	98,730	19,875	33,000	2,550	0
Disbursed During Month	99,685	19,220	30,600	3,055	118
Stock at End of Month	64,385	18,140	7,100	2,772	137

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

Motor Overhauls	52
Class A Inspections and Repairs	97
Class B Inspections and Lubrications	1096
Weekly Inspections - Fuel Trucks and Off Plant Vehicles	80
Semimonthly Inspections - Buses	173
Monthly Inspections - Railroad Rolling Stock	15
Visualiner Inspections	141
Routine Maintenance Repairs and Service Calls	1625
Accident Repairs and Paint Jobs	45
Tire Repairs	574
Wash Jobs	<u>448</u>
	4,346

Twenty units of contaminated HO equipment were cleaned at the 269-W Building during the reporting period.

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Transportation Section

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

<u>Code</u>	<u>Type</u>	<u>No. of Units</u>	<u>Total Mileage</u>
1A	Sedans	343	664,600
1B	Buses	139	249,166
1C	Pickup Trucks	445	278,303
1D	Panel, Carryall, Sta. Wagon	167	157,267
1G	Jeeps	3	731
1H	Power Wagons	50	25,785
68 Series	Trucks	<u>227</u>	<u>105,859</u>
		1,374	1,481,711

Installed sprinkler heads in the paint spray booth at the 1171 Building and painted the walls white to obtain better reflective lighting.

The established schedule for Class A Inspections on light automotive equipment has been revised reducing the number of inspections for the first 50,000 miles from five to two. This change was effected following a thorough study of maintenance patterns and manufacturer's recommendations. Normal average time for Class A Inspections has been fourteen hours. Thus, under the old schedule approximately 70 hours of labor were expended while under the revised schedule a maximum of 30 hours is expected to maintain the equipment at the same standard. The revised schedule has been placed into effect and all new equipment will be maintained accordingly.

The adaptation of a productive maintenance program to equipment maintenance has been developed. Definite time schedules have been established to perform various jobs on light equipment. These requirements were determined by a comprehensive review of time required to perform such jobs during the past several years, also weighing in planned rate schedules from commercial manuals. Similar information is being developed for the heavy equipment shop and motor room. It is believed that this type of program will have a wholesome effect on controlling costs and provide better information on employee performance.

One Automotive Mechanic is to be furnished to the Community Operations Sub-Section on Monday and Tuesday of each week throughout the summer months to maintain lawn mowing equipment. This work will be performed on a work order.

Off-Plant trips for transporting special materials and equipment were made to Trail, British Columbia; Trentwood, Washington; Vancouver, Washington; Auburn and Tacoma, Washington.

Expended 104 man-hours in covering surfaced roadway for contamination control in the 200-West Area.

Completed arrangements for the procurement of the summer supply of ice and established on-plant distribution schedules to users.

OFFICIAL USE ONLY

Transportation Section

Maintenance of Plant roads and the production of road aggregate materials during April required 1,670 man-hours.

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

	<u>MC 3</u>	<u>MC 5</u>
Stock at Start of Month	50.64	23.89
Received During Month	76.22	0
Used During Month	78.7	0
Stock at End of Month	48.16	23.89

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

	<u>3/4" to 0</u> <u>Pre-mix</u> <u>Tons</u>	<u>1/2" to 0</u> <u>Pre-mix</u> <u>Tons</u>	<u>5/8"</u> <u>Chips</u> <u>Cu.Yd.</u>	<u>1/4"</u> <u>Crushed</u> <u>Rock</u> <u>Cu.Yd.</u>	<u>3/4"</u> <u>Crushed</u> <u>Rock</u> <u>Cu.Yd.</u>
Stock at Start of Month	220	633	5,065	1,038	4,407
Made During Month	723	847	0	0	2,290
Used During Month	172	534	0	524	463
Stock at End of Month	771	946	5,065	514	6,234

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PILE TECHNOLOGY SECTION

No visible damage was noted in two 10,000 MWD/T uranium-magnesium specimens that were examined recently. Irradiation of this material to 15-20,000 MWD/T is proceeding normally at the MTR.

Comparative performance between two canning lines, one on present specifications, one on closely limited lead content in the AlSi canning bath has given indications that a 3 to 5 fold reduction in rejections for "dimpled" welds will result.

Examination of four-inch cored slugs charged under PT-313-38 MT and discharged after irradiation of 1100 MWD/T revealed that approximately half of the slugs, which were coincidentally in the highest power zone of the tube, had split cores although only one jacket rupture occurred. The split cores were all associated with metal classified as acceptable by process specifications--another group of slugs which were selected as best quality by several non-destructive tests have received equivalent exposure without failure.

A study of exponential pile data on hollow internally-cooled slugs has been completed. The study was based on two fuel geometries, 1.66" OD x 0.81" ID and 1.66" OD x 1.11" ID. Two interesting conclusions were found. First, the results indicated that lattices loaded with these internally-cooled slugs suffer less variation in reactivity on loss of cooling water than the corresponding externally-cooled slug lattices. Second, the gain in conversion ratio obtained by putting the water on the inside of the slug is only in the order of 1% for a 105-H type lattice.

The experimental measurement of the neutron absorption properties of Np-239 has been completed. The cross section is believed to be 60 ± 25 barns. A conclusion of practical importance in plutonium production can be drawn from this knowledge of the Np-239 cross section. It now can be said that increasing the neutron flux level in thermal piles will decrease the Pu-240 content of the product plutonium provided the moderator temperature is held constant.

In-pile experiments using a nitrogen gas atmosphere indicated that there will be no serious corrosion problems in using nitrogen in the pile atmosphere unless water is present in the liquid phase.

The D Pile operating at 110° C outlet water temperature with 60% helium continued to show no signs of graphite distortion at these high powers and helium concentration.

Pre-startup evaluation of all critical components was completed and KE Pile was placed in operation on April 17. Scheduled power raises were made until tube powers were restricted to about 500 KW (the same as KW Pile) which should prevent extensive damage in case of sudden and complete loss of water to the tube.

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The KE Startup technical program was completed during the month. It was determined that a single channel containing a 50-50 mixture of steel and boron-steel balls would have 95 percent of the poison effectiveness of the all boron-steel channel. It was determined that sufficient control would be obtained by providing a 50-50 mixture in the K Piles.

The cooling system for the K Pile concrete biological shields will provide more than adequate cooling inasmuch as the shields are observed to be running at sufficiently low temperatures to remove heat from the air outside the pile.

SEPARATIONS TECHNOLOGY SECTION

Processing of 200 MWD/T feed in Redox was completed during the month and the plant converted to high MWD/T feed. This latter feed was cooled about 150 days so that iodine emission was no problem. The faulty C-3 reactor, however, was replaced during the month and iodine removal efficiency improved markedly. Rough draft operating procedures for the Purex plant are 90% complete. Scavenging of metal recovery wastes is proceeding with the addition of calcium nitrate. Plant tests have demonstrated a factor 6 improvement in strontium decontamination by this addition.

The Recuplex facility was accepted from Minor Construction early in the month. Seven cold dissolutions were processed through the Slag and Crucible Hood with satisfactory performance.

The Purex Technical Manual was issued as Document HW-31000.

DESIGN SECTION

Design Section effort by major components for the month was approximately as follows:

	<u>Percent of Total Effort</u>
Design Development Program	31
1952 Hanford Expansion Program	11
Reactor Plant Modification for Increased Production	16
4-X Program	13
Other Design Projects	14
Customer Work and Miscellaneous	15

Total design for Project CG-558, Reactor Plant Modification for Increased Production, advanced to 72% complete. Design for the 190-B and 190-D Annex Buildings has been completed. Design for the other 190 Buildings is well advanced. Design for the 183 Building modifications (filter plant) and for the 181 Buildings (river pump house) is essentially complete. The downcomer design for the 105 Buildings is complete and the "C" elevator design is in the comment stage. Further progress was made during the month on design for the 151 Sub-Stations, reactor controls, and the effluent water system.

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Major elements of the 4-X Program moved forward on schedule. Design progress status is as follows:

	<u>Design Scope</u>	<u>Detailed Design</u>
CG-599 - 4X Program - 100 Area	100	100
CG-603 - 4X Program - Bismuth Phosphate Plant	100	98
CG-613 - 4X Program - Metal Conversion Plant	100	37
CG-614 - 4X Program - 300 Area	100	90

Struthers-Wells Corporation was selected as the fabricator for the six calciner units including drives and furnaces. They will also furnish design consultation for specific design problems in connection with the project.

PROJECT SECTION

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

<u>Project No.</u>		<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
CA-512	100-K Area Facilities (excluding 1706-KER which has not been scheduled)	100%	99.2%
CA-513-A	Purex Facilities, Part A	100	99.2
CA-514	300 Area Expansion	81*	87*
CG-535	Redox Capacity Increase, Phase II	100	100**
CA-539	Additional Waste Storage Facilities, Redox	90	87
CA-546	Fuel Element Pilot Plant	97	65***
CG-558	Reactor Plant Modifications	11	7
CG-603	Hanford 4X, Bismuth Phosphate Plants	22	45

* In accordance with schedule transmitted to AEC March 24, 1955, for approval.

** Completed with minor exceptions.

*** Based upon original scope. A revised schedule will be prepared upon approval of the revised project proposal.

Minor Construction work at 105-K to provide connections for 1706-KER Facilities was completed before start-up, and the construction contractor completed structural work at the same time. The 1706-KE Water Quality Semiworks was turned over to the user, Pile Technology, on April 12, 1955.

Extensive emergency work was done on the east line of the 100-K Effluent Lines by Minor Construction after the 84-inch steel pipe moved from its bed in the river on April 25. Both 100-K Reactors were shut down while the line was being re-anchored with loose aggregate and with concrete blocks suspended from used railroad rails. Additional anchors were made from bundles of rails laid across both effluent lines. A diver was employed to inspect the lines, and a break around about 3/4 of the circumference of the east line was found about 350 feet from shore. The reactors were returned to service on April 28, and plans for repairing the line have been completed.

The transfer of remaining Purex work from the construction contractor to Minor Construction forces was accomplished on April 13, 1955. Principal work was concerned with design changes and exceptions. Operability testing was begun late in the month.

ORGANIZATION AND PERSONNEL

Total on Roll April 1, 1955	1,427
Accessions	28
Separations	36
Total on Roll April 30, 1955	1,419

A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

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ENGINEERING ADMINISTRATION SECTION

APRIL 1955

On April 25 the Library assumed responsibility from the Employee Communications Unit for borrowing motion picture film for Plant use. This appeared logical since libraries generally handle educational films and the activity can easily be integrated with the Library's Inter-Library Loan program. In the first week, four films were ordered from the GE Office in Seattle and one from an outside source.

A perpetual inventory of the book collection was begun. By the end of the month 119 different titles, consisting of 299 separate volumes, had been checked. One volume had not yet been located and one volume was found on the shelves which did not appear on the library's records.

During the month the following major contract activities were handled:

1. Modification No. 1 to Special Agreement No. G-32 between General Electric and Givens, May and Milliken covering the license for use of certain motion picture film was returned to the licensor on April 12 for approval of a change made in the modification. It was executed on April 22 and returned to General Electric.
2. Modification No. 2 to Consultant Agreement No. 110 between General Electric and Raymond E. Zirkle covering biological consulting services was executed by the Consultant on April 6.
3. Modification No. 1 to Special Agreement No. G-26 between General Electric and General Telephone Directory Company providing for a change in the number of directories to be furnished to General Electric was approved by the Commission on April 19 and forwarded to the Contractor for execution.
4. Modification No. 1 to Special Agreement No. G-42 between General Electric and Applied Research Laboratories providing for an extension of time of the contract for use of equipment for the quantitative analysis of radioactive samples was executed by the Contractor on April 28.
5. We have been notified by letter from Electric Boat Company that General Electric may, without cost, use certain Electric Boat drawings and bills of material in soliciting bids for two concentrators. No contract will be necessary.
6. Special Agreement No. G-63 between General Electric and the McCray Marine Construction Company providing inspection of the effluent line from 107-K Building to the river was executed on April 27. Modification No. 1 to Special Agreement No. G-63 between General Electric

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and the McCray Marine Construction Company providing for an increase in the contract price was forwarded to the Contractor for execution April 29.

R. J. SCHIER, MANAGER
ENGINEERING ADMINISTRATION SECTION

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PILE TECHNOLOGY SECTION

MONTHLY REPORT

April 1955

VISITORS & TRIPS

E. Auditori, D. H. Cornell and G. Westfall, KAPL, visited HAP0 regarding KAPL-120 renovation, April 4-6.

L. F. Coffin, KAPL, visited HAP0 regarding stress analysis problems and Hanford assistance, April 5-7.

R. L. Ferguson and W. W. Managan, ANL, spent April 25-29 at HAP0 discussing instrumentation and reactor work.

G. Westfall, KAPL, visited HAP0 regarding KAPL-120 renovation, April 25-27.

J. A. Berberet and W. E. Fry visited KAPL, Westinghouse, AEC Division of Research and ORNL, to discuss present and future Hanford irradiations for off-site laboratories, April 1-7.

L. P. Bupp spent April 14-15 at Oregon State College, Corvallis, and Willamette University, Salem, recruiting technical personnel.

S. H. Bush spent April 14-15 at Battelle Memorial Institute, Columbus, Ohio, consulting on zirconium gas reactions.

J. J. Cadwell attended an ASME Regional Administrative Meeting in Berkeley, California, April 29-30.

J. J. Cadwell, S. H. Bush, G. A. Last, K. R. Merckx and M. J. Sanderson attended an AEC Metallurgy Information Meeting at ORNL, April 11-13.

G. S. Cochrane inspected and tested finishing machine on sample parts at Star Machinery Corp., Seattle, April 27-28.

V. R. Cooper visited Mallinckrodt Chemical, St. Louis, April 1, to attend a Metal Development Advisory Committee meeting and also for technical discussions on uranium metal production and fabrication. On April 15 he visited Bridgeport Brass, Adrian, Mich. to discuss zirconium tubing.

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File Technology Section

V. R. Cooper and W. P. Wallace visited Feed Materials Division at Oak Ridge, April 11-13, regarding technical activities in support of Hanford fuel element program.

W. V. Cummings, L. F. Kendall and L. D. Turner attended an AIME Regional Meeting in Spokane, April 28-30.

D. J. Donahue visited the duPont Savannah River Plant, April 26-27, to discuss experimental reactor physics.

A. A. Ferguson presented a paper at the AEC Metallurgy Information Meeting at Carbide & Carbon Chemical, Knoxville, April 11-13.

O. H. Greager visited the Feed Materials Production Center, Fernald, Ohio, April 5-6 to discuss Hanford fuel elements and GE-ANP, Evendale, Ohio, April 7 to discuss joint ANP-Hanford testing program.

L. A. Hartcorn attended a uranium metallography sub-committee meeting at the Savannah River Plant, April 4-6.

H. Harty and V. R. Cooper attended the Annual Metallurgy Information Meeting at ORNL, April 11-13, and visited National Lead, Fernald, Ohio, April 14-15 to discuss uranium metallurgy and fabrication.

L. W. Lang attended a Metallurgy Conference at ORNL, discussed Oak Ridge process in relation to Hanford operations at K-25, and discussed matters relating to Hanford fuel elements at National Lead, Fernald, Ohio, April 12-15.

R. C. Lovington spent April 11-13 at Resistoflex Corp., Belleville, N. J., discussing fabrication of special connectors.

L. G. Marker visited Western Gear Works and Boeing Aircraft, Seattle, April 8 to obtain information on tracer lathes.

W. J. Ozeroff visited Dow Chemical, Rocky Flats Plant, Denver, April 22-25, for consultation on critical mass problems, and discussed experimental reactor physics at the Savannah River Plant, April 26-27.

W. J. Ozeroff, D. F. Donahue and E. D. Clayton attended the American Physical Society Meeting in Washington, D. C., April 28-30.

O. W. Rathbun attended the AEC Metallurgy Information Meeting and also presented a paper, April 11-13, at ORNL.

P. H. Reinker, R. L. Dickeman and L. H. McEwen visited WAPD to discuss high pressure loops and general physics development, and visited KAPL to discuss assistance to Hanford program, April 18-21.

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File Technology Section

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J. W. Riches consulted on uranium metallurgy at Bridgeport Brass, Adrian, Michigan, April 19-22.

J. M. Skarpelos spent April 1 at WAPD, Pittsburgh, discussing high temperature water technology.

W. P. Wallace visited the Bureau of Mines, Albany, Oregon, April 1, to discuss zirconium and its alloys; April 11-15 he presented a paper on uniskanning at Metallurgy Information meeting at ORNL, visited National Lead, Fernald, Ohio, for discussion pertaining to uranium, and discussed zirconium tubing at Bridgeport Brass, Adrian, Michigan.

O. J. Wick and J. J. Cadwell visited UCRL, Livermore, California, April 27-29, for Whitney Project Program discussions.

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File Technology Section

ORGANIZATION & PERSONNEL

Personnel totals are as follow:

	<u>March 31</u>	<u>April 30</u>
Administrative	2	2
Pile Engineering	95	94
Pile Materials	59	59
Fuel Technology	110	112
Physics Research	39	38
Metallurgy Research	69	70
Contact Engineering	<u>4</u>	<u>4</u>
Total	378	379

Pile Engineering: Selma A. Dige, Secretary, transferred in from Reactor Projects on April 18; W. L. Galligan, Engineer II, terminated on April 8; A. R. Jaqua, Tech Grad, terminated on April 29; Mamie D. Masters, General Clerk, returned from leave of absence on April 11; Patricia G. Goins, Secretary B, transferred to Design on April 18.

Pile Materials: D. I. Baget, Engineering Assistant, new hire on April 12; M. E. Liddick, Engineering Assistant, transferred to Metallurgy Research on April 18.

Fuel Technology: S. J. Foreman and R. L. Watrus, Engineering Assistants, were new hires on April 25 and 4 respectively; Ruth B. Ely, Engineering Assistant, transferred in from Metallurgy Research on April 4; T. W. Gore, Engineer II, transferred to Metal Preparation on April 1; D. E. Johnson transferred from weekly to monthly on April 1.

Physics Research: Joanna R. Madsen, Field Clerk C, transferred to Advance Engineering Section on April 4.

Metallurgy Research: I. D. Thomas, Sr. Scientist, new hire on April 22; Daisy B. Buerkle, Field Clerk C, transferred in from Projects; Max E. Liddick, Engineering Assistant, transferred in from Pile Materials; J. T. Smith, Field Clerk C, placed on leave of absence on April 29; R. B. Ely, Engineering Assistant, transferred to Fuel Technology.

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PILE ENGINEERING SUB-SECTION

PROCESS TECHNOLOGY

Power Level Limitations

The maximum operating power level during April, 1955 was limited by 95 C outlet water temperature at DR Pile, 100 C at H Pile, 105 C at C and F Piles, 500 C graphite limits at B Pile and trip before instability limits at D Pile (109 C). At KE and KW Piles tube powers are limited to 500 KW per tube to prevent extensive damage in case of sudden and complete loss of water to a tube.

Process Specification Changes

The following process specification was approved:

31.00, "Composition of the Reactor Gas" - Lower percentages of oxygen in the reactor gas are specified. Oxygen content of less than 0.05 per cent by volume will be required when new instrumentation is provided. A schedule of Orsat and mass spectrographic analyses and results therefrom is specified for use until the new instrumentation is in operation.

To provide greater operating flexibility, a wider range of allowable helium percentages was permitted for graphite temperatures between 460 C and 490 C by reducing the minimum helium requirement five to ten per cent. Also, the period for use of a large percentage of helium during startup was changed from 48 hours for any startup to (1) 72 hours for extended shutdowns and (2) 48 hours for hot startups.

Ruptured Slugs

During the month slug ruptures occurred in five tubes of regular production metal. These were one uranium cleavage failure and three side failures at C Pile and two side failures at D Pile. The four failures at C occurred at exposures below 275 MWD/T, while the one at D Pile occurred at 509 MWD/T. Reasons for the recent out-break of low exposure side failures at C are currently being investigated.

Al-U²³⁵ Alloy Slugs

Two jacket-split type failures occurred in J metal slugs during the month. These slugs were being irradiated in "J-Q" loadings at C Pile.

Production Tests

PT 105-570-A - Irradiation of New Fuel Slugs - This test authorizes the irradiation to failure of four tubes of cored uranium lead-dip canned 4" slugs and four tubes of 4" control slugs at high and low tube powers. Four tubes were charged at C Pile and four tubes at F Pile. A rupture occurred in the one remaining tube of cored slugs at C Pile on 4-11-55 after an exposure of 1158 MWD/T. A control tube also ruptured at C Pile on the same date at an exposure of 1128 MWD/T. The remaining control tube was discharged at an exposure of 1046 MWD/T. The four tubes at F Pile have reached 810 - 850 MWD/T without incident.

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PT 105-576-A - Powder Metallurgy Slugs - This test authorizes the irradiation of five control tubes at C Pile, 10 control tubes at F Pile and 40 supplementary tubes at F Pile. Two ruptures were scheduled for C Pile and both occurred during April, 1955. A control tube ruptured on 4-13-55 at an exposure of 912 MWD/ton and a powder metallurgy slug ruptured on 4-16-55 at an exposure of 813 MWD/tube. All other powder metallurgy slugs at C Pile have been previously discharged. Those tubes loaded at F Pile are scheduled to be discharged at normal goal exposure and have operated for six months without incident. Five tubes were discharged on 4-11-55 due to high outlet water temperatures but no abnormalities were detected.

PT 105-577-A - Hot-Press Canned Slugs - This test authorizes the irradiation of solid slugs with fusion and diffusion welds, cored slugs with fusion welds and cored slugs. Fifteen tubes were charged, four of which were to go to rupture. After the failure of all the test tubes, all control tubes were discharged on 4-12-55 at exposures of 900 - 1000 MWD/ton completing the irradiation under this test.

PT 105-578-A - Unbonded Slugs - Four tubes each of "C" process canned solid slugs, cored slugs, nickel plated solid slugs, and control slugs were loaded in C Pile. Ruptures have occurred as follows:

Solid slugs	161 and 221 MWD/T	2 ruptures
Cored slugs	206 MWD/T	1 rupture
Nickel plated slugs	326 MWD/T	1 rupture

Only the control slugs remain loaded and they have reached an exposure of 550-600 MWD/T.

PT 105-550-A - Unbonded Slugs - Point Pressure Closure - A total of eight 4" pieces, spaced with normal slugs, were charged in three tubes during September to be irradiated to 200, 400 and 675 MWD/T for metallurgical examination. A fourth tube containing four unbonded, cored, enriched slugs centered in 18 unbonded cored pieces and solid aluminum dummies was charged on January 19. One of the non-enriched slugs ruptured on March 16 at an exposure of 259 MWD/T. Post irradiation examination of the tubes exposed to 200 and 352 MWD/T showed the slugs to be in good condition. One tube still being irradiated at H Pile has reached an exposure of 650 MWD/ton.

DT 105-583-A, DT 105-581-A and DT 105-592-A - Irradiation of IQS 7, 8, and 9 Metal - The metal under these tests came from rods which were rolled from ingots that differed slightly from ingots for standard production metal. Pre- and post-irradiation measurements will be obtained. No ruptures are anticipated. Present exposure levels are 550 - 600 MWD/T.

PT 105-584-A - Unbonded and Mechanically Bonded Point-Closure Slugs - Three tubes each of standard lead-dip, unbonded point pressure closure slugs and mechanically bonded point-closure slugs are being irradiated under this test at C Pile. A rupture occurred in an unbonded slug on 4-9-55 at an exposure of 483 MWD/ton at which time all remaining unbonded slugs and controls were discharged. The mechanically bonded slugs had been discharged previously due to a rupture in this group.

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PT 105-586-A - Uranium-Silicon Alloy - Silicon alloy slugs from dingots will be irradiated until two ruptures occur in the dingot metal. One tube of this material has been charged in B Pile for irradiation to goal exposure, and irradiation of a small number of cored alloy pieces is planned.

PT 105-587-A - Internally and Externally Cooled Slugs - This test authorizes the irradiation of seven tubes of I and E slugs at C Pile. The one tube which has been charged was discharged in February at an exposure of 135 MWD/T because of high temperature of the water flowing through the cores. It is intended to resume this test using three tubes of varying diameter cores and then complete the test with tubes of correct core diameter.

PT 105-588-A - Extruded Cored Slugs - Evaluate Process Development - Three control tubes from each month's supply of cored slugs received at HAPD during the development period of cored slug production will be irradiated to 900 MWD/T and given a metallurgical examination. When available, equal numbers of extruded and drilled slugs will be loaded in the same tube. One tube of extruded slugs was loaded at C Pile on 11-7-54 and has reached an exposure of 680 MWD/T. At D Pile, three tubes were loaded on 3-7-55 and six tubes on 3-30-55. All tubes at D contained mixed charges. Three tubes with a goal exposure of 1100 MWD/T will be loaded at C Pile. One of the tubes charged at D Pile on 3-7-55 ruptured on 4-23-55 at an exposure of 174 MWD/ton.

PT 105-590-A - Extruded Cored Slugs - Evaluate Performance by Irradiation to Rupture - This test authorizes the irradiation of four tubes of extruded cored slugs until two ruptures occur. Charging will occur at C Pile in the near future.

PT 105-591-A - Production Quantities of Cored Slugs - This test authorizes the charging and irradiation of production quantities of cored slugs (both extruded and drilled). Three hundred tubes of this material were charged into the initial loading of KE Pile and 18 tubes were charged in C Pile during April 1955.

PT 105-596-A - Irradiation of Dingot Slugs - This test authorizes the irradiation of nine tubes charged alternately with control slugs and slugs fabricated from dingots in order to determine the performance of dingot slugs. The control slugs are from K-lot (rod transformed) and L-lot metal (slug transformed). Two tubes will be discharged at 300 MWD/T and two at 600 MWD/T for examination and measurements. The remaining tubes will have a goal exposure of 900 MWD/T or higher. The nine tubes were charged at F Pile on 4-4-55.

PT 105-602-A - Irradiation of Production Slugs at High Specific Power - This test calls for a 3 x 4 block of tubes with two C columns in the center and 5 tubes of drilled cored and 5 tubes of solid slugs from regular production metal around the C columns. They will be irradiated until the ruptures occur in each type of metal. Tube powers are expected to be about 80 KW/ft.

Manufacture of Other Products

PT 105-567-A - Preliminary Irradiation of J-Q Columns - The irradiation of the block loading of J-Q slugs in H Pile has proceeded without incident. Three tubes have been discharged, two of which have been shipped to ORNL for special separations. Because

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of A.E.C. and duPont interest in high exposure thorium the target exposure of the remaining columns has been extended to 175-200 MWD/tube. Upon completion of this test the resulting separations data will provide four points for a curve of product yield vs. exposure in the 50-200 MWD/tube range.

PT 105-579-A - Quantity Irradiation of J-Q Columns - This test as originally planned has been revised, the details of which are covered in HW-33170. One hundred twelve tubes are loaded in C Pile and 61 tubes in H. Goal exposure is 200 MWD/tube. Eighteen tubes in H will be irradiated to two ruptures. Forty-seven tubes were discharged at C Pile during April 1955, two of which were ruptures. Three tubes were charged with a J-Q loading at C Pile during April 1955.

PILE PHYSICS

Ball 3X System Recommendations

The effectiveness of a 50-50 steel and boron-steel ball mixture relative to that of either all steel or all boron steel was measured in a single channel test in the fully loaded wet KE Pile. The results of the test indicated that a single channel containing a 50-50 mixture would have 95 per cent of the poison effectiveness of an all boron-steel channel; the relative effectiveness should be even greater in a shadowed column array.

On the basis of these results and of the test results reported in March, final recommendations were presented in HW-36103, "Recommended Procurement and Allocation of Boron-Steel Balls," to purchase sufficient boron-steel balls to provide a 50-50 mixture of steel and boron-steel balls in the K Piles; it was also recommended that the boron-steel balls borrowed from the old pile spare supply be utilized in making up the K loading and in replacing the plant spare boron-steel ball supply.

KE Startup Test Results

Startup measurements completed after the last reporting period included the single ball channel test described in the preceding item, a second "C" column interaction test, establishment of safety and control rod critical configurations in the fully loaded wet pile, and a reactivity control calibration of the horizontal rod system.

The "C" column interaction test performed at KE Pile was for the purpose of planning future deliberate "hot spots" for irradiating test slugs in about 8 to 10 tubes at higher-than-normal power levels. Flux traverse results extrapolated to 8-3/8" lattice unit conditions indicated that the heat generation rate of natural uranium columns adjacent to a pair of "C" columns would be raised approximately 10 per cent because of the enrichment; natural uranium column heat generation rates two lattice units away would be increased approximately 4 per cent. The detailed test results were supplied to the Process Technology Unit.

Critical rod configurations in the fully loaded wet KE Pile confirmed similar KW observations; namely, that either 22 central VSR's or 17 HCR's held the unenriched and unflattened pile sub-critical. With 33 "C" columns added in the 8th LU from the fringe, twenty HCR's plus one VSR (the VSR having a value of approximately 40 in-hours) held the pile sub-critical; six lead-cadmium columns reduced the control necessary in this latter case to 19.5 HCR's.

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The HCR calibration was accomplished in the unenriched pile, simulating a reactivity transient by changing the loading in 36 ball valve tubes in steps from poison slugs to water to natural uranium. This test, expected to provide a gross calibration of the HCR system, was more successful than anticipated, providing a smooth calibration of the horizontal rod system from 0 to 700 inhours. The entire horizontal system appeared to have a strength of approximately 800 inhours in the unenriched pile.

KW Dry Temperature Coefficient Test Results

Preliminary values have been obtained for the reactivity coefficients in a dry pile containing green natural uranium. Over the range from 12 C to 200 C for the metal and 160 C for the graphite, the coefficients appeared to be linear. The present values are $-1.06 \text{ ih/}^\circ\text{C}$ for the metal coefficient and $-1.17 \text{ ih/}^\circ\text{C}$ for the dry pile graphite coefficient. These numbers corrected for the small amount of xenon poisoning, apply to a uniform temperature increase over the metal and graphite of the entire pile. The data have not been treated, however, for the effect of temperature change on neutron leakage through the pile boundaries and into the control rods.

Product Yield and Quality, Long Term Gains Studies

HW-36340, "Factors for Total Uranium Burnout," R.O. Gumprecht, was issued as an aid for SF accountability.

The three high exposure columns under irradiation at F Pile for long term reactivity studies (PT 105-553-A) are estimated to have an exposure of about 1200 MWD/T at the present time; an exposure of 1400 MWD/T was authorized by the test.

Thorium Studies

Further IBM calculations for yields of various isotopes from the irradiation of thorium were performed to provide production accounting curves based on adjacent uranium column heat generation rates of 500, 750, and 1000 kw respectively and total thorium exposures up to 4000 MWD/AT. The document, "Nuclide Yields from the Irradiation of Thorium," HW-36341, L.R. Blue, is presently in final form for duplication and will be issued soon.

Power Surge Incidents

Examination of the data from the KW power surge of 4-6-55 does not reveal the exact cause. There is general agreement with Reactor Section personnel that the incident was caused either by sudden displacement of water within the pile by air, or by operator error in horizontal rod movement. Pump and supply line conditions are such as to make the water theory plausible; a surge at low power a few days later at KE Pile known to be caused by operator error likewise makes the latter theory plausible.

Shield Deterioration Studies

A production test is being prepared for measuring the actual shield heat reduction which can be achieved by fringe poisoning combined with compensating enrichment. The

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test as currently conceived would consist of loading 8 to 10 alternate fringe columns on the far side of the H Pile with thorium slugs, adding 2 to 3 kg of U-235 to the 5th lattice unit enrichment pattern to compensate. If the poisoning is as effective as calculated using flux distribution data obtained in the KW fringe poison test, the maximum shield temperature as measured in the existing C test hole thermocouple stringer should be reduced 30 to 40 C.

KW Shield Temperature Observations

Calculations indicating that the cooling system for the K Pile concrete biological shields should provide more than adequate cooling are confirmed by observations that the K shields are running at sufficiently low temperature to remove heat from the air outside the pile.

HEAT TRANSFER

Cooling-by-Boiling Equipment Development

Modification of the high pressure loop to withstand pressures to 2000 psi has proceeded on schedule. This schedule presently calls for completion early in June. However, some equipment, delivery of which was promised for last January, has not arrived yet. Consequently, it appears that some delays will be encountered and that the modification may not be completed until July.

Program to Raise Pile Outlet Temperatures

Studies have continued to define and find solutions to the problems involved in operating one of the old piles at about 100 C bulk outlet. The studies indicate that such operation is feasible, and laboratory tests are in progress to demonstrate such feasibility. These tests are aimed at securing additional data on (a) instability temperatures, (b) conditions associated with a steam power failure or local power excursion and (c) conditions associated with the flow of steam-water mixtures through the effluent piping. It is expected that most of these data will be accumulated during the month of May.

Experimental Studies of Instability Limits

Tests are being run on the full scale process tube mock-up to determine tube instability limits more accurately. Some data exist which indicate that the instability limits for the B, D, and F Pile central tubes can be raised to 120 C without additional pressurization of the rear crossheaders. This contrasts with the present interpretation of the instability limits that 120 C can be reached only by reorificing the rear crossheaders. Tests have been run at 300, 500 and 700 kw/tube, and they indicate no change from previous concepts. However, preliminary tests at 900 kw/tube do tend to confirm that reorificing is not required for that tube power. The tests will be continued and the significance of the results will be determined.

Experimental Study of Steam-Water Flow through Effluent Piping

With pile operation at bulk outlet temperatures above 100 C, steam-water flow in the outlet piping will be encountered. Within reasonable limits, such flow is not

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expected to have an adverse effect on pile operation. However, these beliefs are being confirmed experimentally in the Hydraulics Laboratory. In addition, the laboratory tests will lead to definition of the actual limits.

Pile Safety Studies

A formal report, "KW Reactor Incident, Part II, Heat Transfer Aspects," W. F. Ekern, HW-35820, was issued. As reported previously, the main conclusions in the report were that (a) essentially all of the post-discharge examination results attributable to temperature effects could be explained from a heat transfer standpoint, (b) uranium diffusion into the slug jackets with the formation of a high-melting-point alloy occurred much more rapidly than had been anticipated and (c) this diffusion will necessitate alteration of the postulated effects of the general consequences of loss of pile coolant. However, this alteration is expected to be relatively small from the practical standpoint.

Work is continuing on a report which will indicate the probable consequences of a loss of water to a single tube or to a whole pile at times before and after shutdown. Previous calculations are being reviewed and corrected as necessary to allow for the uranium diffusion phenomena discussed above.

A study of the K Pile water supply system is being made with prime emphasis being placed on pile safety. The entire water system from the river to the pile risers will be considered, and the cross-tie connections between KE and KW are receiving special consideration. The water systems of the other areas will be scrutinized upon completion of the K study.

The results of flow tests of the KE cross-under line used for discharge operations were analyzed. This led to the recommendation that the cross-under line not be used until either extensive tests or modifications were made.

I-E Slugs

Tests were performed in the Hydraulics Laboratory to determine the flow characteristics of a shortened charge of internally-externally cooled slugs. It was found that the results were quite consistent with those reported previously in HW-33625. It is planned to charge a tube at C Pile soon with 24 - 8.92 inch slugs having about 3/8 inch holes. If the tube is not orificed, a flow rate of about 53 gpm is expected with about 33 per cent of the flow going through the hole. Subsequently, slugs having 7/16 inch and 1/2 inch holes will be charged.

Metallurgical Samples

Calculations were made to estimate the temperatures which could be expected in an in-pile sample composed of alternate uranium and zircaloy disks. This specimen will be exposed in the MTR by Metallurgy personnel in order to obtain basic data on metal behavior.

PHYSICS DEVELOPMENTPrototype Physical Constants Test Reactor

The graphite components for the prototype Physical Constants Test Reactor have been erected in the 305-B Building and the installation of the vertical safety system and the boral shield begun. The remaining significant mechanical components, i.e., the moving face and flux leveling mechanisms, are largely fabricated. Approximately 80 per cent of the electrical control panels are currently under construction; the design of the safety and electrical interlock circuitry is frozen and will be installed in place early next month. It is currently expected that the reactor will be completely installed and component performance tests largely completed during May.

The aluminum-U-235 alloy fuel for both the control rods and flux leveling application have been received from Carbide and Carbon Chemicals personnel at ORNL; these elements include (1) 4.1 kilograms of U-235 in the form of alloy annular slugs and (2) 2.2 kilograms in the form of solid alloy slugs for use in the shutter-type control rods. Development work at Metals and Controls Corporation has yielded satisfactory lead-U-235 matrix elements through the impact extrusion technique; these elements are in the form of thin wall (~ 50 mil wall thickness) tubing canned in aluminum -- the matrix contains about 20 weight per cent U-235 in the form of enriched UO_2 . The oxide has been fabricated at ORNL and delivered to Metals and Controls Corporation who expect to have our requirement for 4.1 kilograms of U-235 in fabricated slugs (500 2" slugs) complete by the week of May 15.

The horizontal control system, as presently designed, is expected to be stronger than required to accomplish much of the physics program to be performed in this reactor; this results from the span of control available in the shutter system in going from a fuel loaded rod to a full poison rod. However, additional fuel is required in the reactor proper if the fuel is removed from the control rods. This consideration for additional flexibility has lead to increasing the desired number of lead matrix elements from 500 to 650.

Slug Rupture Detection

The evaluation and improvement of the gamma spectrometer circuits submitted by Radiation Counter Laboratory as the initial spectrometer unit under Projects CG-578 and 579 continued. The necessary modifications were discussed at Hanford with an RCL field engineer and will be included in subsequent units. The initial work for the H Pile installation is underway and that for the DR Pile will begin shortly. The spectrometer installation at H Pile is scheduled for early June.

Several experimental installations have been made to evaluate the utility of cationic resins in the slug rupture detection application. The results thus far consistently show that the cationic resins concentrate background activities which will decrease the sensitivity to fission products. An anionic resin appears, in principle, to be more promising and can perhaps be employed following a cationic resin which decreases the background activities resulting from impurities; the latter approach would probably be necessary in a recirculating system.

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The slug rupture detection system for the high temperature and pressure recirculating coolant KAPL-120 loop has been fabricated and the auxiliary components designed; this system is designed to detect delayed neutrons in the coolant. Liaison with Design Section continues in developing the KE pile recirculating loop delayed neutron detection system.

Reactor Safety - Nuclear Instrumentation

The sub-critical pile neutron multiplication detection system has been refined to permit ready utilization by operating personnel. The mechanical system provided to remotely reposition the detector in the shield has failed through rust by condensate and is currently being redesigned.

Low power level operation at KE Pile has indicated that the nuclear systems function properly. The high level period trip should be operative from about the 500 watt level to full power while the low level period system should operate between the one watt and ten kilowatt levels.

Recommendations have been made to Manufacturing to install the sub-critical monitor in all piles -- the development is advanced sufficiently to permit firm cost estimates and component specifications to be prepared. This system will also include the low level period monitor as a single channel of instrumentation. Recommendations regarding action on the high level period trip system will be based on the experience with this type of system on the K Piles and should follow in two or three months.

Reactor Safety - Tube Outlet Water Temperature Monitoring

Functional specifications for a cell type temperature monitor have been developed jointly with Design and Manufacturing. The exact number of temperature points required per pile have not been resolved with various proposals ranging from 120 points (one tube in twenty-five with a one in nine frequency in critical areas) to a complete one in nine coverage (225 points). Project Section estimates that \$350,000 will be required to provide the more extensive system; this compares with about \$200,000 for the 120 point system. The functional specifications will be submitted to vendors for bid and it is expected that firm cost and delivery time quotations will be available within six weeks.

The basic system specified calls for thermal resistance elements to sense temperatures with the output read in a bridge circuit; a supplementary circuit is provided to perform the readout function. The circuitry will be fail safe where required, possess adjustable trip point settings, and designed for fast response insofar as this can be done without extensive extrapolation of proven thermal resistance bulb designs. The readout will sense about ten points per second and activate lights on a display panel in the event a tube in the zone being monitored exceeds a pre-selected outlet temperature; the temperature selection point will be adjustable to permit the growth of "hot spots", during startup for example, to be visually observed.

Lattice Neutron Economy

The detailed neutron distributions measured in the KW Pile lattice have been analyzed in more detail to yield refined values for the cold, clean initial conversion ratio.

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A value of $0.88 \pm .02$ is obtained from the distribution measurements and the ratio of 25 and 28 thermal cross sections; the major portion of the quoted uncertainty is in the cross section ratio. The conversion ratio calculated using the resonance escape probability experimentally determined (0.847 ± 0.006) is 0.883. Also k_{∞} has been determined at 1.036 from measured values for thermal utilization (0.878), resonance escape probability (0.847), and fast effect (1.040) and a calculated η (1.34) which compares well with the value of 1.0385 obtained from the critical buckling determination. The determination of lattice constants for J-Q, J-N, E-Q, and E-N loadings are now being made.

Neutron distributions have been determined in several slug types to assist in the evaluation of the reactivity and conversion ratio of a loaded lattice as part of the fuel element development evaluations effort. The slug designs studied were (1) large diameter solid, (2) large diameter with dry core, and (3) large diameter with wet core.

Reactor Safety Project

The details of the three irradiations to be performed at Hanford with the North American safety fuse element were developed jointly with NAA and Special Irradiations personnel. The series of irradiations will not be initiated prior to July 15 and are scheduled as follows:

- a. Irradiation I will be performed on a fuse element containing about one-third the U-235 content in the heater tube expected to be required in the final element. The nominal exposure time will be one month with the element triggered with an electrical heater. The purpose of the irradiation is to determine the temperature distributions reached so that necessary design changes can be made in subsequent elements.
- b. Irradiation II will (1) contain about two-thirds the estimated requirement of U-235, (2) be irradiated four months, (3) be triggered electrically if it does not fail during irradiation, (4) contain provision for monitoring B^{10}F_3 dissociation, and (5) contain provision for monitoring temperature distributions.
- c. Irradiation III will essentially be a life test of the element which will be an exact functional prototype of the final design, i.e., contain the target quantities of poison and U-235 and possess the required temperature distributions. Dissociation of the B^{10}F_3 will also be monitored.

Test Pile - Routine Tests

The reactivity of uranium produced by Fernald from Hanford recycle material continued at a uniform level. Twenty-seven Fernald billet egg lots yielded TDS values ranging from 10 to 14. Eighteen Mallinckrodt billet egg lots (virgin uranium) yielded TDS values ranging from 12 to 15.

Test Pile - Special Tests

The reactivity of several groups of slugs coated with nickel and/or iron (hot pressed canned) was determined as a function of coating thickness to assist the

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fuel element development program. The forty aluminum-U-235 alloy fuel slugs for the prototype Physical Constants Test Reactor were individually tested for uniformity -- the reactivity variation was within ± 3 per cent which will be acceptable in this application.

EQUIPMENT DEVELOPMENT

Charging and Discharging Studies

Continued assistance was given to Operations and Maintenance on charging machine revisions. Six automatic cycling cylinders are on order, and a design is being prepared for overhead suspension of the machines to permit greater clearance on the C elevator.

Testing of a fabric-type segmental discharge spline is awaiting delivery, scheduled for early May. Modifications to the spline guide and holder were made during the month.

HW-36224, "Charge-Discharge During Pile Operation," was issued during the month. The document presents a general analysis of the subject, occasioned by a proposal for a full pile demonstration installation.

Horizontal Rod Studies

It was discovered that the channel blocks should not be removed for the CG-558 Horizontal Rod Conversion at DR and H Piles, since these piles contain no retaining keys in adjacent blocks. Project and Minor Construction have been notified of this change.

Control rod coating samples irradiated under PT 105-530-A have been submitted to the 300 Area Metallurgy Laboratory for examination. Results are expected by early June.

HW-36102, "Final Report on Design Test Request for 105-C Horizontal Rod Molded Rib Sphincter Seal," was issued during the month.

Vertical Rod Studies

Components for a newly designed cushioning and latching mechanism for an air accelerated rod are being fabricated with completion expected by the end of April. Various modifications have been made to the latching mechanism in an effort to permit it to hold against a one ton force and still release properly when de-energized.

Supplementary Control

Tests were completed on the VSR hole mock-up to determine water flow rates into the graphite stack. A report is being prepared which will summarize the tests and studies connected with the use of graphite wetting as a disaster control system.

Development of nozzle seals for poison splines continued during the month with the objectives of finding the optimum spline slot size and eliminating the need for a

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rubber-to-metal bond. Progress was encouraging. Samples of the various splines are being irradiated to obtain needed data for designing the shields required for the spline handling equipment.

Process Tube Assembly and Piping

During the month, three suspect pigtails from KW front face were received and examined. One of them had the flare extruded back into the ferrule. This pigtail was subjected to a static pressure test which caused it to blow apart, with no warning, at less than 500 psi. The other two were not defective.

Installation of the new flexible connector test facility was completed and minor modifications made to improve its operation.

Installation of the new flow mock-up in the laboratory is complete except for piping to the pump.

The high pressure-high temperature loop is awaiting fabrication by Minor Construction. Work associated with this program is being directed toward forming acceptable Van Stone flanges on cold worked Zircaloy-2 tubing.

Document HW-35980, "Van Stone Gasket Tests," was issued, describing the test program and results obtained on Van Stone-to-nozzle gasket evaluation work for the K Piles.

Arrangements were made with Reactor Design Instrument Group personnel to effect liaison and a mutual assistance program in the development of boiling tube instrumentation.

Equipment was installed and made ready to use Stresscoat brittle lacquer in support of the pigtail testing program.

Physical Constants Test Reactor

Erection of the graphite stack was completed during the month. Fabrication was completed on the driver rod and tube assemblies, and on the flux leveling tube and can assemblies. Fabrication is progressing on other components with the boral shield, synchro readout panel, movable face steel frame, and the template for the flux leveling rings and reactor face plates, all at various stages of completion.

Five cadmium pieces for the horizontal control rods were X-rayed and found to be satisfactory.

Other Engineering Development Work

A detailed investigation into the effects of high pushing forces on the graphite stack at the various piles was continued during the month.

Further modifications were made on the graphite core-borer to control the cutter travel and to indicate when it has been fully retracted.

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A saw to facilitate removal of stuck ruptured slugs from the section of process tube enclosing them was completed. Slight modifications are being made to improve its operation.

Design is in progress on the addition of a power feed mechanism to the tube slitting saw to permit its use with zirconium tubing.

HW-35918, "Development of Underwater Equipment for Process Tube Examination Facilities," was issued.

SPECIAL IRRADIATIONS UNIT

ANP Feasibility Study

At the request of GE-ANP, work on the feasibility study for the irradiation of aircraft nuclear propulsion fuel elements has been stopped. Reports summarizing the technical specifications for the facility, status of the study at this date, and comments on its feasibility are being issued. The study has shown that, although the facility could be accommodated in C Pile, interference with pile operation and hazards to the pile are without precedent.

KAPL-120 Loop

Formal approval from all parties concerned has been obtained for the design of the modified KAPL-120 loop. Shop fabrication is now in progress by Minor Construction. The X-1 level at H Pile has been decontaminated in preparation for the beginning of installation of the loop on May 1. Preparations for cutting up the old tube, now removed from H Pile, have begun to obtain a sample for analysis by the KAPL metallurgists. A prototype test section with SAR fuel ribbons has been made at KAPL in preparation for the first irradiation in the new loop. The prototype assembly will be tested in the 305 test pile to permit the determination of the power generation when this assembly will be irradiated in the loop.

In-Pile Experiments

The irradiation of neptunium samples in the Snout I facility at H Pile, as a portion of the experiment to determine the absorption cross section of neptunium 240 (HAPO 143), continues. Analysis of data obtained is not sufficiently complete to make a statement concerning this cross section.

Experimental equipment to support studies to determine damage to graphite samples maintained under conditions identical to those in-pile with the absence of pile irradiation (HAPO 158) is in preparation. Control equipment is essentially complete and is to be tested in conjunction with the graphite oven.

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The experimental assemblies for studying the in-pile reaction between pile gas impurities and certain process tube and slug jacket materials (HAPO 105) were discharged from F Pile. Heat generation in the stainless steel gamma type heaters provided excessive temperatures and voided all results. Additional assemblies are being prepared.

Work in support of the NAA safety fuse experiments (HAPO 162) has been resumed. A meeting was held with NAA representatives and future tests at HAPO were outlined. Cored fuel elements required for the experimental assemblies are being prepared and will be shipped to NAA upon completion of their fabrication.

Facilities

All experimental facilities and equipment at KE Pile were checked out in support of the KE Pile startup. With the exception of the pneumatic facility, the facilities on the experimental levels are ready for use. Use of the front to rear test holes is contingent upon the provision of satisfactory tubing and pigtails. Cavitation resulting in a rupture in one of the aluminum pigtails was observed at KW Pile.

Casks for the removal of irradiated materials from the Snout facilities in KW Pile are in the design stage. In addition to the casks, provisions are being made for the disposal of radioactive materials resulting from irradiations in these facilities.

H Pile Stack Examination

An examination of process channel 1586-H on April 11, 1955, showed that the rear face cast iron blocks had been moved to the rear. On the same date, an examination of tube 4171-H revealed that the reflector plate of the plenum chamber on the rear had fallen and was completely obstructing the process channel. Also, on the same date, observations made with the borescope on tube 2663-F showed a 2" tube block separation at 13'7" from the front Van Stone flange. A short section of process tube was also found in the same channel at 25'9" from the front Van Stone.

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PILE MATERIALS SUB-SECTION

PILE GRAPHITE STUDIES

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

D Pile continued to operate at 65 per cent helium and 500 C under this test. Distortion measurements were not taken during the month but are scheduled for the extended shutdown of May 2-14. The test will continue following this shutdown.

X-ray analysis of the cores taken from channel 1169 indicate that the outside surface of the tube block is in good condition in the front fringe region. Maximum damage to bore graphite apparently occurs at 10 to 11 feet from the Van Stone flange, corresponding to the point of maximum expansion. Bore samples at 12 and 13 feet show less damage to C₀ spacing and crystal size, indicating that bore temperature may be high enough at this point to cause some annealing. At the extended shutdown, cores will be obtained from an empty channel to observe how much annealing has occurred in the bore graphite at a temperature slightly higher than the surrounding filler blocks.

PT 105-548-E, C Pile Burnout Experiment

C Pile, plagued by ruptures and extraneous scrams, has had very little equilibrium operation during the month. During brief periods, the following temperatures have been reached:

Channel 2773	- 650-690 C
Channel 2785	- 530-550 C
D Test Hole	- 500-530 C
Limiting Temperature of Pile	- 600 C

The D test hole is operating at temperatures considerably lower than desired, but recent changes in the pile poison pattern should remedy this. No samples will be discharged until the pile has operated for a significant period of time at high temperature.

KE Pile Temperature Distribution

Temperature distribution in KE Pile shows the same predominant effect of the over-boring pattern reported last month for KW Pile. Maximum indicated temperature in the 0.130 inch zone is about 60 to 70 per cent higher than in the 0.030 inch zone (at KW it is 100 per cent higher). The difference is attributable to a lower CO₂ concentration at KE (45 per cent vs 60 per cent) and somewhat different control rod configuration. Maximum temperature reached to date is 370 C.

Skewed Temperature Test

Currently being circulated for comments is a production test calling for forward skewing of power at D Pile to attempt annealing of graphite damage in the front fringe by raising its temperature. The test would be conducted for six months,

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during which poison columns would be displaced downstream and maximum use would be made of downstream control rods. This test can be run concurrently with the 100 C bulk outlet water test proposed by Heat Transfer and Pile Coolant Studies Units. Maximum graphite temperature with both tests in progress would be 600 C.

Full Size Graphite Bars, PT 105-521-E

Ten graphite bars discharged last December from "D" test hole of C Pile were transported into 300 Area and tested for purity in the 305 Test Pile. It was found that the purity of all bars increased as a result of pile exposure. The magnitude of increase in purity varied with each bar, from a minimum of 1.9 per cent, to a maximum of 8.7 per cent. Maximum purity obtained was + dih 1.10. All bars tested had original purity values greater than dih + 1.0.

Each bar was weighed before and after exposure, but unfortunately the balance used for this purpose was not accurate. Its nominal accuracy being about ± 1.5 ounce. Each bar registered exactly one ounce heavier after pile exposure. A previous experiment with similar bars exposed in "G" test hole at C Pile for about the same length of time as these bars at "D" test hole revealed that the maximum oxidation occurring was about 0.3 per cent based on surface area measurements. On this basis, the weight loss for a given bar should be 0.6 ounces which is much too small to be measured with the balance used. At the time of charging of these bars, the oxidation rate of 0.3 per cent for the bars exposed in the "G" test hole had not been determined.

Stability of Chromel/Alumel Thermocouples at Elevated Temperatures

In preceding graphite oxidation experiments, changes in the mechanical and magnetic properties of Chromel and Alumel have been noted. Chromel became paramagnetic and both Chromel and Alumel, particularly Alumel, became brittle enough to break with a single 90° flex after 15 or more hours in CO₂ at 1000 C. It was reasoned that such changes might also be accompanied by changes in thermoelectric properties which could help explain some of the discrepancies in oxidation rate data. An illustrative example might be the "Oxidation Rate Versus Surface to Volume Ratio Series" in which there were discrepancies in the expected order of relative oxidation rates. In one sample of this series it was shown that a variation of only one per cent (indicated temperature reduced from 1000 to 990 C) in the thermocouple calibration resulted in an 18 per cent oxidation rate reduction. W. I. Pumphrey⁽¹⁾ has also noted the above paramagnetic and embrittlement effects along with an associated lowered thermoelectric power. Berry and Evans⁽²⁾ have also studied the stability (or instability) of thermocouple materials (including Chromel and Alumel) at elevated temperatures (780 C). They found a change in calibration (for C/A) of approximately plus 2 C at the zinc point after 50 days in air at 800 C.

From the foregoing, an experiment to determine the effect on the thermal emf of Chromel-Alumel thermocouples under the test conditions seemed advisable. After preliminary experiments in which C/A thermocouples were compared to a Pt/Pt-10 per cent Rh thermocouple and to other C/A thermocouples after varied exposure periods in helium at 1000 C, it appeared that C/A thermocouples were indeed unstable.

(1) Pumphrey, W.I., Journal of the Iron Institute, 157:513-514 (1947).

(2) Berry, J.M. and Martin, D.L., 55RL-1234, General Electric Research Laboratory (1955). Unclassified.

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The limited data denoted an increase in the thermal emf of a C/A thermocouple equivalent to 4 C at 1000 C after a 24 hour "soaking" in helium at 1000 C.

In order to quantitatively measure the effect of the composition of the surrounding atmosphere and the effect of time at an elevated temperature on the thermoelectric power of C/A thermocouples, a comprehensive program of thermocouple testing was initiated. Twenty-eight new thermocouples were prepared from the same two spools of 26 ga. Chromel and Alumel wire and a schedule was prepared for matching these couples by heating four at a time in a copper block to 1000 C and measuring the emf. To date, the greatest variation within a group of four has been 0.035 millivolts (0.91 C) at 1000 C.

Tentative plans are to use the matched thermocouples in an attempt to determine the changes in the thermal emf caused by 2, 20, and 100 hours at 1000 C in atmospheres of helium, air, CO₂, and CO₂ plus carbon. All the couples will be exposed simultaneously in a common furnace with individual withdrawals being made after the designated time intervals. A separate line will supply gas to each group of couples. None of this work has been started.

Pile Oxidation, PT 105-532-E

Routine monitoring samples discharged from 1580-F on April 4 continue to indicate low oxidation rates. Included in this series of samples was a series of varying density samples. Preliminary data indicate that higher oxidation rates are obtained for lower density material.

H Pile Stack Distortion

Previous investigations have indicated that a train of graphite blocks and rear cast iron thermal shield blocks had been displaced towards the rear face in channel 1586-H. These initial observations were made from the front face only. Observation of the location of the rear components of 1586-H were made to verify the displaced conditions. Borescope observations from the rear face in channel 1586-H indicated that the rear thermal shield blocks had been displaced downstream and were up against the donut tube, and thereby filling the plenum chamber gap. Further investigation of other channels is planned for the next outage at H Pile.

GRAPHITE AND MATERIALS DEVELOPMENT

PT 105-537-E, Effect of J-Q Pairs on Radiation Damage to Pile Graphite

Three J-Q pairs were loaded at the front fringe of thirteen tubes in a diamond array at "F" pile on 1/17/55. At that time, graphite tube block cores were removed from both 1688, the central tube block stringer and 1786, a tube block stringer just outside the J-Q array. During the month, both stringers were cored again. Results indicate that in 1688, annealing took place at the tube bore varying from seven per cent at ten feet up to twenty-five per cent at thirteen feet. The only appreciable annealing detected at the center of the cores or at the filler block end of the cores was at thirteen feet where about fifty per cent of the damage was annealed. In 1786, the only annealing observed was at thirteen feet. The per cent

annealed varied from eight per cent in the tube bore to thirty per cent at the filler block end. It was recognized that initial results of this test indicate that an increased curvature might be obtained by the general use of this type of loading. However, it is also indicated that this type of loading has produced some annealing. It is possible that some other arrangement of enriched pieces may produce the desired effects. The test is continuing and final results will be available in August.

Thermal Annealing of Damaged Graphite

Experimental work has continued on thermal annealing of irradiated graphite. A series of runs have been completed which were designed to test some of the assumptions of the Vand theory, and these calculations are now being made. Also, the temperature coefficient for Co expansion for graphite with various degrees of damage is being investigated. Tests have been conducted to determine how rapidly a graphite sample comes to annealing temperature with the optical furnace used to heat the sample. For the purposes of analyzing the rate data, the temperature rise may be considered instantaneous.

A report is now being written which will give the results of thermally annealing a graphite sample with a cold test hole exposure of 556 MD/CT. The data have been interpreted using a theory developed by Vand for the study of metallic films condensed from the vapor phase. The end result of this type of treatment is an activation energy "spectrum" of the CO damage in graphite prior to annealing.

PT 105-535-E, Supplement B, Alternate Pile Atmosphere Study

Two process tubes have been operating in H Pile for approximately one month with CO₂-CO mixtures in contact with weighed graphite samples. One tube is operating with five per cent and the other with twenty-five per cent CO. They will be discharged after another month's operation and weight changes of the graphite measured.

Dimensionally Stable Graphites

Carbons produced from resin coke with resin binders at Battelle Memorial Institute were measured for physical distortion following 2500 MD/CT exposure in water cooled test facilities. A contraction of about .18 per cent was observed on both transverse and parallel samples. On these samples, a slight increase in the rate of contraction was observed after 1000 MD/CT. This material is the most dimensionally stable carbon measured to date.

International Conference on Peaceful Uses of Atomic Energy

A survey paper on the subject of irradiation damage to carbon moderator materials is being prepared for presentation at the International Conference on Peaceful Uses of Atomic Energy, to be held in Geneva, Switzerland, in August. This paper, which includes data from all AEC sites, will be presented in the section on "Effects of Radiation on Materials for Use in Reactors, Fuels, Moderators, or Structural Materials."

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

No new trends in the radiation behavior of graphite exposed in cold test holes was observed. Irradiations continued to higher exposures. The controlled temperature test hole at KW Pile was charged with a set of graphite samples and has been operating at river water inlet temperatures. As soon as possible, the heat exchangers will be used to bring the temperature as near to 100 C as possible.

PT 105-506-E, Supplement A, Irradiation in Recirculation Loop

Physical expansion data on graphite samples exposed in the recirculation loop at H Pile were correlated with exposure and temperature. Because of the uncertainty in the exposure calculation, any correlations from these data are questionable. For comparable temperatures, the physical expansion was higher than observed in test holes. Samples adjacent to the uranium slugs showed higher damage than those separated by a graphite sample.

High Temperature Irradiation Facility

The final prints for this facility were completed. The fabrication of a mock-up of the unit to be installed in the MTR will be fabricated to check thermal characteristics. Actual installation in the MTR is still scheduled for late August.

RECIRCULATION TECHNOLOGY

Operation of the H inpile loop continued throughout the month, operating at an outlet temperature of about 200 C. Scheduled discharge of the aluminum slugs from this tube will take place after 42 exposure days, the longest exposure to date for these conditions. Correlation of available corrosion data from the H loop tests has been completed. Further investigation of the feasibility of low pH testing in high purity water was made. Based on tests in out-of-pile loops it appears that a pH of about 4.8 to 5.0 can be obtained by using a cation resin in the de-ionizer. This pH, so far, appears safe with regard to the stainless steel loop components and should effect a significant reduction in corrosion rates. Preliminary study of particle size in H loop water was made with the aid of an electron microscope. The particles observed were in the range from 0.2 to 2.0 microns.

Nine slug rupture tests were conducted in out-of-pile loop, EIMO-4. Types of slugs included solid uranium, internally-externally cooled uranium, and uranium magnesium matrix elements. In all cases rupture of the slugs caused complete flow stoppage in a matter of minutes at temperatures of 240 to 280 C. A meeting was held with representatives of other interested organizations to determine candidate fuel elements for further tests of this kind.

Several vendor contacts were made concerning various recirculation technology problems including analytical chemistry, sampling techniques, conductivity measurements, and hydrogen addition apparatus.

Procurement of additional mock-up loops continued. Arrangements are being made for Minor Construction to fabricate EIMO-5, the carbon steel loop. Also preliminary negotiations are continuing for installation of a component test loop in 1706-KE.

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1706-KER Facility

The structural portion of the KER facility has been completed. Also, approximately 90 per cent of the 105 piping is installed. No further installation of KER equipment is planned for about two months, pending delivery of additional material.

A rough draft of KER operating procedures was prepared and circulated for comments among Manufacturing and Design personnel. A study of KER boiling capabilities was completed and published. Results of the study showed that high head (450 psi) pumps should be installed in the boiling loop to permit the required flexibility of operation. As an aid toward evaluation of the crud problem in KER a computation was made to determine the ratio of loop surface to loop water. This ratio is approximately the same as that of the STR reactor. Experience with the STR indicates that crud deposition will not be a major problem, at least in the three stainless systems. Potential crud problems of the KER carbon steel loop are still under study. Revised specifications for KER demineralizer resin were prepared and forwarded to Design.

Semi-Works Operation

The 1706-KER Water Studies Semi-Works was completed and turned over to Pile Technology personnel. A series of tests and checks were made of the pumping system, panellet lines, nozzles, pigtails, and miscellaneous equipment. The Semi-Works operators began shift coverage following a training period of one month.

Preparation for conversion of a 1706 in-pile tube for boiling studies continued. The equipment will be mocked up in 1706 prior to installation in the pile. Necessary material is on order or out for bids by vendors.

Specifications were prepared for a dual bed ion exchanger to provide make-up water for several mixed bed units in the laboratory. These units will provide high purity water for the in-pile boiling system and for various out-of-pile loops scheduled for installation in 1706.

Process Water pH Evaluation

Corrosion data on slugs cooled with pH 7.2, 6.6 and 6.2 were obtained; minimum corrosion rates were observed with pH 6.2 water. No pitting or other unusual attack was noted. Final reports on the work at 105-D Flow Laboratory and the low pH test at 105-F are being prepared.

PILE COOLANT STUDIES

Production Tests

The far side of D Pile has operated throughout the month without incident under PT 105-542-E which authorizes a reduction from 2.0 to 0.5 ppm of sodium dichromate in the water to one-half pile. No difference in slug and tube corrosion rates has been detected between the two halves of D Pile during the ten months that this test has been in progress.

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A feasibility document, HW-36415, "Pile Operation at 100°C Bulk Outlet Water Temperature" has been issued. The document discusses rear crossheader pressure, reactivity changes, corrosion, graphite, and instability limits at power levels associated with 100 C bulk outlet temperature. The document is to serve as a source of background information for a production test which will propose operation of D Pile at 100 C bulk outlet temperature.

Corrosion Monitoring

Eleven process tubes were examined during the month. Only in tube 3571-D was a new or unusual type of corrosion attack observed. This tube had been supplied low pH, 7.0, water from the 105-D Flow Laboratory. The new type of attack was characterized by small raised areas about 1/8 to 1/4 inch in diameter with a small spire in the center. The circular ledge was sharply defined and about one mil higher than the surrounding metal. Looking down on these areas gave the impression that they were donut shaped.

A correlation of the tube corrosion data obtained from the process tube examination program indicates that the in-pile corrosion rates for 72-S aluminum are the same as flow laboratory rates. Over the temperature range covered by these data the 72-S aluminum corrosion rate approximately doubles for each temperature increment of 11 C. The corrosion rate of 72-S aluminum at 95 C is 0.72 mil/month. A detailed report presenting this information will be issued in the near future.

190-DR tanks number 1 and 2 were inspected and found to be in satisfactory condition except for the presence of large tubercles in low velocity regions of the tanks. Pits under the tubercles were estimated to be 1/8 inch deep. A typical tubercle was four inches long, 3/4 inch wide, and 1/2 inch high. Inspection of the 105-DR near high tank revealed no serious corrosion. The bottom of the tank was covered with about 1/2 inch of mud which would be removed by flushing with water.

Laboratory Corrosion Tests

The internally heated mock-up was discharged after 45 days of operation. The heater-corrosion-samples operated with surface temperatures about 60 C higher than the water temperature and showed corrosion rates from two to seven times greater than the rates of non-heat-generating control samples. A new test apparatus will be designed to obtain more quantitative data on corrosion under heat transfer conditions.

Aluminum corrosion tests in low pH water were continued in the minitube mock-up apparatus. Examination of the data from a 2-S aluminum corrosion test in pH 7.0 water, with 2.0 ppm sodium dichromate, has shown that significant reductions in 2-S aluminum corrosion rates at 115, 135, 155 C can be accomplished by reducing the pH from 7.65 to 7.0. The corrosion rates in pH 7.65 water were ten to fifteen times the rates observed in pH 7.0 water.

Final preparations have been made to start up the 1706-KE in-pile facilities for the initial "shake-down" run. Four in-pile tubes loaded with aluminum dummies

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will be fed water from the 1706-KE high head pumps. Equipment operation and control mechanisms will be thoroughly checked-out in this run before weighed regular metal is placed in the tubes supplied with water from the 1706-KE Semi-Works.

The installation of the minitube systems in the 1706-KE Semi-Works was started when the 1706-Building was turned over to G.E. Installation is about 10 per cent complete. All the aluminum components except the pipe tees have been received. Shipment of the pipe tees has been delayed until May 10 due to difficulties at the factory.

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FUEL ELEMENT DEVELOPMENT

Rapid Surface Hydrogen Analysis Technique

As a means of assuring that the uranium slugs shipped to HAPO will not cause bonding layer porosity rejection during lead dip canning, HAPO personnel have been developing a rapid procedure for estimation of surface hydrogen concentration to in turn predict bonding layer porosity. A vacuum extraction apparatus, heated by electrical induction, has been constructed and placed in operation by the Process Sub-Section, Manufacturing Department.

In this apparatus the surface of a slug is heated to 600 C in four minutes and 15 seconds and held at that temperature for two minutes and 15 seconds. As the gas (the collected gas is greater than 95 percent hydrogen) is evolved it is pumped to a calibrated volume where, at the completion of the 6 minute and 30 second outgassing period, the pressure is measured by a manometer. A total of nine evenly spaced strokes of the Toeplar pump are taken during each run.

In the first phase of this work, 15 eight-inch slugs were "analyzed" for surface hydrogen in the 6 minute and 30 second cycle. Other slugs adjacent in rod position to the 15 "analyzed" slugs were canned and tested for bonding layer porosity by autoradiography and the "Sonobond" bonding layer porosity detection equipment.

The data show a difference of approximately a factor of 2 in surface hydrogen evolved correlating with a difference of almost a factor of 4 in the bonding layer porosity count. A most encouraging feature of this correlation is that it was obtained on a group of slugs that would have passed Frost Test and Sonobond testing with the exception of one slug.

The next phase of this work involves increasing the range of the relationship between surface hydrogen evolved and bonding layer porosity to embrace uranium having sufficient hydrogen to cause Frost Test and Sonobond rejection. With these data it will be possible to set a product specification on the hydrogen concentration in uranium shipped to HAPO.

Cored Slugs

Cored slugs from tubes extruded in January, 1955 have been received at HAPO. A 72 percent yield of slugs having concentric holes was obtained. The use of a self-centering billet in the February development extrusion increased the hole concentricity yield to 85 percent for slugs from 44 billets. The self-centering billet was used for all tubes extruded in March and April, but no information on yields is available.

Twelve control tubes containing extruded cored slugs alternated with rolled and drilled cored slugs have been charged.

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A technique for drilling a blind hole (a slug drilled from one end to within 1/4" of the other end) is being developed by NLO. A sample slug was cycled in the woodsplitter and sectioned to determine the effect of the sharp radius at the bottom of the drilled hole. Small cracks were observed originating at the sharp radius. Elimination of this stress concentrator is recommended.

Flat Sided Ingots

Ingots cast at NLO having flat sides to enter the first edging pass in the breakdown rolls were rolled, and sent to HAPO. The cruciform pattern was no different than that in the initially round ingots; however, NLO reports that breakdown rolling of these flat sided ingots is considerably simpler than for round ingots.

Dingots

Slugs from dingots that had been hammer forged and rolled were charged in nine tubes in F pile. About 30 tons of dingot material are being press forged by MCW at Huppenstall for subsequent extrusion or rolling to complete the initial pile charge of the dingot material. Forty-seven billets of unalloyed and 10 billets of uranium + 1.5 atomic percent silicon alloy were extruded at Adrian. The balance of the material will be rolled at NLO in May and June. These pilot lots will be followed by 15 tons of dingot metal per month.

Zirconium Clad Fuel Elements

A group of 19 fuel elements were made by direct casting into zirconium cans. There was no bond between the can and the cast core on some pieces. Diametral contraction of the can wall, which is a necessary condition for bonding, did not occur in all instances. This, perhaps, was due to the high yield strength of the as-drawn cans. Also, chemical analyses for gas pick-up disclosed that both nitrogen and oxygen were picked-up by zirconium from the furnace atmosphere, indicating a poor vacuum during the casting operations. To overcome these difficulties, cans in the annealed, as-drawn and unskanned conditions will be tried in future casts, and the modifications to the melt plant now under way should result in a better vacuum control.

Billet for Co-Extrusion Cladding Development

An experimental billet was prepared in the melt plant for stainless steel cladding and co-extrusion. Metallurgical analyses disclosed that the silicon (1.5 a/o) was uniformly distributed throughout the billet. This billet will be used also to ascertain the effectiveness of ultrasonic testing to detect secondary piping in relatively large castings of uranium. An additional casting is being prepared for the co-extrusion trials.

Uniskanning

It was established that this process can be used to supplement the drawing process for zirconium cans. Partially drawn zirconium cans were unskanned

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satisfactorily, thus eliminating approximately one-half of the operations at Bridgeport Brass Company.

Experiments on the directionality of mechanical properties in unskanned zirconium cans disclosed that such an effect exists and further work is in progress. This information will be of value when closure experimentation on slugs is initiated.

Aluminum Quality Investigations

A program to evaluate the suitability of some aluminum alloys for use in higher temperature water is being formulated in conjunction with the Coatings & Corrosion Unit. This program will entail a complete metallurgical and corrosion evaluation of the selected alloys. Commercial alloys plus others which indicate promise in preliminary autoclave tests will be included in this program.

Cold Closure Failure

The cold-closed slug failure from tube No. 2062-C, which was discharged February 27, 1955 at 312 MWD/T exposure, was examined both in the 100-B basin, and, after nitric acid cleaning, by Radiometallurgy personnel. There was no evidence of leakage through the closure. Sectioning through the zone of the major jacket fissure disclosed a wide radial crack in the core immediately beneath the opening in the can. The slug diameter at right angles to the crack was about .050" greater than the diameter parallel to the crack. Thus, it is evident that the can was split by the forces of slug cleavage. Rupture of the can under such circumstances was promoted by two conditions: (a) the can was 3/4 to full hard at the time of charging. Further hardening by irradiation would reduce its ductility to such an extent that very little elongation before rupture would be expected. That brittle fracture of this particular jacket actually occurred is shown by the appearance of the secondary jacket fissures which developed as a result of internal swelling following water entry through the primary fissure. These secondary fissures are sharp-edged, without neck-in, and obviously occurred after very little elongation of the jacket wall had taken place, and/or (b) the mechanical keying action between the slug and the jacket prevented the distribution of internal expansive forces over a considerable portion of the jacket circumference and localized the affected area in the region immediately overlying the cleft in the core.

Zirconium Tubing

Results from rolling tests on extruded zircaloy-2 tubing material indicate that a strain-rate effect may be important in the cold working of the material. An attempt is, therefore, being made to develop data to clarify this observation.

Samples of extruded zircaloy-tubing material were rolled to thicknesses of 80 mils, 89 mils, 100 mils, and 115 mils and subsequently vacuum annealed at 750 C for one-half hour (furnace cooled). These coupons were then rolled to produce specimens approximately 40 mils thick. The rolling speeds used included the

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fastest speed available (about 120 RPM) and several other speeds throughout the speed range of the rolling mill. The approximate percent reductions in thickness by rolling were 50%, 55%, 60% and 65%. Specimens were also rolled to a 50% / reduction in one, two, and three passes. Tensile specimens were machined from the rolled coupons and data for the ultimate strength, yield strength, elongation, reduction in area and for the strain hardening exponent are being collected.

Some calculations were made to determine the desired dimensions for the cross section of an extruded KER process tube blank. The calculations were based on the dimensions shown on Drawing H-1-20438KE and on the reductions which are desired in the tube reducing process. It was found that the area of cross section of the ribs for the tube blanks which were recently extruded at Bridgeport Brass Company is markedly less than the area that is required if a uniform reduction of all elements of the section is to be made.

FUEL ASSEMBLY DEVELOPMENT

Evaluation of Braze Layer Porosity

The outgassing anneal of uranium cores to mitigate braze layer porosity in canned slugs was discontinued. This was based on improvement in braze layer quality of non-outgassed slugs to the point where the remedial outgassing step was providing no improvement. The braze layer porosity associated with current Fernald rod-treated uranium was subsequently more precisely evaluated by obtaining an integrated count for total unbonded area on both an as-received lot and a companion outgassed lot. The amount of braze porosity observed was less than at any time since mid-1954. Outgassing neither significantly reduced or increased the amount of porosity present. If the material tested is typical of current Fernald rod-treated production, early replacement of the frost test with the ultrasonic bond tester should be feasible.

Low Impurity Canning Line

Operation of a low impurity canning line in which canning bath lead contamination is held below 0.2 percent was started April 18. Analysis of long-term canning data had indicated that the "Al-Si" spike weld defects were associated with bath impurity. The rejection rate for Al-Si spikes or dimples was about one percent from the low impurity line (6954 slugs) and about six percent from the rest of the production canning lines (18,875 slugs) during the first week of operation. Other categories of closure defects have not shown marked change. The lead content of the low impurity canning bath has increased from less than 0.04% to 0.1% during this period.

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Fabrication of Cored Slugs

During April approximately 5400 eight-inch bare uranium cored slugs were sealed for canning by DC fusion welding of the uranium end plugs. About 3800 canned cored slugs were sent to storage - a yield of about 70 percent. To date approximately 20,000 eight-inch canned slugs have been sent to finished slug storage, 18,000 of which have been shipped to the 100 areas. The overall yield from slug core welding to storage has averaged about 67 percent.

Cored Slugs with Aluminum End Plugs

Components for the lead dip canning of drilled slug cores sealed with pressed-in aluminum end plugs were prepared. Canning is scheduled for May 2. About 2900 slugs are to be canned for irradiation to high goal exposure. Muffle furnace tests on slugs of this type were completed. The slugs were heated to 400 and 500 C for periods up to 762 hours to observe the effect of plug-core diffusion on the assembly. No damage to the core or to the assembly as a whole due to plug-core diffusion that would indicate contribution to failure was noted. (At these temperatures the bond between jacket and core is destroyed in less than 24 hours. The bond layer itself is, of course, not subjected to these temperatures in the piles.) As this test does not simulate in-pile conditions, but severely damages the slugs as a whole, little significance is attached to the results.

Hot Press Canning of "C" Alloy Slugs

The acceptability of the hot pressed "C" alloy slugs produced to date is under discussion with the Process Sub-Section. During the early part of this year slugs were being canned under tentative process specifications. Some deviations from the process standards used by Manufacturing prior to receipt of final process specifications were noted. It has been agreed that January's production (less than one thousand slugs) might well be rejected as the nature of the deviations is not accurately defined for this period (and reactor requirements are not pressing). Deviations in February and March were better defined and the resultant product is amenable to quality estimation. As the

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process is new, it may be that the process specifications and, therefore, the process standards are more restricted in some aspects than will ultimately be necessary. In view of this, it is recognized that some of the material canned out of process with respect to certain particular steps may be of suitable quality for pile use. Acceptance of the slug based on the use of the ultrasonic bond tester and the final visual examination without regard to detailed knowledge of the processing steps is not yet feasible for the HPA process.

The slug yield has continued to rise as marginal processing is reduced; about 92 percent of the assemblies currently processed through bond testing are acceptable.

Fabrication of Joined "C" Alloy Fuel Element Pairs

The Fillerarc process for joining "C" alloy fuel elements base end to base end was tried on 50 Al-Si filled cans (simulated bonded "C" alloy elements) with good results. Such longer elements may be helpful in alleviating the "C" slug chattering problem in the piles.

Sound welds with 360 degrees of weld deposit flush to or recessed below the can wall were consistently produced. The joined assemblies were checked for axial alignment and warp. It was found that unless special pre-welding alignment of slugs was performed that considerable warp and misalignment resulted. Special collets are on order to facilitate the aligning.

Alternate Final Etch for Dip Canned Slugs

High nitric acid vapor losses (~ 65 lbs/hr), with attendant equipment corrosion problems were being encountered in the new penetration equipment for continuous processing. As a remedial measure, acid concentration will be reduced from 60 percent to 40 percent. The bath temperature will be unchanged ($80 \pm 5^\circ\text{C}$).

Consideration is being given to further reducing these problems by using a five percent NaOH solution for etching followed by a dilute cold nitric acid rinse. The caustic etch method may improve the slug surfaces for visual inspection and for the application of a uniform oxide film during autoclaving.

Cold Closure Process

Two sizing dies have been completed for the cold closure assembly of eight-inch fuel elements. Presses and equipment for assembling eight-inch fuel elements have been installed in 306 Building. Studies are underway to determine the amount of uranium deformation with various core hole sizes, the optimum types of end caps for cored uranium, and methods for assembling short pieces of uranium in eight-inch or longer cans.

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Canning in Zirconium Alloy Jackets

Al-Si dip-canning has been demonstrated as a feasible method for canning uranium in zircaloy-2 jackets. Six iron-nickel plated cores were canned by this method after coating the zircaloy-2 cans with a zinc-chloride flux. Five of these were thermally cycled in a muffle furnace between room temperature and 350 C for 100 cycles. (The sixth slug was removed after 54 cycles.) No apparent change in dimensions or mechanical properties of the can material occurred as a result of the cycling. Metallographic examination showed the bond intact and no excessive diffusion between the components.

Two elements were fusion welded. Hardness and visual examination (subsequent to welding) showed embrittlement of the weld zone and some separation of the can and/or cap from the core in areas in the vicinity of the cap.

Mechanically stripping showed good bonding and very little porosity. No difference in bond adherence was noted when comparing stripped thermally cycled slugs with stripped as-canned samples.

Hot Press Canning

The hot-pressed cored fuel element which failed during irradiation at C pile was classified as a core failure. Several of the non-ruptured pieces had "worm tracks" (denoting an impending core failure), which substantiates the classification. Attempts to duplicate the failure (core split with severance of the end pieces) in the woodsplitter have not been successful to date. Three cored pieces were cycled in the beta phase an average of 300 cycles before failure. Two were cycled in the alpha phase an average of 400 cycles before failure. None of the failures appeared to simulate the pile failure. These pieces will be sectioned for examination.

During initial irradiation of internally and externally cooled fuel elements, temperature measurements of the cooling water from the hole and annulus showed a 40 C temperature difference. Since no explanation has been advanced for the discrepancy between calculated and observed values, three additional tubes of material will be charged with three hole sizes: 3/8 inch (original size), 7/16 inch, and 1/2 inch. Approximately ten cores with the two larger hole sizes have been hot-press canned for evaluation of the process, components, and equipment. An additional 250 hollow cores and jacket components are currently being processed prior to canning for the in-pile measurements.

In setting a specification for the hot-press canning of nickel plated uranium cores, the effect of aging of the nickel plate on fuel element quality was considered. Nickel plated cores were stored in a fume free atmosphere for periods of one, seven, thirty, and ninety days prior to canning. The elapsed time between plating and hot-pressing nickel-plated uranium was shown by the ultrasonic bond tester to have an effect on the uranium-nickel-aluminum bond. Pieces which were hot-pressed one day and seven days after plating were shown to be completely bonded by the bond tester, but two of five pieces

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hot-pressed thirty days after plating and two of five pieces hot-pressed ninety days after plating were shown to have unbonded areas. Additional tests planned for these pieces are frost-testing, undercutting tests, and chisel tests.

Out-of-pile tests have shown that maximum corrosion resistance with minimum reactivity loss can be obtained with a hot-pressed fuel element when the nickel is plated on a smooth uranium surface. Tensile and diffusion tests with wafer specimens indicate that 0.3 to 0.5 mil of nickel on a smooth surface is adequate from a strength and diffusion barrier standpoint. Full size production-type cores with 0.3 and 0.5 mil of nickel on a smooth surface were pressed to determine if the same results could be obtained. Because of deviations from standard procedures, the results of the 24 pressed cores are not considered conclusive. However, most of the cores (both 0.3 mil and 0.5 mil) had a good bond along the full length. Where the bond could be separated, the fracture occurred in the Ni-Al diffusion area. Additional pieces are being processed.

Temperature Determination in Single Unit Furnaces

A desire for better control of the temperature variable has led to a study of temperature characteristics in a fuel element assembly during hot-pressing. It has been found that during the present canning cycle, temperatures can be controlled within 7.5 C and that this temperature is maintained for at least 60 percent of the specified pressing time. For expediency and lower costs, these temperatures are being determined using aluminum thermocouple slugs with three thermocouple points - top, middle, and bottom of the slug. A cursory check with a similar thermocouple slug made from uranium shows no significant difference in operation. Additional tests are being run preliminary to establishing a standard procedure for testing and operation.

Modified Heat Treatment of Uranium Cores

Four groups of eight-inch solid uranium slugs, approximately 35,000 total, have been heat treated at HAPO using air delay periods of 35, 43, 50, and 80 seconds prior to quenching. This material was heat treated under Production Test 313-53 MT and Supplements A and B. Based on present uranium technology this metal should have irradiation characteristics, particularly with respect to limited deformation or warping, equal or superior to present production uranium.

Approximately 1500 slugs were removed from the production stream at definite intervals as representative samples to determine bulk grain orientation by sonic testing. Charges for 16 control tubes are now being made up from these pre-measured sample slugs. A portion of the remaining sample slugs will be subjected to various tests and studies in the laboratories to evaluate the material prior to irradiation.

Arrangements have been made to pile charge the bulk of this material with a significant number of slugs from each time delay group in high power tubes at 105-B, D, or F for irradiation to high goal exposure.

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FUEL EVALUATION

Low Exposure Slug Failures

The number of low exposure failures has increased. During April four regular production slugs failed in 105-C at tube exposures of 220 to 270 MWD/T, bringing the total in this category to eight, including one during February, two during March of 1955 (one in 105-D), and one during July of 1954. Seven have been side failures, and one a longitudinal split of the uranium core. Tube power levels have been high, ranging from 800 to 1000 KW. Several of the side failures were not typical, in that there were large bumps or blisters on the jacket and cracks in the jacket surface, rather than the usual deep corrosion cavity. Metal types include B, K, L and N lots, all lead-dip canned. Six of the 1955 failures were canned during December, 1954 and later, and all were charged December 31, 1954 and later.

Slug Tests in Charging-During-Operation Equipment

Possible slug damage resulting from charging-during-operation,⁽¹⁾ was explored using the prototype charging machine and mock-up facility in the 108-D building, at water flows of 100 and 180 percent of the normal maximum expected at 105-C. Damage to the can-slug bond was assessed by ultrasonic testing, and by water autoclaving (170 C, 100 psig) after drilling 1/16 inch holes through the cap and base of the can to the uranium. No damage was found which would be considered significant at present pile operating conditions. Ultrasonic testing indicated some end-bond damage on slugs which had poorly bonded ends prior to the test. This effect was observed only at the high (180 percent) flow rate. Surface damage (gouging and scratching) was more severe than for normal charging, and this condition was worse at the higher flow rate. However, since surface damage is dependent on the condition of the particular process tube used, the observed damage may not be significant.

Post Irradiation Examination

Cored Slugs

Fifty-seven percent of the four-inch bonded cored slugs from tube 1378-C (PT-570-A) discharged March 23, 1955 at 1129 MWD/T were apparently split longitudinally within their cans. The following observations support this. The tube had been discharged with a split failure. The failed slug was stuck in the tube and as viewed from the ends after cutting the tube away on either end, was cracked longitudinally into at least seven segments. Visual examination of the remaining slugs in the tube showed several slugs which were swollen and which had length-wise indentations on the jacket. The slugs were measured on the profilometer. Nineteen of the 33 slugs measured were ellipitical with

(1) HW-34465, Interim Report, Production Test 8-MR, Uranium Charging During Reactor Operation, J. E. Robb, January 18, 1955.

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a difference between the maximum and minimum diameter at a particular cross section as high as 80 mils. A four slug sample averaged 1.50 inches maximum diameter and 1.43 minimum diameter at 90° from the maximum. Pre-exposure diameter was approximately 1.44. Two slugs were broken and showed longitudinal cracks which separated the slugs into two segments in the can. The ellipticity is thus attributable to longitudinal splitting of the uranium core inside the can.

All of the slugs so classified as split were X⁽²⁾ slugs by a pre-exposure examination. Also, the split slugs were in the high power zone of the tube. X and W⁽²⁾ slugs from the front part or low power zone of the tube showed negligible diameter changes. Solid companion pieces under PT-570-A but in a separate tube are not yet available for comparison; however, solid eight-inch pieces examined in this exposure range have not shown this splitting. These data will be compared with data from other W cored slugs and X and W solid slugs from the same test recently discharged from 105-C at similar exposures.

Further data on splitting tendencies of cored slugs were obtained by bend testing eight-inch cored hot-press slugs at 660 MWD/T from tube 1482-C (PT-577-A). Contrary to the breaking pattern of solid slugs which break transversely near the center of the slug when subjected to a simple beam loading in the slug breaker, the cored slugs located in the high power zone of the tube either split longitudinally, broke transversely at the base of the end plug, or broke by a combination of these two methods.

B-Lot Slugs

About one-hundred and forty tubes of rod heat-treated slugs (B-lot) charged into the H-pile under PT-539-E* were discharged in March at exposures between 1050 - 1150 because of excessive warp. During this discharge four charges stuck in the process tube so badly that retubing was required after the slugs were pushed at forces up to 7000 pounds. Examination of portions of the stuck charges and of slugs from four tubes discharged normally at 1100 - 1125 MWD/T showed slug warp up to 8 mils in stuck charges and up to 77 mils in normally discharged tubes at the same exposures. As observed previously, the high degree of warp occurred upstream in the process tube. Other than warp, the slugs were stable dimensionally. Changes in diameter were consistently a gain of less than 0.005 inches. Of the four tubes examined, indentations on the can showed evidence of one slug being split longitudinally and eleven pieces split transversely inside the can. Two of the latter slugs broke during handling. It is not known how much longer these slugs could have withstood irradiation without rupture.

- (2) HW-33757, The X category had surface flaws and striations, the W category was relatively of sound surface quality.

* PT-539-E was authorized to compare rupture rates of triple-dip (A-lot) and rod heat-treated (B-lot) slugs.

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Powder Metallurgy

Three (of 45 in pile) tubes of powder metallurgy compact slugs were discharged from F pile at approximately 550 MWD/T to investigate cause for process tube pressure-drop increases observed on the panellit gages. Since no reason for the pressure gain was found, the remaining 42 tubes were left in.

Gas from Cored Slugs

Two tubes of cored slugs; one containing unbonded pieces at 176 MWD/T and one containing hot-press bonded pieces at 660 MWD/T, were broken to determine the amount and composition of gas present in the slugs. Gas was found in the cores at both exposures. The end six slugs of the low exposure tube gave off approximately 5 to 10 cc of gas per slug. Half of the remaining slugs emitted no gas and the remainder gave off gas estimated at 1/2 cc or less per slug. Analysis of this gas showed it to be primarily air. Three slugs from the high exposure tube gave off about 1/2 cc gas; the remaining slugs showed no gas. Insufficient gas was collected from this tube for analysis. The gas from both tubes showed negligible radioactivity when monitored at the surface of the storage basin. Details have been reported in HW-36281.

Metal Examination Facility, 105-C

Project CA-431-C, which includes major portions of the equipment for the 105-C Metal Examination Facility, is expected to be closed on May 1. Operator Training and trial operation will be started after exceptions to the project have been completed.

TESTING METHODS

Ultrasonic Bond Test

Two production runs were made with the ultrasonic bond test in a continued effort to reduce sensitivity to small voids and unbonded areas. The first of these, which was expected to result in a 1.4 percent rejection rate, actually resulted in a .84 rejection rate. Frost test rejects in this lot were very low however. At the conclusion of this test it was determined that a circuit change in the count rate circuit could be made which would reduce the sensitivity to small voids still further without affecting the sensitivity to large ones. This change was made, but in the subsequent tests the overall reject rate actually increased. In the second production run, after changing the count rate circuit, 24 slugs out of 408 tested were rejected of which three were also rejected by the frost test. Nineteen of the 24 rejects were opened, nine showing voids of less than one square centimeter with a wide variation in sizes, two showing voids greater than one square centimeter, and eight non-wet cans. Additional production runs are now planned to reduce the reject rates for voids less than one square centimeter.

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Sonic Orientation Test (SORT)

All material, except critical filters, which were to have been shipped April 20, has now been received for the production prototype sonic orientation test. This material will first be used in making a breadboard model since the circuit details have been worked out only on paper.

Secondary Test Instruments

Drawings for a can thickness measuring device to be used with the cold canned slugs, a nickel plating thickness device, and revised mechanical assembly for the non-seat test are completed and the first two have been submitted to the shop.

Pulsed Eddy Currents

Work has been resumed in the study of pulse techniques for use in eddy current devices. Purpose of this work is to develop a method of eddy current testing in which frequency is added to the amplitude and phase parameter which characterize an object in the present fixed frequency system. Preliminary work is being done (1) on finding an orderly method of displaying (on an oscilloscope or by other means) the large number of data values delivered by a pulse and (2) on balancing devices or networks to simulate a metal so that a multiple frequency balance can be obtained. Some consideration is being given to frequency modulation rather than pulse techniques.

Temperature Measurement

Efforts are being made to develop methods of (1) measuring resistivity of hot metal with the object of measuring the resistivity of irradiated slugs at various temperatures and (2) adopting eddy current measurements to process control of metal forming processes such as rolling and extrusion. Work to date has been on eddy current high temperature coils in which it has been found that alumel wire, potted in Sauereisen cement, seems to work well both mechanically and electrically at high temperatures.

Internal Friction

Studies are being continued to develop a technique for making accurate measurement of the internal friction of uranium slugs. The SIFT, sonic internal friction test device, has been built to measure the logarithmic decrement of materials of high "Q".* For low "Q" materials it is planned to measure the half width of resonant peaks. SIFT is now being debugged. Several types of suspensions and driving systems have been studied to find one which is mechanically rugged and at the same time introduces no extraneous damping. The electrostatic technique developed by Mannal was found to be unsatisfactory for internal friction measurements. The more conventional suspension on two wires is now being studied.

* High "Q" materials are materials having low internal friction. These are characterized by ringing a long time after being struck.

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Mechanical

The tank, drive, and roll mechanisms of the automatic skewed roller conveyor have been turned over to the shop for construction without the loading devices on which design is now complete. Loading devices will be added after the initial test for wear and serviceability of the drive mechanisms have been made. Meantime connection devices for inclusion of this conveyor in the 313 conveyor system are being designed.

A model of a device for automatic unloading of slug boxes has been made for study of the problems involved in making a completely automatic machine to unload the boxes and test slugs prior to the slug pickle station.

COATINGS AND CORROSION

Anodizing - PT-313-105 27M Suppl. B

Two tubes of anodized slugs were charged in C-pile for coating evaluation in 110-115 C process water. The slugs were regular lead-dip production fuel elements with the surfaces prepared by three different methods:

1. Anodized in sulfuric acid solution and sealed at 170 C in buffered dichromate solution.
2. Anodized in oxalic acid and sealed in distilled water at 170 C.
3. Autoclaved at 170 C for 40 hours.

This is the first time that aluminum jacketed fuel elements anodized in sulfuric acid and sealed in buffered dichromate solution have been charged into the pile. Goal exposure is 400 MWD/T.

Anodizing: Corrosion Resistance of Anodic Coatings with BMI Seal

Samples of EC, 2S, 24S and 63S aluminum anodized in chromic acid solution and sealed in 1 w/o silicic acid have been exposed to low flow 120 C process water for one month. These samples were prepared at Battelle Memorial Institute. Comparison of weight loss and appearance of BMI coating and of specimens prepared at HAPO and sealed at 170 C do not indicate any advantage for the BMI coat. Tests continue.

Corrosion Studies of Ceramic-Coated Aluminum

Samples of EC, 2S and 63S aluminum alloys ceramic coated at BMI have been exposed one month in 120 C process water. The coating has the following composition: 10% Na_2O , 50% PbO , 30% SiO_2 , 6% TiO_2 , 3% ZrO_2 , 1% NiO . Weight losses are higher than for high temperature sealed anodic films. Some spalling of the coating was noted particularly at the coupon edges. Tests continue.

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High Temperature Corrosion Studies

The survey of commercial aluminum alloys has indicated two more alloys of interest for use in high temperature distilled water. After 12 days at 350 C, 18S and 32S have demonstrated excellent corrosion resistance. Both alloys are classified by ALCOA as wrought alloys.

Electroplating

A program has been initiated to minimize the total amount of nickel which will be required to provide the sweater coat for the hot pressed fuel element. Recent efforts have been directed toward obtaining a uniform distribution of the plate on both horizontally and vertically racked uranium cylinders. Since the distribution can be altered depending upon location and geometry of plastic shields, cathode robbers, or a combination of both, empirical work is in progress to determine the optimum design required for uniformity.

Technique for Bond Testing

A new technique was evolved for disclosing unbonded areas in hot-pressed (aluminum-jacketed, nickel-plated uranium) fuel elements. In this procedure the aluminum jacket is removed by dilute (one percent) sodium hydroxide. The unbonded areas of nickel are then exposed as a bright metallic surface while the bonded areas are black. Presumably, the latter represents a solid solution or intermetallic compound of aluminum and nickel.

Two eight-inch slugs canned in the four-hole hot press at 575 C and 12 tsi for 10 minutes were tested in this manner. Approximately 25 percent of the surface of each of them was unbonded at the cap end. Three eight-inch slugs canned at 625 C and 12 tsi for 15 minutes also were tested. One of them was completely bonded; each of the other two had an unbonded area of approximately one square inch near the cap end. These preliminary results support a previous conclusion from undercutting experiments that improved hot press bonding may be obtained by using a temperature of 600 to 625 C and, possibly, a longer pressing time than the usual 10 minutes. Additional slugs are being evaluated and the results will be correlated with undercutting and frost test data.

Secondary Corrosion Studies

Twenty-one nickel-plated, hot-pressed slugs having part of the aluminum jacket stripped in cold 1 percent caustic are being tested in a recently assembled flow tube using 120 C tap water flowing at about 12 ft./second. Some of these slugs have previously been tested in autoclaves and 100-D flow tubes for periods up to three months. Data from these tests show that after hot pressing, electroplated nickel coatings as little as 1 mil thick provide far more corrosion protection than has ever been observed with 1 mil as-plated nickel coatings or nickel coatings heat-treated in a vacuum.

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Wafer Slugs

A wafer slug having alternating discs of aluminum and uranium was tested to determine its behavior when high temperature (170 C) water penetrated the jacket. The slug did not swell and split the surrounding process tubing as all other slugs previously tested in a similar manner have done. It broke transversely into three water-tight segments of the same diameter as the original slug. The breaking occurred at points where 1/16" holes had been drilled through the jacket and into the uranium. A wafer thus exposed to the water disintegrated, leaving water-tight slug segments to each side of it.

Four more wafer slugs, each of them having wafers of a different thickness, are being similarly evaluated. Using wafers of the most promising dimensions, a slug is then to be tested in flow tubes by the Recirculation Technology Unit.

Multi-Jacket Slugs

A thin layer of uranium or uranium alloy between an outer slug jacket and an inner secondary jacket might provide ample warning of failure of the outer jacket without causing enough swelling to make the slug stick in the process tubing. As a preliminary test of this possibility, a piece of uranium tubing four inches long, 1.335 inch O.D. and 3/32-inch wall thickness, was canned by the lead-dip process. The jacket was perforated by a 1/16-inch hole and the assembly then exposed to 170 C water. After 41 hours, the jacket had swollen sufficiently to bulge the surrounding process tubing, indicating that 3/32" may be too thick for a warning layer. Other thicknesses are being tested.

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PHYSICS RESEARCH SUB-SECTION

Lattice Physics

A study of exponential pile data on hollow internally-cooled slugs has been completed. The study was based on two fuel geometries, 1.66" OD x 0.81" ID and 1.66" OD x 1.11" ID. Two interesting conclusions were found. First, the results indicated that lattices loaded with these internally-cooled slugs suffer less variation in reactivity on loss of cooling water than the corresponding externally-cooled solid slug lattices. In the case of the undermoderated lattices, the wet and dry bucklings are nearly the same for a wide range of moderator to fuel ratios. In the overmoderated lattices, loss of water results in less than half the gain in reactivity experienced for externally-cooled, solid slug lattices. The second conclusion was that the gain in conversion ratio obtained by putting the water on the inside of the slug is only on the order of 1 per cent for a 105-H type lattice. As the amount of water is increased the conversion ratio gain will increase correspondingly. This work is to be reported in HW-36174, "Exponential Measurements with Hollow Slugs in Graphite-Uranium Lattices."

Exponential pile measurements of 0.925" diameter fuel rod lattices have been resumed with measurements in the 5-3/16" and 7" lattices. The H₂O/U ratio of the assembly measured was 0.174 water molecule per uranium atom. This is about 10 per cent less than the ratio of 105-H Pile fuel assemblies. The results are tabulated below together with the previous measurements in the 6-3/16" and 7-1/2" lattices.

BUCKLING

(in μb units, 1 $\mu\text{b} = 10^{-6} \text{ cm}^2$)

<u>Lattice Spacing</u>	<u>Wet Lattice</u>	<u>Dry Lattice</u>
5-3/16"	75	69
6-3/16"	98	115
7"	84	109
7-1/2"	66	95

These measurements confirm earlier calculations showing that the buckling of the wet lattice becomes larger than that of the dry lattice in the region of a 5.4" lattice spacing. Measurements are being made in the 5-3/16" and 7" lattices using the same fuel rod but about 4.5 times as much water. This corresponds roughly to the H₂O/U ratio of interest for high specific power reactors such as the revised DPR.

Reactor Physics

(1) Physical Constants Testing Reactor

The status of the PCTR fabrication is as follows: The graphite stacking has been completed, the major portion of the wiring from the control room to the reactor room has been installed, and fuel elements for the control rods and flux leveling slugs have been fabricated.

Prestartup testing and loading procedures are being prepared.

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Physics Research Sub-Section

Data were obtained from which the diffusion length of the PCTR graphite stack is being calculated.

(2) Thermal Test Reactor

The graphite stack for the TTR has been completed. TTR fuel element procurement awaits the return and analysis of bids.

(3) General

Progress has been made in developing a technique for measuring the neutron temperature in a reactor. The method is based on the dissimilarity in the fission properties of U-235 and Pu-239 as a function of energy. The relative fission product activities induced in U-235 and Pu-239 foils is a measure of the effective neutron temperature at the exposure location. During the KW startup experiments a pair of foils was irradiated in the hot wet pile (77°C). The relative counting rate was $\left(\frac{49 \text{ activity}}{25 \text{ activity}}\right)_{77^\circ\text{C}} = 1.056 \pm 0.006$. The same pair of foils was

irradiated recently in a wet K-pile geometry in the Test Pile. The relative counting rate in this cold assembly was $\left(\frac{49 \text{ activity}}{25 \text{ activity}}\right)_{20^\circ\text{C}} = 0.967 \pm 0.005$. This

9 per cent change in relative counting rate in going from 20°C to 77°C is about what was expected and indicates that this technique should enable the detection of variations in effective neutron temperature as small as 10°C. This technique will be used in the PCTR temperature coefficient experiments to determine the neutron temperature distribution near the boundaries between the hot core and the cold driving lattice.

Theoretical calculations have been made on the variation of the graphite coefficient with fuel exposure. These calculations include variations which occur in f , the thermal utilization, in η , the number of fast neutrons per slow neutron captured in fuel, in τ , the neutron age and in L , the diffusion length. A few representative numbers for $\frac{\Delta k}{k} = \frac{k_0 - k_{0.025}}{k_{0.025}}$.

Neutron Temperature θ	Exposure (Natural Uranium)		
	0 MWD/T	600 MWD/T	2000 MWD/T
0.025 ev.	0	0	0
0.040 ev.	-0.0025	0.0016	0.0077
0.060 ev.	-0.0049	0.0092	0.0278

Nuclear Physics

A measurement of the variation of η^{25} was made in the energy region 0.1 ev to 0.5 ev. η^{25} is the number of fast neutrons produced per slow neutron absorbed in U-235. The slow neutrons were obtained with the aid of the neutron spectrometer. Fast neutrons were detected by scintillation counting techniques. The results of this experiment

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indicate that η^{25} decreases by $6\% \pm 2\%$ in changing the energy of the bombarding neutrons from 0.1 ev to 0.29 ev. This is in general agreement with η predictions based on cross-section measurements previously made at Hanford.

A substantial portion of the work on this experiment was the development of theoretical corrections which must be applied to the data to account for neutron scattering and attenuation in the U-235 sample.

Experimental work has been completed on the neutron absorption cross-section measurements of Np-239. This experiment has been a joint effort of the Physics Research and Chemistry Research Sub-Sections. The present results are as follows: Np-239 absorbs thermal neutrons with a cross section of 60 ± 25 barns; two isomeric states of Np-240 are formed with about equal probabilities; the half lives of the two isomeric states are 7 minutes and one hour.

Several unforeseen points of interest have come out of this experiment. First, the possibility that two states of Np-240 might be formed had not been anticipated prior to the experiment. Second, it has been possible to add to the knowledge of the decay schemes of both Np-239 and Np-240.

A conclusion of practical importance in plutonium production can be drawn from this knowledge of the Np-239 cross section. It now can be said that increasing the neutron flux level in thermal piles will decrease⁽¹⁾ the Pu-240 content of the product plutonium provided the moderator temperature is held constant.

(1) Leonard, B. R., The Dependence of Pu-240 Concentration in Pile-Produced Plutonium on Neutron Flux Level, HW-31016

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METALLURGY RESEARCH SUB-SECTION

Irradiation Effects

The optical strain measuring instrument and the elevated temperature vacuum furnace, to be used for testing irradiated tensile specimens, have been installed in the Radiometallurgy laboratory. The furnace maintained a vacuum of 1×10^{-5} mm Hg when heated to 700 C. The calibration of the furnace showed less than 1 C variation in cycling and 1 C variation in gradient along the sample gage length and at the specimen grips. This calibration indicated that the furnace was exceptionally well designed. One irradiated tensile specimen was tested at 285 C. This specimen was irradiated under PT-105-3N and was exposed to approximately 620 MWD/T (1.8×10^{20} nvt). The values obtained on this one specimen tested at 285 C are as follows: Ultimate tensile strength - 71,000 psi, yield strength (0.01 percent offset) - 70,000 psi, and elongation - 0.7 percent. Results indicated that the irradiated uranium had little ductility even at 285 C and that its strength values were also similar to those obtained at room temperature as reported in HW-31823. The data in the following tabulation serves to illustrate the marked effect of moderate in-pile exposure on the mechanical properties of natural uranium.

<u>Specimen History</u> (All samples were β -heat treated normal production metal)	<u>Test Temp.</u> °C	<u>Ultimate</u> <u>Strength, psi</u>	<u>Yield Strength</u> (0.1% offset) psi	<u>Elongation</u> %
Irradiated 620 MWD/T	285	71,000	70,000	0.7
Unirradiated	285	44,000 (avg)	25,000*	33.00 (avg)
Irradiated 620 MWD/T	25	76,000 (avg)	71,500 (avg)	0.36 (avg)
Unirradiated	25	91,500 (avg)	33,500*	12.5 (avg)

*0.2% offset

Metallurgical Techniques

Studies have been conducted for the purpose of developing techniques for macro study of irradiated samples in the magnification range 1X to 25X. Chemical and electrolytic etching techniques have been sought that would yield satisfactory results in shorter times than are required for cathodic vacuum etching. Resolution of macro structure was possible with any of several techniques tried, but the 10-1/2 inches of lead glass viewing plug obscured the etch to such an extent that accurate photographs could not be taken. Electrolytic etching in a hydrochloric phosphoric acid bath followed by a brief nitric acid clean and rinsed successively in ethyl alcohol and n-octyl alcohol showed the greatest promise and is being studied further. Since existing optical equipment at the metallographic cell is incapable of giving macro photographs at greater than about 3X magnification, studies have been made pursuant to designing equipment capable of magnifications up to 25X when used in conjunction with the 10-1/2-inch thick lead glass viewing plugs.

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Metallurgy Research Sub-Section

Work with existing thermal conductivity apparatus continued. An attempt was made to calibrate the 430 stainless steel standard with another 430 standard. The accuracy obtained was not within the desired limits of five percent. Work is continuing to improve techniques and accuracy. A literature survey of methods used in measuring thermal conductivity was terminated, and after evaluation of the techniques, a choice of an alternate method has been made, and a different unit is in the design stage. This apparatus will utilize the same vacuum and temperature measuring equipment as the existing unit. A "T" from the present vacuum will enable both units to operate singly or together. Attempt is being made to incorporate sufficient flexibility into the equipment to allow several thermal conductivity methods to be tested.

Weighed and precharacterized metallographic specimens of annealed, ingot uranium and of Zircaloy-2 have been heated in NaK at temperatures of 600, 700, and 800 C for a period of 18 days and then re-examined. Weight changes in the fifteen-gram uranium specimens was less than ± 0.0004 g; each of the three two-gram Zircaloy-2 specimens increased in weight by 0.0010 g. An examination of the uranium specimen heated at 600 C disclosed essentially no microscopic changes in surface structure; the 700 and 800 C uranium specimens displayed increasing surface structural irregularities and isolated attack; however, the original markings and many of the original grain boundaries of the 700 and 800 C heat treated uranium specimens still could be found. The Zircaloy-2 specimens heated at 600 C were slightly attacked at the grain boundaries. The 700 and 800 C Zircaloy-2 specimens were pronouncedly changed at the original scratch markings and grain boundaries. An extensive optical and electron microscope study of these specimens is in progress in order to establish whether a possible precipitate has formed at these locations.

Three Zircaloy-2 capsules, each containing a precharacterized, metallographic uranium specimen and NaK as a heat transfer medium, have been prepared for MTR irradiation. The test, GEH-3-10, will permit a determination of the effect of irradiation on the microstructure of uranium.

A new type capsule for in-pile diffusion studies, consisting of a thick-walled Zircaloy-2 cup ironed onto the diffusion couples, has been designed so that it can be used for U-Al and U-AlSi at 200 C - 250 C (392 F - 482 F), and U-Zr couples at 350 C - 450 C (662 F - 842 F). An inert atmosphere is maintained in the capsules so that the diffusion couples are never exposed to air. Fluxes ranging from 4×10^{13} to 7×10^{13} nv will be required to produce these maximum temperatures at the diffusion interfaces. One of the new capsules containing two U-AlSi couples and one containing two U-Al couples have been prepared and will be shipped to the MTR on May 2 for irradiation at 200 C (392 F) and 250 C (482 F), respectively. Laboratory experiments have continued as a basis for interpretation of the in-pile diffusion studies. A U-Al couple was clamped together and annealed at 200 C (392 F) in vacuo for 310 hours. The resulting diffusion zone penetration from the original U-Al interface into the Al was 0.0048 inch; much greater than would be expected on the basis of data obtained at higher temperatures by investigators at ORNL, BNL, and HAPC. Extrapolation of data from these sources indicates that the penetration should have been approximately 0.0018 inch. The temperature recording system used during this experiment was later checked against a direct measurement of the temperature of an identical couple and was found to be accurate within ± 5 C (9 F). Additional U-Al couples will be annealed at 200 C (392 F) in vacuo in order to check this result. A U-AlSi diffusion couple is now being prepared for a diffusion anneal at 200 C (392 F).

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Fuel Elements

Unbonded slugs, canned by the room temperature point closure technique, are being irradiated to determine their rupture resistance and to check the hypothesis that an unbonded fuel element should give improved performance under Hanford conditions. Four solid, unbonded slugs are operating normally in H-Pile in a tube scheduled for discharge at a tube exposure of 725 MWD/T. The slugs are operating at 42 kw/ft, and current exposure on the tube is about 675 MWD/T.

A tube charge of 36 unbonded cored natural slugs and four unbonded cored enriched slugs in C-Pile incurred a failure at a tube exposure of about 280 MWD/T. The ruptured slug, a natural uranium slug, had split longitudinally. The axial core had suffered extensive corrosion, but there was no evidence of bulges due to corrosion product between the can wall and the uranium. Water entry through the closure or can wall may with fair certainty be ruled out as the basic cause of failure. The examination of the rupture indicates that an unknown amount of solution was contained in the core and that corrosion by this liquid precipitated the failure of the element.

An additional cored insulated slug has been fabricated and shipped to the MTR for irradiation next month in the Fuel Element Testing Facility. Two cored insulated slugs will be irradiated simultaneously; one having the cored uranium slug plugged with welded uranium end plugs and one having a smooth core without end plugs. A zirconium disk at each end of the latter served to prevent flow of aluminum into the core during the canning process. Failure of cored slugs with welded end plugs has led to the supposition that cracks in the weld material or preferred orientation and large grains in the weld structure are causing slug failure. This test will permit a comparison of the performance of cored insulated slugs with and without welded end plugs. The slugs will operate with surface temperatures of 400 C and maximum uranium temperature of 850 C.

Fuel Materials

No visible damage was noted in two 10,000 MWD/T uranium-magnesium specimens that were examined this month. The irradiation of two similar capsules of this material to 15-20,000 MWD/T and two larger fuel elements of uranium-magnesium fuel material to 5,000 MWD/T is proceeding normally at the MTR. Present exposures on the specimens being irradiated are approximately 13,000 and 500 MWD/T, respectively.

A number of ternary alloys of thorium-uranium-zirconium have been prepared and examined. It does not appear that additives of 6 w/o and 10 w/o zirconium to alloys of thorium - 3 w/o uranium decreases the solid solubility of uranium in thorium. Samples of these ternary alloys have been submitted to the Chemical Research Sub-Section for analysis, but it has not been possible to dissolve them using hydrochloric, sulfuric, nitric, hydrofluoric, or combinations of these acids. Since this suggests that these ternaries may be highly corrosion resistant, samples are being prepared for high temperature corrosion studies.

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Metallurgy Research Sub-Section

The study of making uranium shot is continuing. Preliminary tests are being made on materials and components for a new design shotting apparatus. This apparatus will use a salt bath with a controlled temperature gradient to permit the melting, spheroidizing, and quenching of uranium metal without exposure to air or to a contaminated inert atmosphere. Development of a process of slip casting uranium pellets is continuing with the construction of furnace equipment for study of the problem on a batch laboratory basis. A study of the variables in the preparation of the slips is being carried out.

In support of an understanding of the metallurgical phenomena associated with the KW startup, diffusion studies were carried out on centrally heated, AlSi-bonded, canned slugs. A temperature of 600 C at the U-AlSi interface caused massive diffusion and can wall swelling within less than one minute. This rapid diffusion arises principally because of the molten AlSi eutectic present in the bonding layer. For comparison purposes, an unbonded slug was heated to 600 C at the U-Al interface. No visible damage occurred within a period of two hours.

Areas of large columnar grains have been noted in slugs heated into the beta phase in-pile. In order to study this grain growth, bare unirradiated slugs were heated with a longitudinal temperature gradient such that one end of the slugs entered the gamma phase (above 760 C) while the other end remained in the alpha phase (below 660 C). That portion of the uranium which was heated above 660 C for as little as one minute contained large columnar grains oriented parallel to the path of heat flow. Two uranium alloy slugs were also tested to determine whether grain refining additives would suppress this grain growth. A 0.4 atomic percent chromium alloy slug exhibited no grain growth in the beta phase (660-760 C) region, but columnar grains developed in the material heated above 760 C. A 1.5 atomic percent silicon alloy slug exhibited no grain growth even in that portion of the slug heated up to 900 C for two hours.

MTR Fuel Element Testing Facility

Word has been received from the Phillips Petroleum Company that the catch-tank vent system modifications to the Materials Testing Reactor will be completed in time for the testing facility to resume operations after the May 9 shutdown. The fuel element charge in the testing facility consists of two insulated slugs and one mechanically bonded slug. The rechargeable "B" block to be used for all future irradiations in this facility will make it possible to remove irradiated specimens for examination during shutdown periods and recharge the test fuel elements for additional exposure periods.

Zirconium Metallurgy

Weight gains of Zircaloy-2 specimens after 2100 hours in dry air at 400 C (750 F) average 0.8 mg/cm², while the value predicted by extrapolation from data obtained at 500, 600, and 700 C is 2.0 mg/cm². This is considered reasonable agreement in view of the uncertainties involved. Weight changes of similar specimens at 300 C are still insignificant.

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Metallurgy Research Sub-Section

Creep strengths and creep rates of 50 percent cold-worked Zircaloy-2 are now being determined for use as design criteria of process channels for graphite moderated piles. The fracture of one annealed specimen at a stress of 28,000 psi and an elongation of 33 percent at 320 C (608 F) displayed voids in the highly stressed region near the fracture similar to those described by Forscher at WAPD from tensile testing. These were attributed to hydrides.

At the request of Fuel Element Development personnel, an investigation is being made into the change in preferred direction of orientation of the (200) planes in zirconium fuel element jackets as a function of reduction in wall thickness by the unskinning technique. Although the data are incomplete to date, a pattern is developing which indicates that increasing reduction of can wall thickness tends to increase the number of (200) poles perpendicular to the rolling plane. The maximum density of these poles after a reduction from 0.020" to 0.002" occurs at approximately 10 degrees from this perpendicular.

Uranium Reduction Studies

Preparation of spherical uranium particles by reduction of uranium oxides with calcium has continued. Three forty-gram charges of uranium have been fired. The uranium trioxide was reduced with calcium metal while calcium chloride was employed as a flux. The calcium chloride forms a fluid slag with the calcium oxide formed during reduction. No booster was employed in these reductions. The charges were fired and soaked at elevated temperature for varying lengths of time. In one charge held for one hour at each of the temperatures 1000 C, 900 C, and 800 C, with 15 minutes required to cool from 1000 to 900 to 800 C, the amount of +325 mesh uranium was considerably increased over that obtained from a similar charge which was fired and cooled with essentially no soak at elevated temperature. A second charge held at 1030 C four hours after firing appears to have resulted in a slightly greater percentage of +325 mesh material than was obtained with the previous charge. Several additional small scale reductions are planned with soaking at temperatures as high as 1400 C.

Radiometallurgy Examination

The examination of the four-inch mechanically bonded point closure rupture from tube 2062-C was begun. This slug was irradiated under PT-105-584-A to an exposure of 300 MWD/T and was discharged February 27, 1955. A large area of the jacket was severely swollen by the formation of uranium corrosion products. There was no swelling observed between the rib marks or at the cap end of the slug. Four longitudinal splits of various sizes were found in the jacket. The largest of these was approximately one inch long and was located near the center of the slug. Some necking down of the aluminum appeared to have occurred before failure. A smaller split was located near the edge of the swollen area and had the appearance of a brittle failure. Careful examination of the outside surface of the jacket revealed no evidence of excessive corrosive attack. A small pit was observed in the center of the cap; however, it did not appear to be the result of corrosive attack. The cap was easily removed and examination of the small axial hole which is drilled into the end of the uranium core revealed no evidence of this area having been exposed to water. There was, however, a crescent-shaped area on the end of the core which was covered with a thin film of black corrosion product indicating that water had seeped between the cap and uranium. The uranium in this area was only slightly attacked. A simple

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Metallurgy Research Sub-Section

leak test of the cap revealed no evidence of leaks. The slug was transversely sectioned through the major jacket split and three large radial cracks were found in the core. The largest of these extended from the center to the periphery and exactly coincided with the jacket split. It was about 1/8 inch wide at the periphery and was filled with oxide. The two smaller cracks were located approximately 150 and 210 degrees, respectively, from the large crack. Neither of these cracks extended to the outside of the slug.

Examination of the unbonded point closure rupture from tube 1675-C, discharged March 17, 1955, was begun. This is a four-inch cored natural uranium piece which was irradiated under PT-105-580-A to an exposure of 248 MWD/T. The slug had split longitudinally into two nearly equal pieces. The cap and uranium plug were attached to the larger of the two pieces, although there was a circumferential tear in the jacket at the cap-core interface which extended for a distance of about 90 degrees. The jacket base and uranium base plug were not received. No swelling of the jacket was observed. The jacket was mechanically stripped from the small piece, and examination of the outside surface of the uranium revealed only a slight amount of corrosion. The entire inside surface of the core and the base end plug hole were very severely corroded; however, the plug and plug hole at the cap end had undergone very little attack. It was found in stripping the jacket that it had become bonded to the uranium at two small areas just below the cap end of the uranium. Sections have been taken through these areas for metallographic examination. The evidence to date indicates that severe corrosion of the core of the uranium during irradiation and the resulting build-up of corrosion products produced sufficient internal pressure to cause the slug to split. It also appears that the corroding agent was present in the core prior to charging, and probably entered through a faulty plug weld during pickling.

The production test to evaluate the acceptability of a proposed uranium-magnesium fuel element was continued. Two Zircaloy-2 canned capsules which had reached an exposure of 10,000 MWD were discharged and sent to the Radiometallurgy Building for examination. Visual examination and photographs of the exterior of the sample containers disclosed no changes due to irradiation. Diameter measurements on the cans showed one sample to be a few thousandths larger even though both samples were sized in the same die. The sample which showed a slight increase in can diameter was successfully driven out of the jacket after the ends were removed. The second sample, which is apparently unchanged from its original diameter, has so far resisted any attempts to drive it out of its jacket.

A cored, lead-dipped, natural uranium slug rupture from PT-105-570-A was removed from the process tube after an exposure of 1213 MWD/T and examined. The uranium of the slug was found to have split longitudinally with only superficial corrosion of the uranium having taken place. There were additional radial cracks at the cap and base end indicating the possibility of stress concentrations at these points. A detailed examination of the slug end, including the welded uranium plugs in this slug, and in adjacent unruptured slugs will be made.

The detailed examination of components from tube 4669-KW continued with emphasis on a determination of the results of the uranium-aluminum diffusion processes which occurred. The end product of the diffusion reaction at the temperatures reached in the central portion of the tube generally was a porous mass of UAl_3 with small amounts of UAl_4 present.

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Metallurgy Research Sub-Section

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Radiometallurgy Facilities

A parting-lathe designed for in-cell use was received from the 325 Technical Shop and set up in the Radiometallurgy hot shop for preliminary tests. Cut-off tests were made on 2S aluminum, brass, mild steel, stainless steel, and zirconium in order to determine the most versatile parting tool design and the most suitable cut-off speeds. An 1/8 inch thick parting tool ground with a front clearance of five degrees and a back rake of 10 degrees proved the most versatile parting tool design, working equally well on all of the above metals. The machine showed a remarkable freedom from vibration and chattering and seemed to be satisfactory in all respects.

Separation Plant Corrosion

Visual examinations were made of the electrically heated calcining pots numbers PW-24 and PE-27, 224-U Building, following their removal from service after about 18,000 hours of operation. Both pots exhibited cracks on the outer surface of the pot wall, ranging from two to six inches in length, some of which had penetrated through the pot wall. The cracks tend to be circumferential in nature and appear to occur within a circumferential band about 12 inches wide and about 12 inches vertically above the pot bottom. Pot Number PE-27 had corroded intergranularly in the vapor phase until it was impossible to seat the gasket which seals the cover on the pot. Pot Number PE-24 showed serious intergranular corrosion in the vapor phase, but it had not progressed to a point which interfered with the seating of the gasket. It appears probable that the cracking phenomena observed in these pots is caused by the thermal cycling involved in their operation and is a function of the number of cycles through which the pot has passed. Since all of the original pots in the 224-U Building have very nearly the same length of service, it is believed that most of these pots in service at the present time are cracked to varying degrees.

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Metallurgy Research Sub-Section

Two large reductions of plutonium (2240 g and 1430 g) which had received a peroxide precipitation in addition to standard processing were made in an effort to produce metal with less than normal impurities. The densities of these two pieces were 19.11 and 19.09 g/cc, respectively. This would indicate the absence of stabilizing alloys as these high densities were determined while the metal was still in the "as-reduced" condition. A chemical analysis of the larger piece indicated an undetectable (less than 0.02 percent) amount of gallium.

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CONTACT ENGINEERING UNITPROJECT REPRESENTATIONProject CA-512-R

Installation of gamma monitoring equipment for the K Piles was approved, but the source of funds has not yet been identified. Installation of a sub-critical monitor, proposed by the Pile Technology Section, was not approved for inclusion in the project, thus a separate project will be initiated for this purpose. Based on the KE startup tests the decision was made to use a mixture of 50 per cent boron steel and 50 per cent carbon steel balls in the K ball 3X systems.

Project CG-558

Major item of interest concerned the awarding of contracts for construction of the new 190 B and D pump houses. Horizontal rod installations were completed at F and DR Piles. Difficulty was experienced with rod scratching and galling. Installation at the remaining piles is being delayed pending investigation of this problem.

Project CG-600

Approval was granted for the addition of new 190 pumps to this project. Expected pile flow rates will be approximately 95,000 gpm. No motor overloading will be required under this case of operation.

RESEARCH AND DEVELOPMENT GROUP REPRESENTATIONMechanical Development

Consideration was given to tube flow monitoring instrument and process tube removal equipment development. Flow monitoring studies to date show a differential pressure meter with electrical signal output to be the most promising.

Reactor Development

Review was made of the schedule for preparation of the project proposal for installation of continuous charge-discharge equipment at C Pile. The project will be complete on June 20, 1955, with actual installation on C Pile expected to be between May 1956 and March 1957 depending on possible conflicts with CG-558 installation. The connector development program was reviewed. The use of stainless steel nozzle adapters on the front face was authorized. Intensive efforts to evaluate both stainless steel and teflon hose connectors are now underway.

PROCESS STUDIES

The study on pressurization has established the minimum out-of-pocket cost of plutonium production as a function of maximum tube outlet temperature, goal exposure, and corrosion rate of aluminum slugs and tubes in HDF type piles.

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Contact Engineering Unit

Optimum exposures are near 800 MWD/T for all cases examined. Improvement in corrosion rates by a factor of four leads to optimum operation at 145°C maximum tube outlet temperature. A detailed report is in process of preparation.

A summary report of the alum-activated silica water treatment processes and associated tests at HAPO is being prepared.

With final issue of the fiscal 1957 construction budget, assistance in budget preparation was completed.

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 April, 1955. 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.

O. H. Greager
Manager - Pile Technology
ENGINEERING DEPARTMENT

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VISITORS AND BUSINESS TRIPS

W. Alter, from Knolls Atomic Power Laboratory, Schenectady, New York visited Hanford April 25, 26 and 27th to discuss the assistance to Hanford program with regard to possible separations problems arising from the use of different fuels.

W. J. Lindsey, Atomic Energy Commission, Washington, D. C. visited Hanford on April 20 and 21st to discuss reduction characteristics of continuously produced UO_3 .

Pat J. Selak, Joseph Finke and W. M. Mallott, Atomic Energy Commission, Kaiser Engineers, visited Hanford on April 22nd to discuss separations plant design for power plants.

R. C. Smith of Hanford visited the Los Alamos Scientific Laboratory, Los Alamos, New Mexico on April 18, 19, and 20th to discuss problems relating to plutonium fabrication.

G. Sege of Hanford visited the Atomic Equipment Company and KAPL, Schenectady, N. Y. on April 18 for an employment interview; visited the General Engineering Laboratory on April 18th to discuss separations plants processes and April 25th 26th visited the ANP Department, Cincinnati, Ohio for an employment interview.

R. G. Geier of Hanford visited Oak Ridge National Laboratory, Oak Ridge, Tenn on April 24th thru the 28th to discuss the quality of future products; and Mallinckrodt Chemical Works, St. Louis, Missouri to discuss reduction characteristics of continuously produced UO_3 .

C. E. Michelson of Hanford visited Cincinnati, Ohio on April 4 and 5th to attend the American Society meeting, and the Argonne National Laboratory, Lemont, Ill. on April 7th to discuss analytical problems; and the University of Wisconsin, Madison, Wisconsin on April 8th to discuss analytical problems.

D. C. Kaulitz of Hanford visited Allied Engineering Company, Oakland, California on April 2nd to discuss engineering details in regard to irradiation apparatus.

E. P. Galbraith of Hanford visited the So. Dakota School of Mines, Rapid City, So. Dakota on April 1st, to recruit technical personnel.

ORGANIZATION AND PERSONNEL

	<u>March</u>	<u>April</u>
Separations Technology General	2	2
Plant Processes Sub-Section	50	54
Chemical Development Sub-Section	81	74
Chemical Research Sub-Section	60	61
Contact Engineering Unit	4	5
Analytical Laboratories Unit	33	33
Technical Shops Unit	29	28
	<u>259</u>	<u>257</u>

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Separations Technology Section

Plant Processes Sub-Section: H. A. Anderson, Jr., Engineering Assistant was hired into the Sub-Section on 4/25/55. L. W. Burn, General Clerk B, was transferred from Technical Shops into the Sub-Section on 4/4/55. M. H. Curtis, Engineer I, D. O. Darby, Senior Engineer, H. C. Rathvon, Engineer I and R. J. Sloat, Head, T&U Plant Process transferred from Chemical Development on 4/1/55 to Plant Processes Sub-Section. J. G. Bradley, Head, T&U Plant Process transferred to the Contact Engineering Unit on 4/1/55. W. A. Burns, Engineer I, transferred to Technical Personnel on 4/1/55.

Chemical Development Sub-Section: Doris A. Parthenay transferred from Office Auxiliaries as Secretary C into the Sub-Section on 4/4/55. Robert D. DeWitt, Technical Graduate, transferred into the Sub-Section on the Rotational Training Program on 4/11/55. J. L. Carroll, Engineer II terminated on 4/29/55. Beatrice P. Galbreath, Steno-Typist, terminated on 4/15/55. G. Asanovich, Engineer II, terminated on 4/21/55. Betty J. Buxton, Secretary B, was deactivated on 4/7/55. R. H. Bond, Engineer I, was deactivated on 4/12/55. D. O. Darby, Sr. Engineer, H. C. Rathvon, Engineer I, M. H. Curtis, Engineer I, and R. J. Sloat, Sr. Engineer was transferred to the Plant Processes Sub-Section on 4/1/55.

Chemical Research Sub-Section: T. J. Birchill, Engineer, was hired into the Sub-Section on 4/11/55. J. F. Calkin, Technical Graduate, was permanently assigned in the Sub-Section on 4/4/55.

Contact Engineering Unit: J. G. Bradley, Sr. Engineer, transferred into the Unit from the Plant Processes Sub-Section on 4/1/55.

Technical Shops Unit: Laura D. Burn, General Clerk B, transferred from the Unit into the Plant Processes Sub-Section on 4/4/55.

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PLANT PROCESSES SUB-SECTIONREDOX PROCESS TECHNOLOGYSummary

The processing of 200 MWD/T metal was finished on April 9, 1955, approximately one week later than originally planned. The delay was caused by the necessity for re-working approximately 6,600 gallons of salt waste containing 250 grams of plutonium, lost during the 24 hour period from March 31 to April 1, 1955, in which the acid deficient flowsheet for the Plutonium Cycles was under test. The reasons for the loss still are not clear, but it appears to have resulted from the formation of plutonium(IV) polymer, in spite of the fact that analytical data show the plutonium to have been more than 99 per cent oxidized to the hexavalent state.

Operations were resumed on April 14, with 560 MWD/T metal, cooled approximately 150 days. The IA Column, having been equipped with a larger IAW letdown valve during the shutdown, was used, and the IA dual scrub flowsheet was again employed. Because of the long metal cooling period, iodine-131 was not a major problem and, except for one or two peaks of 1.5 to 2.0 curies (principally from B Dissolver), the daily average emission was less than 0.5 curie. A recent regeneration of B-3 Reactor has apparently solved that problem also.

Although difficulty was encountered with decontamination immediately after startup, the plutonium and uranium products improved rapidly and, at the end of the report period, were excellent, averaging about 0.9 gamma ratio for the uranium and less than 0.1 G/AT ($\times 10^{-9}$) for plutonium. Immediately following startup, excessively high plutonium losses were encountered as the result of exceptionally high acid deficiency in the second Plutonium Cycle feed solution which, in turn, is believed to have been introduced via the necessary rework of the first plutonium to go through the cycles after startup. The net result was the loss of 45 grams of plutonium to underground storage and the accumulation of 4,750 gallons of aqueous waste containing 275 grams of plutonium which were reworked through head-end. This was successfully accomplished, but routine plutonium losses remained abnormally high (one to two per cent) for the balance of the month and necessitated the rework of two additional waste batches at the end of the report period.

The new Plutonium Concentration Building (233-S) received its first feed solution on April 15, and operated successfully the balance of the month with only minor difficulty due to frequent plugging of the solution filter (L-5). The average plutonium concentration in the concentrated solution was 100 to 110 grams per liter with about 10,000 parts of iron per million parts of plutonium.

Feed Preparation

Just before the finish of the 200 MWD/T processing, three batches of feed were prepared without the use of permanganate oxidation, in order to provide feed containing ruthenium for the test of acid deficient plutonium cycle flowsheets. The rest of the feed batches were oxidized with permanganate with some variations in

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the normal procedure being required during the rework of a total of about 12,500 gallons of salt waste. This waste was blended off with virgin material at the average rate of one volume of waste per volume of normal two molar uranium metal solution, and, in these blends, the permanganate concentration was approximately doubled to compensate for the potential recycle of any reducing impurities.

Since the reversion to processing high exposure metal, the average exposure of slugs charged to the dissolver has been 725 MWD/T (564 to 875), with an average cooling time of 136 days (106 to 174). The use of mercury(II) nitrate in the dissolving step was discontinued due to the extended cooling time, and the daily average iodine-131 emission from the stack from April 1 to April 25 was 0.7 curie. This value includes the period of dissolver heel removal (200 MWD/T metal), i.e., the first week in April. Iodine through the sand filter has been consistently less than 0.1 curie per day since return to 600 MWD/T metal and, from reactors A-3 and C-3, the emissions have been less than 0.01 curie per day. The B-3 Reactor was regenerated on April 22, and this appears to have solved the most recent problem characterized by peak emissions as high as 1.8 curies per day and up to 0.6 curie for one cut. Following this regeneration, the daily average iodine-131 stack emission dropped to 0.1 to 0.15 curie.

Solvent Extraction Performance

The test of the acid deficient plutonium cycle flowsheet designed to improve fission product decontamination resulted in excessive losses and was discontinued after 24 hours. The loss was particularly severe from the 3A Column, where analysis showed as much as 45 per cent of the plutonium in the raffinate. On the other hand, a marked improvement in decontamination was obtained, as evidenced by a three to five-fold decrease in the gamma-to-plutonium ratio before the test was abandoned. The causes of the loss are still under study and, although not clear, are ascribed to the formation of plutonium(IV) polymer in the 3A Column feed solution. How the polymer was formed is not known, and it seems all the more puzzling in view of the fact that analytical results show that the plutonium was almost entirely in the hexavalent state in the column feed solutions. Approximately 90 per cent of the total loss was recovered.

Upon conversion to the high MWD/T metal processing, trouble was again encountered in the plutonium cycles. Because of a plugged aluminum nitrate addition line, a certain amount of unbutted 2BP solution was held for rework, and to this it was later found necessary to add the initial 3BP which was out of specifications. When a portion of this mixture was blended with normal second plutonium cycle feed for rework, it was found to be excessively acid deficient. It was made acid and sent to the columns, but undoubtedly still contained undestroyed plutonium(IV) polymer. Again severe waste losses occurred, and again it was necessary to shut down and rework a large volume of salt waste through the entire system. This was accomplished with comparatively little difficulty, as shown by the fact that, during this entire period of abnormal operation from April 1 to April 20, 1955, only 1.05 per cent of the total product plutonium was not recovered. Total production was, of course, curtailed since it was necessary to reduce the rate for virgin material to an equivalent of six tons per day during the rework periods.

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Operations did not return to normal with respect to plutonium losses, however, following the completion of rework, and the losses remained consistently and unaccountably high (up to 1.5 per cent) for the balance of the report period, with most of the loss coming from the 2A Column.

It is noteworthy that essential materials costs were reduced by approximately 200 dollars per ton during rework operations, although head-end capacity was necessarily reduced. With the satisfactory recovery and decontamination accompanying this rework, and the successful operation of the dual-scrub IA flowsheet, the soundness of complete back-cycle operations was thus demonstrated.

Following the startup with high MWD/T metal on April 14, the uranium losses were also abnormally high (up to a maximum of two per cent) and remained high throughout the period of rework described above. The source of the loss was the second cycle extraction column, but its cause was never definitely determined. The losses subsequently returned to normal. The average overall recoveries for the entire month were 99.05 per cent and 99.25 per cent for plutonium and uranium, respectively.

Decontamination

The decontamination for both uranium and plutonium was, in general, excellent after the first two batches produced from the high MWD/T metal. The following data represent "steady-state" conditions for the latter half of the month's operation:

<u>Cycle</u>	<u>Gamma Decontamination Factors, dF</u>	
	<u>Uranium</u>	<u>Plutonium</u>
Head-End and First Cycle	4.67	4.34
Second Cycle	1.57	2.04
Third Cycle	0.68	0.76
Overall	6.92	7.14

Both products were well within specifications at the end of the month, with averages for the last twenty batches of each approximately:

Uranium (E-12 Solution) = 0.9 Gamma Ratio

Plutonium (E-3 Solution) = 0.1×10^{-9} G/AT

Flowsheets

Aside from the rework flowsheets, the following items are worthy of mention:

- (1) The dual-scrub IA Column flowsheet was used for startup and has performed well since.

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- (2) Because of criticality considerations, the 3BX flow was increased 150 per cent when processing was started with the high MWD/T metal.
- (3) In an attempt to decrease the plutonium losses in the third cycle, the 3A Column extractant flow was increased by approximately 15 per cent.

Plutonium Concentration Building

Following the completion of calibration and leak-testing in 233-S, nitric acid boil-up tests were run during the first week of April. Operation was satisfactory, but the concentrated acid was found to contain undesirably large amounts of iron, chromium, and nickel. After an inspection by members of the Corrosion and Metallurgy Unit, it was concluded that oxides formed during welding were responsible for these high values and that they would probably remain high for some time unless the equipment were pickled with a hydrofluoric and nitric acid mixture. Due to the limited time available, the pickling was not done. The first 3BP solution was received on April 15, and for the balance of the report period, the building operated smoothly and with no difficulty except for the need for back-flushing the filter. The filter element, which is sintered stainless steel, appeared to be plugging with increasing frequency at the end of the month.

The average plutonium concentration for the first twelve L-6 (Product Sampler) batches was 118 g/l (84 to 156), and the average nitric acid concentration was 5.0 M (3.1 to 6.3). The spectrographic analyses for iron ranged from 800 to greater than 10,000 parts of iron per million parts of plutonium (with about 8,000 ppm aluminum and 1,000 ppm each of nickel and chromium), but the chemical analysis for iron (on a subsequent set of five samples) gave an average of almost 24,000 parts of iron per million parts of plutonium. These high values for metallic impurity content (particularly iron) may be contributing to the difficulty experienced in 234-5 Task I which has been characterized by recoveries in the oxalate precipitation step of as low as 80 per cent and seldom better than 90 per cent. If it should develop that the sintered stainless steel filter element is dissolving and thus contributing to the high iron content of the product, it may become necessary to bypass the filter entirely or replace it with one of a different material of construction.

Stack Emission

Following the dissolving of the first of the high MWD/T metal on April 6, 1955, there was little or no trouble with emissions of iodine-131 from the stack. A few peaks of up to 1.8 curies per day were noted when B Dissolver was in operation during the second and third weeks of the month, but a regeneration of the B-3 Reactor on April 22 apparently solved this problem. Aside from these peaks, the average daily stack emission was less than 0.5 curie per day, with consistently less than 0.1 curie per day coming through the sand filter. Because of the age of the metal (average 135 day cooled), mercury was neither needed nor used during dissolving, but since it is recognized that cooling time cannot be used as a permanent solution to the iodine emission problem, efforts are being redoubled to find a long range solution which will not require the use of mercury.

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241-SX Waste Storage Tank Farm

The auger agitator in Tank 101-SX was motorized and operated continuously at 125 rpm from March 25 to April 7, 1955, with a continuous boil-off of two to three gpm and no bumping or pressurization in the tank. Three bumps were recorded, however, between April 7 and April 10, reaching a maximum pressure of 28 inches water gauge. The agitator coupling failed on April 13, and agitation was not resumed until April 19, 1955. During this time, four more pressurizations were recorded, the last one coinciding with the resumption of agitation. The maximum pressure was 41 inches water gauge, and condensate flow rates of 34 to 36 gpm were noted. These are the largest condensate flow rates yet observed. Since agitation was resumed, there have been no more bumps.

PUREX PROCESS TECHNOLOGY

Rough Draft Operating procedures are approximately 90 per cent completed. Those which have been completed are: Dissolver Operations, HAF Preparation, Co-Decontamination Cycle, Partition Cycle, Final Uranium Decontamination Cycle, Uranium Concentration, Waste Concentration, Acid Recovery, and No. 1 Organic System.

Additional series of training discussions on the Purex process were presented to Separations Section supervision and operators.

Effective April 25, coverage on a two-shift, seven-day-per-week schedule is being provided in order to follow operability and capacity tests.

BISMUTH PHOSPHATE PROCESS TECHNOLOGY

Dissolver Section

The coating removal procedure has been altered to evolve ammonia at a more uniform rate during the dissolution of the aluminum cans in sodium nitrate-sodium hydroxide solution. The solution temperature is raised gradually over one hour's period to 100 C. A digestion period of three hours follows with the temperature held between 95-100 C.

The procedure for the dissolution of the uranium in nitric acid has also been modified to evolve the oxides of nitrogen at a more uniform rate. Fifty per cent nitric acid has been substituted for sixty per cent, and the solution is brought to boiling in a four hour period.

Stack Emissions

Sampling equipment has been installed on all lines leading to the stack. All data collected indicate the 3-5R dissolver system to be the major contributor to the high iodine-131 emissions. Three emissions have occurred during the coating removal step, with a magnitude of from two to seven curies. Additional sampling equipment has been installed in the 3-5R system in the canyon pipe gallery to determine the operational characteristics of the different components. Preliminary data indicates the 3-5R silver reactor is currently contributing 99.9 per cent of the iodine-131 evolved during uranium dissolution.

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DECLASSIFIEDEquipment

The special teflon tipped, one inch, hydrofluoric acid dip tube installed on April 19, 1954, in the B-1 tank was inspected on April 22, 1955. The tip was in very good shape, with no signs of corrosion appearing. During the elapsed period, a total of 620 runs were processed through the B-1 tank. Previous plant experience has shown the dip tubes to have been replaced every 250 runs. It is recommended that all the hydrofluoric acid dip tubes either be replaced with the teflon tipped tubes or be replaced by a complete teflon dip tube which can be obtained from the Resistoflex Corporation.

URANIUM RECOVERY PROCESS TECHNOLOGYSummary

During the month, the TBP Plant processed at instantaneous processing rates ranging from 5 to 7.5 tons of uranium per day. Processing rates were generally limited by the availability of feed from the tank farm removal and blending facilities.

Overall TBP plant uranium losses were generally quite low, with daily plant losses ranging from 0.3 to approximately 2.0 per cent, and averaging approximately 1.4 per cent. Decontamination was more than adequate for the entire month. During the latter portion of the month, feed was processed in which approximately 30 per cent of the uranium was from 25 month aged supernatant. Overall logarithmic decontamination factors for the month ranged from 5.1 to 5.9, and the product radioactivity for the entire month was less than 75 per cent aged natural uranium gamma activity and, for the greater part of the month, averaged from 30 to 50 per cent aged natural uranium activity.

On March 29, fully automatic pH control of the waste neutralization system was initiated and, throughout the month, efforts were made to improve the reliability and effectiveness of the automatic control system. At month's end, it appeared that the automatic control system could be operated to provide pH control well within the range required (± 0.3 pH unit of the specified value) for optimum waste scavenging.

On the basis of actual batch plant tests which demonstrated a four to six-fold improvement in strontium scavenging when calcium nitrate was added to the nickel ferrocyanide scavenged waste, routine calcium nitrate addition was started in the plant on April 21.

Metal Removal

A summary of the source, age, and irradiation history of the metal removed from three tank farms in which removal operations are currently being conducted is given below:

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<u>Tank</u>	<u>Fraction</u>	<u>Age</u> ^(a)	<u>Average MWD/T</u> ^(b)
104-C	0.002	87	203
109-111-112-BY	0.324	36	582
104-107-108-TX	0.588	33	582
105-TX	0.086	25	506

(a) Estimated minimum age since pile discharge in months.

(b) The average MWD represents the weighted average pile exposure for the metal in the cascade.

Metal removal operations in C Farm were completed on April 1, 1955, when Tank 104-C was examined and found empty. After completion of operations at C Farm, the 001-CR Johnston sluice pump was moved to U Farm. Preparations for metal removal at U Farm are now essentially complete (glass wool vault filter and stack are currently being replaced), and it is expected that processing of one year minimum age metal from Tank 101-U will be started during the coming month.

Feed Preparation

Routine acidification, using 11,400 pounds of 100 per cent nitric acid per ton of uranium, followed by an average 69 volume per cent boil-off, gave RAF of the following average composition:

	<u>Composition, M</u>				<u>M Na</u> <u>M U</u>	<u>Per Cent</u> <u>ANU Gamma</u>	<u>RAW</u> <u>K_{1/2}(NO₃), M</u>
	<u>U</u>	<u>HPO₄⁼</u>	<u>Na⁺</u>	<u>H⁺(1)</u>			
Average RAF	0.27	0.33	4.8	3.0	18	1.0 x 10 ⁷	4.8
HW No. 6	0.27	0.27	4.1	2.7	15	---	5.5

(1) "Titratable" nitric acid.

Solvent Extraction

The solvent extraction batteries were operated under modified TBP No. 6 Flowsheet conditions (as specified in HW-29466), using 20 volume per cent TBP in hydrocarbon diluent as the organic phase. The nominal flows, expressed as per cent of the flowsheet (volume) rate were:

<u>Cycle</u>	<u>Feed</u>	<u>Extraction - Scrub Stream</u>			<u>Extractant</u>	<u>Stripping</u> <u>Column</u> <u>Extractant</u>	<u>Organic Phase</u> <u>Scrub Streams</u>	
		<u>Top (Water)</u> <u>Scrub</u>	<u>Intermediate</u> <u>(Acid) Scrub</u>	<u>Extractant</u>			<u>First</u>	<u>Second</u>
First	80 to 150 ⁽¹⁾	180 ⁽²⁾	100	120	65 to 70	100	100	
Second	80 to 100 ⁽¹⁾	100 to 170 ⁽³⁾	100 to 170 ⁽³⁾	125	90	100	0 or 100 ⁽⁴⁾	

(1) To maintain a constant uranium processing rate at varying feed uranium concentrations.

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- (2) To minimize RCU (RAU) acidity.
- (3) To provide RAIS (backcycled RDW) at the flowsheet rate while the second cycle operated slower than the first.
- (4) Used occasionally to insure adequate organic phase cleanup while processing RDF containing organic phase. This organic phase was entrained into the feed tank through the RD Column vent or pumped through the intercycle stripper-evaporator as undecanted RCU.

Other departures from the original HW No. 6 Flowsheet conditions included the use of: RCX and REX containing 0.005 M nitric acid (vice 0.01 M) and heated to 55 C; RDIS containing 0.4 M sulfamic acid (vice 0.2 M); and organic wash streams containing three weight per cent sodium carbonate (vice sodium sulfate).

The average uranium losses from the solvent extraction battery were:

Per Cent of the Feed Uranium			
<u>RAW</u>	<u>RCW</u>	<u>RDW (recycled as RAIS)</u>	<u>REW</u>
0.2	0.2	0.1	0.1

The RAW loss is significantly less than the average of 0.5 per cent sustained during February and March. The cause of this decrease is the reduced frequency (once rather than twice per week) of the interface jetting operation. The RCW and, to a lesser extent, the REW losses continued to be abnormally high. Dilute RC Column uranium distribution ratios measured by the "direct" contact method (see HW-33969) were about 0.02, or about two-fold greater than "normal". The source and nature of the organic phase contaminants responsible for these high distribution ratios has not been determined.

Average decontamination data are:

<u>Cycle</u>	<u>Logarithmic Gamma Decontamination Factor</u>		<u>Product Gamma Activity, Per Cent ANU</u>		<u>Plutonium, Parts Per Billion Parts Uranium</u>
	<u>Period I</u>	<u>Period II</u>	<u>Period I</u>	<u>Period II</u>	
First	4.3	3.6	560	2100	9
Second	1.2	1.7	35	43	4

Period I - March 25 to April 8.

Period II - April 8 to April 22.

The feed processed during Period I was older and contained a higher percentage of supernatant uranium than that for Period II; thus, the better decontamination performance. Introduction of feed, one-third of which was two year old supernatant from Tank 105-TX, caused a three-fold increase in the RCU gamma activity, from 1,000 to 3,000 per cent ANU. While processing feed of nearly flowsheet feed composition aged a minimum of 33 months since pile discharge after irradiation to

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580 MWD/T, first cycle logarithmic decontamination factors of 4.5, 3.9, and 4.1 were obtained for cesium, niobium-zirconium, and gross gamma activity, respectively.

Second cycle product activities continued to be low (approaching precise analytical detection limit). The increase in decontamination from Period I to Period II reflects only the increased feed (RDF) activity, and not necessarily an actual improvement in fission product decontamination.

Intercycle Concentration and Stripping

Uranium losses from the intercycle stripper tower (T-8-4) averaged 0.1 to 0.2 per cent of the new feed uranium for the month, compared to approximately two per cent for the previous two months. Modification of the stripper tower so that the top two plates operate "dry" (reported last month) has been effective in reducing the stripper tower uranium losses. The addition of reflux water (one to two gallons per minute) was not effective in giving sustained stripper tower uranium losses of less than 0.1 per cent. Additional stripper tower modifications (e.g., four "dry" plates instead of two) may be necessary to insure sustained uranium losses of less than 0.1 per cent.

The stripping efficiency of the stripper tower (T-8-4) with one to two gallons per minute reflux water was evaluated. The data show that the stripper and stripper-concentrator combination are effective in removing TBP from the stripper feed even with one to two gallons per minute reflux water on the tower. The TBP concentration in the evaporator bottoms is at or below the solubility of TBP in 1.5 M UNH solution. Also, as expected, the stripper-concentrator does not remove DBP from the feed as the concentration of DBP was essentially the same in the stripper feed and evaporator bottoms.

Waste Handling

Approximately 5,000 gallons of concentrated, scavenged waste per ton of uranium at an average pH of 9.0 were returned to storage for settling in 107 and 108-BY. The average composition of the waste and the specified methods of disposition, based on soil column studies, are summarized below:

Tank No.	PO ₄ ⁼ , M	Sr ⁹⁰ , μc/ml	Cs ¹³⁷ , μc/ml	Average dF		Disposition of Supernatant
				Sr ⁹⁰	Cs ¹³⁷	
7-106-BY	0.108	0.90	0.15	2.0	3.0	706,000 gallons to BY#3 crib.
8-110-BY	0.146	4.01	0.36	1.4	2.6	700,000 gallons to Tanks 101-102-103-BY for storage.
9-107-BY	- - -	- - -	- - -	- - -	- - -	Analyses not available - - - - Sampled 4/24/55.

Three UR Plant tests show that up to a six-fold improvement in strontium scavenging may be attained by adding calcium to the nickel ferrocyanide scavenged waste. Soil column studies show that residual calcium in the scavenged supernatant will

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not give adverse Sr^{90} soil adsorption effects. On the basis of the favorable plant, Process Chemistry Laboratory, and soil column tests, routine addition of calcium nitrate to the nickel ferrocyanide scavenged waste was started on April 21, 1955. Sufficient calcium nitrate is being added to the 60 to 70 C (90 C desired but, at present, unattainable) waste to produce a 0.016 M Ca^{++} concentration in the dilute (unconcentrated) scavenged waste.

Equipment

Section 6 - At month's end, the feed evaporator unit in Section 6 was shut down for inspection, and it was determined, by hydrostatic test, that the 6-1 evaporator had one or more leaks in the heat exchanger. A spare evaporator unit is being fabricated in the White Bluffs shop for a 6-1 replacement, but the construction is being delayed because of heat exchanger tube procurement difficulties. The expected completion date for this evaporator is sometime in the latter part of May.

Section 10 Conversion - The conversion of the presently unused spare waste concentration section, Section 10, to permit its use as a utility evaporator section (waste and first cycle feed) has continued during the month. The modifications that were necessary to utilize the old Section 8 equipment in the Section 10 position (removal of the leaky evaporator, extension of the seal pot, and improvement of the seal pot vent system) have been completed, and about one week's work remains in the 221-U Building after the evaporator being built in the 200-W shops is delivered. The construction of the new evaporator has been delayed because of heat exchanger tube procurement difficulties.

The priority of the Section 10 activation has been increased since Section 6 was shut down due to a leaky evaporator unit.

URANIUM CONVERSION PROCESS TECHNOLOGY

Summary

Total metallic impurities, fission product gamma activity, and plutonium in product UO_3 averaged 138 parts per million parts of uranium, 92 per cent of aged natural uranium gamma, and four parts per billion parts of uranium, respectively. The average reactivity was 1.11, using 0.05 weight per cent sulfamic acid as an additive.

On April 20, 1955, a blow-back occurred in Electric Pot No. 3, and the cap on the adapter for the continuous unloading nozzle was forced off with a considerable amount of UO_3 jetted into the pot room. Several possible mechanisms have been hypothesized for the blow-back which occurred during the final (heat off pots approximately ten minutes) stages of the calcination. A study is continuing to determine the corrective action required to prevent (or minimize) additional incidents. At the present time, it is felt that the blow-back occurred because of a sudden release of nitrogen oxides or steam in the pot (e.g., breakup of a large lump of uncalcined powder, or release of gasses trapped in the powder, or

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drainage of a UNH fill line). The severity of the blow-back was believed aggravated by the low pot vent vacuum present (two inches of H_2O or less) at the time of the incident, and the possible pluggage of the pot fume line with UO_3 .

Anticaking and Reactivity Improvement Tests

On the basis of laboratory tests which indicated possible improvement in pot caking and a possible reduction in the calcination time cycle as a result of addition of urea to the calcination pots, a series of plant tests were made using urea as a pot additive. Two sets of conditions were studied. Three pots were charged with 0.02 weight per cent urea (uranium basis) used as the pot additive while three additional pots were charged with both 0.02 weight per cent urea and 0.05 weight per cent sulfamic acid used as pot additives. Comparison of the data from these runs with control pots (0.05 per cent sulfamic acid) indicated no significant improvement in pot caking characteristics or pot time cycles. Additional tests are planned using higher concentrations of sulfamic acid and/or urea. Samples of the recovered nitric acid taken during the urea tests indicated no increase in the ammonium ion concentration. This confirms earlier laboratory studies which indicated that, under the conditions employed, urea decomposes to form nitrogen rather than ammonia.

Equipment

Electric Pot No. 12 liner was removed from service and replaced with a new unit. Considerable vapor phase corrosion around the gasket seal prevented a tight seal of the liner and the pot lid. Close examination of the pot revealed a considerable number of long intergranular stress cracks in the pot bottom.

An examination of Pot No. 10 liner, removed for a general overhaul, revealed a significant crack approximately 1 1/2 inches long and three small (ca. one inch) shallow cracks on the pot bottom. The pot is being returned to service.

Luckey Pot 20 agitator was forced up about 3/4 inch by cake formed under the agitator when the pot deformed during the heating cycle. The repair required removal of the agitator shaft and the installation of a sleeve on the shaft at the bearing.

Fabrication of the new triangular cross-section test agitator for Pot No. 9 is approximately 50 per cent complete.

Acid Recovery

Nitric acid recovery operations, using the 53 per cent test arrangement, led to recovery of ca. 867 pounds of 100 per cent acid per ton of uranium calcined. During periods of "smooth" operation, the absorber consistently produced 48 to 53 per cent acid. The approximately 43 per cent acid (absorber acid composited with other dilute acid) was returned along with about 0.8 per cent of the uranium calcined, to tank farm blending operations.

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Inadvertent pumping of ca. 150 gallons of 100 per cent UNH solution to EA-2, via the pot room fume vent header, resulted in pluggage of the EA-2 drain line, loss of pot room vacuum, and disruption of the nitric acid absorption system for a two-day period at the time of the blow-back described above.

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

Isolation Building

A peroxide supernatant that had been stored overnight in the CT-1 tank, Cell 2, with cooling water on the jacket, reacted violently when heated at a fast rate the following morning. The rate of heating, as determined from the CT-1 tank recorder, was faster than the process specifications allow. Storage overnight with the jacket cooling water on is good practice and could not have contributed to the violent reaction that resulted when the charge was heated.

The 300 MWD/T material processed in T Plant on Supplement A, Production Test 200-2, "Processing of Special Irradiated Uranium", was processed to AT solution. Four runs were transferred to 234-5 Building for neutron and purification studies, and eleven runs were blended with 200 MWD/T material to reduce the neutron emissivity to specifications.

Oxalate Precipitation (Task I)

The new Task I equipment was activated at the first of the month. Very low recycle losses were realized from AT solution, and satisfactory bulk densities were obtained. The processing time was long, however, because of slow chemical additions.

When the Redox Plant resumed high MWD/T production and the 233-S facility was activated to give a Redox product solution of about 100 grams of plutonium per liter, direct coupling of the Redox Plant to Task I of the purifications plant was realized. Using this feed, losses to recycle have been high, averaging about ten per cent. Chemical additions continue to be erratic and poorly controlled because of equipment shortcomings.

The aluminum content of Redox material has been as low or lower than expected, averaging about 8,000 parts per million; on the other hand, the iron, chromium, and nickel content has been ranging from 800 to 8,000 parts per million, which is high. The high iron content has caused excessive foaming on occasion and may be contributing to high losses to recycle by causing catalytic decomposition of the hydrogen peroxide before the plutonium is reduced from the VI to IV valence state.

At month's end, plugged transfer lines were being encountered in Task I. Routine equipment cleanout has not been instituted to date, and conjecture would have it that hot permanganate flushes will have to be made routinely to alleviate the plugging problem.

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Hydrofluorination (Task II)

The Task II operation was resumed when feed from Task I was available. About one-half of the runs processed in standard filter boats required refluorination. On the other hand, no runs processed in the boat equipped with a liner, gold-soldered to the Hastelloy C body, required refluorination. Based on the results obtained from the special boat, additional boats are being modified as manpower is available.

Reduction (Task III)

The new Task III equipment was activated when feed became available. To date, no acceptable pieces have been produced via reduction-casting. Only two of 21 buttons produced have been machined directly and coated. Of these, one failed to meet the void specifications, and the other contained too much magnesium to be acceptable. The reduction yields have been about three per cent lower than those realized from the old equipment. The significance of this is not known at this time.

The buttons produced have stuck badly to the crucible, a problem which has not been encountered previously in laboratory or production equipment. On the other hand, sticking of the button to the slag was encountered in the laboratory when no iodine booster was employed. The amount of iodine was varied over the range 0.01 to 0.14 mol ratio I_2/Pu , with no significant effect on reduction yield, button quality, or degree of sticking (button to crucible). The present reductions are being made in 130 reduction crucibles using 110 pressure vessels. A 110 crucible was used for one reduction, and the button also stuck to the crucible. This button, however, broke when the crucible was struck with a mallet, indicating that the run was off-standard, since this phenomena had never occurred before. The evaluation of the cause for the button breaking is awaiting chemical analysis data.

Final Inspection

Inspection operations were started in the new quarters, with no difficulties encountered.

Crucible Services

Slip-cast MgO crucibles were produced for 234-5 operations and the technical laboratories. A large pouring crucible and liner were designed and fabricated

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for Product Metallurgy, and a special mold was designed for the same group. Stabilized ZrO_2 crucibles were fabricated for Pile Metallurgy.

234-5 DEVELOPMENT

Recuplex Facility

The Recuplex facility was accepted from Minor Construction at the beginning of this report period. Work on presently authorized orders to plant maintenance forces for startup items and instrument calibrations is estimated to be 50 per cent complete. Repair maintenance of items disclosed by shakedown runs has been extensive, major items being leaking process lines, leaks at column joints, and bent agitator shafts. All agitators have been removed for rebalancing.

Acid runs have been in progress throughout the month on swing and graveyard shifts. Seven cold dissolutions were processed through the Slag and Crucible Hood with satisfactory performance. Product stripping and evaporation equipment was tested, showing a 50 per cent greater evaporation capacity than had been predicted. The pulse columns have been operated for extended periods. Flooding limits for the extraction columns have been established at 400 to 1,000 gallons per hour x square foot with corresponding pulse frequencies of 100 to 40 cycles per minute and a pulse amplitude of 0.75 inch. Uranium runs have been delayed pending completion of the major in-hood maintenance.

Experimental Coating

The runs required by the statistically designed test for evaluation of surface area, blower speed, temperature, gas outlet diameter, and initial X-gas pressure with respect to coating time were completed, and the data have been submitted for statistical analysis. The special two tripod leg iron-constantan thermocouple will be evaluated when the test results are known. It was used throughout the test runs and appeared to give consistent results. During the same period, it was necessary to replace the conventional thermocouple two times.

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CHEMICAL DEVELOPMENT SUB-SECTION

PUREX DEVELOPMENT

The Purex Technical Manual was issued, as Document HW-31000. The manual, constituting a documentation of Hanford Purex-process know-how, is intended to serve as an aid in training and education of new technical and supervisory personnel at Hanford and as a reference book in running the Hanford Purex Plant.

Equipment Development

Pump Development. An Allis-Chalmers centrifugal pump, equipped with fluid piston bearings, was fitted with a graphite shaft that had been fabricated on site. After 626 hr. pumping water at 7 gal./min. against a 42-ft. head there was no significant wear on either the bearings or the shaft. While the test period is too short to give conclusive results, it appears that a graphite shaft might be superior to the original steel shaft. The test has been interrupted to return the pump to the vendor for repair or replacement of the original steel shaft which failed.

Pulse Generator Development. Test work continued on the large (Size No. 2) Purex Plant pulse generator installed on the 321 Building prototype HA Column (standard cartridge). With the piston weep hole plugged, it was found that at pulse frequencies of 0, 47, and 100 cycles/min., it required between 30 and 40 min. to fill the pulse leg completely with liquid under simulated start-up conditions; i.e., with the column completely empty at the start of the test. With the pulser off and air pressure of 8 to 9 lb./sq.in. gage below the piston, air leakage past the piston rings and out the overflow line was 3.5 to 4.5 cu.ft./min. With the pulser off and the overflow line blanked off, air pressure of 6 to 9 lb./sq.in. gage could be maintained above the piston by supplying 3.5 to 4.5 cu.ft./min. of air. Leakage at this rate occurred between the piston rod and the piston rod bushing.

Inspection of the generator, plus spectrographic analyses, showed that 14 of the 16 cap screws that support the lower rider ring on the piston and all 16 cap screws that support the upper rider ring were carbon steel rather than stainless steel. Stainless steel cap screws were installed, the piston weep hole diameter was reduced from 3/32-inch to 3/64-inch and the pulse generator was reassembled for further testing.

Agitator Development. The Purex Plant agitator installed in the 321 Building Tank Farm has operated for 3984 hr. in 60% nitric acid. The operating period includes 83 cycles of draining and refilling the tank. There have been no apparent changes in agitation, but mechanical performance seems to have improved since there is less vibration with the agitator rotating in air than was noted at the start of the test.

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Instrument Development. A prototypical Purex rotameter flow-control system, which operated satisfactorily in water service for 1552 hr., completed 706 hr. of satisfactory operation in 2 M ANN service. The system was returned to water service, calibrated and checked for deviation from calibration. Data indicate that the Purex flow-control system is capable of maintaining a given flow to ± 3 per cent of the instantaneous rate.

Stability tests of two sensing units for capacitance-probe, interface-control systems were made. The Fielden-Telstor unit with 450 micromicrofarad terminal capacitance varied $\pm 2\%$ and the unit developed by the Mechanical Development Unit, Design Section, with 1600 micromicrofarad terminal capacitance varied less than $\pm 0.5\%$ over a two-week period.

HOT SEMIWORKS PUREX STUDIES

During most of April, final Hot Semiworks equipment maintenance and alterations preparatory to "hot" start-up on Purex studies were carried out on the day shifts, with operability testing and "cold" runs being conducted on night shifts and week ends. The Hot Semiworks is expected to go into "hot" operation employing full-level Hanford irradiated natural uranium to demonstrate all phases of the Hanford Purex process beginning in May.

Initial operability tests and "cold" shakedown runs were conducted employing Shell Spray Base, E-2342 Solvent, as the hydrocarbon diluent in the 30% TBP - 70% hydrocarbon solvent. Final "cold" runs were made employing Phillips Soltrol-170 in place of the Shell diluent. "Cold" solvent-extraction performance was essentially the same with both diluents, with uranium waste losses from the individual columns generally on the order of 0.02 per cent of the feed uranium. Several frequency flooding point checks using Soltrol-170 solvent indicated little or no change from those determined using Shell Spray Base solvent.

Information obtained during the "cold" uranium runs indicates an over-all plutonium UX_1 decontamination factor of approximately 100 using HW #3 Purex Flowsheet conditions. Increasing the IBX nitric acid concentration from the flow-sheet value of 0.1 M to 0.5 M resulted in no detectable change in the UX_1 decontamination factor, whereas increasing the 2AS flow rate from 100 to 150% increased the UX_1 decontamination in the 2A Column by a factor of seven.

REDOX DEVELOPMENT

Process Planning

Iodine Evolution and Control. As a part of the continuing H.A.P.O. program of evolving better and better procedures for containing and controlling the release of radioactive wastes, a goal is being established to control the average release of radioiodine to the atmosphere to approximately one curie per day.

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As an example of the requirement this limit imposes on the silver reactors in the separations plants, when processing 80-day "cooled" uranium at a high production rate 99.97% of the radio-iodine in the irradiated uranium would have to be retained in the process. A development program to improve the efficiency and dependability of the silver reactors is being initiated in both laboratory and semiworks facilities.

Process Chemistry

Thiosulfate Feed Pretreatment Process. During the month, laboratory studies of the thiosulfate feed pretreatment process for ruthenium removal were extended to include operation of laboratory packed columns employing feeds which contained sulfur-bearing precipitates from the thiosulfate treatment. Columns used were 0.69-inch I.D., packed with 0.25-inch stainless steel Raschig rings, and arranged in a IA-IC cascade. The volume velocity (sum of both phases) in the IA Column was 345 and 254 gal./(hr.)(sq.ft.) for the first and second runs, respectively. In the first run, "cold" feed was prepared by thiosulfate treatment of simulated dissolver solution containing inactive ruthenium. In the second run, ruthenium was not added and the precipitate formed on thiosulfate treatment was essentially only sulfur.

Some solids collected at the interface, in the packing, and on the column walls during both runs. However, at no time was any tendency toward emulsification noted. Water flushes removed essentially all of the solids which accumulated in the columns during the first run. Water flushes alone did not remove a film of colloidal sulfur which was deposited on the column packing during the second run. However, a NaOH-peroxide solution did loosen the film and produced a free-floating sulfur which could be removed from the column by displacement of the interface or by water flushes.

Conditions used in these runs were of maximum severity with respect to the amount of solids present in that a relatively high (0.03 M) concentration of thiosulfate was employed, and the entire sulfur precipitate was fed to the columns without a prior centrifugation or filtration step to remove the bulk of the solids. While solids were deposited in the packing and at the interface, emulsion formation was not observed and means are available for removing such solids from the columns.

Dichromate oxidized centrifugate from thiosulfate pretreatment of simulated dissolver solution was irradiated in a gamma field for 96 hours at 8.92×10^5 ergs/(g.)(min.), (i.e., 2.5×10^5 roentgens/hr.). The resulting total exposure is estimated to be equivalent to that which Redox feed would receive, due to its own radioactive content, in 16 hours. No observable formation of sulfur occurred.

Although experimental thiosulfate head-end studies are continuing, with the objective of developing more nearly optimum process conditions, the laboratory studies conducted to date plus the "cold" semiworks demonstrations reported below are considered of sufficient promise to justify an early trial of this new head-end procedure in the Redox Plant.

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Chemical Engineering Development

Cold Semiworks Thiosulfate-Scavenging Studies. Seven "cold" pilot-plant tests of the thiosulfate-scavenging head-end treatment for Ru decontamination were carried out to test equipment scale-up of this new feed treatment procedure. Non-radioactive ruthenium chloride was used in lieu of radio-ruthenium. The procedure employed, except where otherwise noted, was as follows: (a) sodium thiosulfate was added to an acid deficient simulated Redox dissolver solution; (b) the treated solution was digested at 65°C., then cooled and centrifuged, and finally (c) oxidized at 95°C. in a 0.2 M sodium dichromate solution.

Highlights of the findings are as follows:

1. In all but one of the runs, the centrifugate contained very finely divided free sulfur. (The one run free of sulfur had insufficient agitation and, as a result, a poor ruthenium decontamination factor.)
2. The presence of the finely divided sulfur in the centrifugate can be minimized by digesting at 65°C. for 30 min. and then at 90°C. for an additional 30 min.
3. The clarity of the centrifugate is more highly dependent upon the conditions of digestion than upon the conditions of centrifugation.
4. The cake is readily slurried for removal from the centrifuge.
5. No coating of the digester steam coils with sulfur was observed, even after heating a free-sulfur-bearing uranium solution to 125°C.
6. The digester solution and the cake slurry had no adverse effects on steam jet operation.
7. Ruthenium (arithmetic) D.F.'s across the centrifuge of more than 9 are obtainable.

Recent laboratory tests by Process Chemistry have indicated the possibility of obtaining clear centrifugate by adding sodium dichromate to the digester solution after digesting for 1 hour at 65°C. After the dichromate addition, the solution is digested for 1 hour at 85°C., cooled, and centrifuged. Pilot-plant tests of this revised procedure are planned for the near future.

URANIUM RECOVERY DEVELOPMENT

Process Chemistry

Precipitation of Ruthenium from RDF with Thiosulfate. Approximately 95 per cent removal of ruthenium from RDF was obtained by digesting 0.13 M acid deficient RDF made 0.033 M in sodium thiosulfate for one hour at 65°C. and centrifuging for ten minutes at 120 G. The radioactivity remaining in the RDF was too low to permit determination of the solvent extraction characteristics of the residual ruthenium.

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Reduction of UO_3 . A laboratory thermobalance was constructed and put into operation to study the rate of reduction of UO_3 powders to UO_2 with hydrogen. Highlights of information gained to date are as follows:

1. Based on limited studies to date, the times required for 98 per cent reduction of UO_3 powders produced in the continuous calciner (321 Bldg.) are greater than those for UO_3 produced currently in the 224-U Bldg. by factors of from 5 to 20, depending upon operating conditions during the calcination.
2. UO_3 powders produced at high through-put in the continuous calciner appear to reduce more rapidly than those produced at lower through-put.
3. Reduction time is dependent upon particle size. A four-fold decrease in reduction time was noted for a sample of UO_3 from the continuous calciner ground to pass a 325 mesh screen as compared to the unground sample (96% retained on an 80 mesh screen).

It is possible that the laboratory conditions chosen for the thermobalance tests accentuate this apparent difference in the reduction time required by the two types of powders, and test programs which are underway in the laboratory, in the semiworks, and in the K-25 feed-plant pilot plant are aimed at the overall objective of providing satisfactory performance of H.A.P.O. continuously-calcined UO_3 in the customer's processing plants. There is a substantial basis for optimism that this objective will be attained.

Continuous Calcination

The 16-inch-diameter by 8-ft.-long semi-plant-scale continuous calciner was operated to test further the effect of sulfate addition and to determine the effect of the reduced holdup time and the changed agitator characteristics caused by using an 8.5-inch diameter agitator shaft in place of the former 3.5-inch shaft. A thick, soft scale that had previously formed on the reactor walls under conditions of 260°C. feed-point temperature and no added sulfate, did not form during runs with the large-diameter agitator shaft. This may have been due to closer agitator clearances or to higher powder velocity.

In general, no marked effect on reactivity of the product to hydro-fluorination was noted as a result of the changed agitator design. Apparently, longitudinal mixing was not as good as with the smaller agitator shaft, and a larger powder particle was produced. Although the bed volume was reduced by approximately 30% by the large-diameter shaft, the drive power requirements, for equivalent bed depth, was somewhat greater than that required by the small agitator.

Development and demonstration of the paddle-agitated trough type continuous calciner is considered successfully completed, and operation of the calciner on a 24-hour, 7-days-per-week basis has been terminated.

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MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENTProcess Chemistry

Waste Treatment. Further laboratory work and pilot-plant-scale tests on the use of calcium nitrate to improve the removal of strontium from uranium recovery process scavenged wastes continued to be promising. Routine addition of calcium nitrate along with nickel sulfate in the waste scavenging process has been started in the Uranium Recovery Plant. A reduction in pH occurs on the addition of calcium nitrate depending upon the amount added and the initial pH. Greatest improvement in strontium decontamination factor is obtained when calcium is added at such pH as to get a final pH of from 9 to 10. Digestion at elevated temperature (90°C.) after calcium addition further improves strontium removal.

Stored Uranium Recovery Process Wastes can be decontaminated to less than 0.1 microcurie/ml. of either Cs or Sr by scavenging with 0.0025 M and 0.01 M nickel ferrocyanide and calcium phosphate, respectively, at pH 8.8 to 9.1. These conditions reduced Cs activity levels for supernatant liquid samples from six representative tanks of waste to 0.003 to 0.092 microcurie/ml. Strontium levels after scavenging ranged from 0.006 to 0.11 microcurie/ml. Strontium decontamination is only slightly improved by precipitation of more calcium phosphate.

BiPO₄ Centrifuge Studies

Five runs have been made in semiworks-scale equipment to investigate the behavior of BiPO₄ precipitate during centrifuge operation. When precipitated slowly from a hot solution, the BiPO₄ is granular and behaves nicely in the centrifuge, being easily and uniformly slurried during the washing and dissolving steps. When precipitated rapidly in the cold with a reverse strike (bismuth solution added after the phosphoric acid), the BiPO₄ precipitate is nearly colloidal and forms a cohesive centrifuge cake that is difficult to remove by slurrying. In the studies to date there has been no indication of a tendency for any cake to form balls or heaps during the operation.

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CHEMICAL RESEARCH SUB-SECTION

PUREX

Additional continuous distillation experiments simulating the operation of the Purex #1 acid concentrator have been performed in an effort to determine the minimum feed "nitrite" concentration required to suppress ruthenium volatilization. In two twenty-four-hour runs employing an average acid residence time of nine hours, average gamma decontamination factors (bottoms/distillate) of 2×10^3 and 7×10^3 were obtained for feed "nitrite" concentrations of 0.10 M and 0.24 M, respectively. These results may be compared with gamma decontamination factors of 200 and 4×10^5 obtained in runs at 0.00 M and 0.5-0.6 M "nitrite" reported previously.

It was noted in the course of these runs that acid accumulated in the still pot, the bottoms acidity increasing from an initial value of 8 M to a final value of ca. 11 M over the course of a 24-hour run. This effect is attributed to fractionation of the still vapors resulting from condensation and reflux in the de-entrainment section of the apparatus. The "steady-state" decontamination factors herein reported are thus presumably associated with a bottoms concentration of ca. 11 M HNO_3 . (The apparatus does not permit the bottoms to be sampled during a run.) Measures have been taken to reduce reflux in the de-entrainment apparatus, and it is planned to repeat the foregoing experiments under more closely controlled conditions and in addition to extend this study to acid concentrations in the range 6-8 M, such as would be encountered in the plant concentrator.

The rate of solvent deterioration due to chemical attack (measured by "C" contact E_A° values) was found to be first order with respect to the product of acidity times total nitrate ion concentration in the aqueous phase. Thus, for a system in which nitric acid is the predominant nitrate compound, the rate of solvent deterioration is second order in nitric acid concentration, but if the system contains appreciable amounts of another nitrate salting agent, the product of the acidity and the nitrate concentration must be used to predict the rate of deterioration.

The energy absorbed by the Purex solvent due to the retention of I-131 was calculated to be 9 watt-hr/liter. Since this dose is less than half that required to affect measurable solvent damage, it is unlikely that iodine retention in the solvent will present any significant plant problem. The assumptions used for this calculation were as follows: 1) sixty-day-cooled uranium, 3.3 megawatts/ton exposure; 2) all the I-131 in the slugs is retained by the solvent; 3) ten solvent passes per day and a solvent lifetime of 20 days; and 4) energy of radiation is 0.6 Mev. A more realistic calculation would probably reduce the dosage (indicated above) by at least a factor of 100.

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The effect of DBP on plutonium waste loss in the HC column has been investigated. No effect is expected for 35 ppm DBP, the anticipated concentration. A six-stage batch countercurrent run with 100 ppm DBP in the feed resulted in a plutonium loss of ca. 0.01 percent. There was no evidence that DBP would reflux in the HC column as contrasted to the results of previous DBP distribution measurements.

The presence of DBP in the 2B column, however, may be of more concern. Batch countercurrent runs simulating the operation of the 2B column showed six and seven percent plutonium loss to the 2BW when the feed contained 50 and 100 ppm DBP. (It is to be noted that further experimental work must be carried out to define more precisely the DBP concentration likely to exist in the 2B column.) Since the 2BW is combined with the 1BXP, the subsequent loss to the 1BU stream was examined and shown to contain 3 to 18 percent of the plutonium initially lost to the 2BW stream. This plutonium was shown to be strippable with the uranium and, hence, recoverable via the 2DW and 2WW. The over-all plutonium loss originating from the 2BW will show up with the solvent (1CW) and is expected to be ca. 0.1 percent.

THOREX

Thorex development effort during the month has been concentrated largely on the "Thorox" operation (processing of irradiated thorium in the Redox plant).

A batch countercurrent run was made to determine the feasibility of recovering thorium in Redox columns. Greater than 99.98 percent recovery of thorium was demonstrated with seven extraction stages and five scrub stages on a flowsheet as follows:

Feed: 1.9 M Th, 0.85 M ANN, 0.42 M HNO_3 , 0.03 M HF, Relative Flow: 100
 Scrub: 2.45 M ANN, Relative Flow: 400
 Extractant: Hexone, 0.5 M HNO_3 , Relative Flow: 1050

Thorium distribution ratios (organic/aqueous) were ca. 4 in the lean-end of the extraction section, ca. 3 in the scrub section, and 1.6 at the feed stage. Distribution ratios for nitric acid were ca. 8 through the extraction section and 9 to 10 in the scrub section.

There is substantial excess extraction potential in this flowsheet, as indicated by the fact that four extraction stages would have sufficed to recover more than 99.97 percent of the thorium. Accordingly, an immediate objective of further studies will be to determine the minimum acidity in the hexone extractant and the minimum waste ANN concentration necessary to assure adequate thorium recovery. Reduction of the nitric acid content of the organic product is desirable, both from the standpoint of improving the decontamination potential of the "A" column flowsheet and from the standpoint of improving the efficiency and safety of the "C" column operation. Reduction of the ANN concentration in the scrub is desirable in order to improve "A" column decontamination and reduce ANN consumption.

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A series of batch contactings was performed with protactinium tracer to determine the extractability of protactinium into hexone and into TBP-hexone mixtures. The distribution of protactinium into hexone from 2 M ANN solutions was found to be very dependent on acidity, the distribution coefficient (organic/aqueous) increasing several hundredfold (from 0.001 to 0.4) as the acidity was increased from 0.4 M acid deficient to 1 M acid. Since thorium recovery requires operation in the acid range, the effect of phosphate complexing on protactinium extraction was investigated. It was found necessary to employ as much as 0.05 M phosphate to decrease the distribution ratio for protactinium by a factor of 40. This corresponds to a thorium-protactinium separation factor ($E_A^{\circ}(\text{Th})/E_A^{\circ}(\text{Pa})$) of about 130.

Extraction of protactinium into 30% TBP-hexone from 1 M ANN, 0.2 to 1 M Th, 0.4 M acid deficient to 1 M HNO_3 solutions was also studied. In this system, the distribution was much less sensitive to acidity. In the absence of phosphate, protactinium distribution ratios ranged from 0.035 to 0.39. The effect of thorium, at low concentrations, was to increase the protactinium distribution into the organic phase. High concentrations of thorium reduced protactinium extraction, presumably through saturation of the organic by thorium. Phosphate complexing was found to be much more effective than in the 2 M ANN-hexone system, 0.01 M phosphate sufficing to reduce the protactinium distribution ratio to values of 0.001 to 0.002, corresponding to thorium-protactinium separation factors of 300 to 1000. These results are similar to results obtained previously with the TBP-hydrocarbon solvent system and nitric acid salting.

A head-end protactinium recovery step which would enable adequate protactinium recovery from feeds high in thorium and low in acid would be desirable since this would permit processing of short-cooled thorium feeds for U-233 recovery on a demonstrated flowsheet (cf. ORNL-715) in existing Redox equipment. Accordingly, the carrying of protactinium by coformed manganese dioxide has been studied in the region of high thorium and low acid, conditions which were of little interest in former studies of head-end protactinium scavenging in conjunction with Thorex (TBP) flowsheets. Carrying of tracer-level protactinium by coformed manganese dioxide (0.05 M) out of 1.5 M Th, 0.015 M HF and 2.0 M Th, 0.015 M HF has been found to increase slightly as the acidity is decreased. In the case of 1.5 M Th, protactinium decontamination factors ranged from 20 at 0.5 M HNO_3 to 40-50 in the range 0.1-0.3 M acid deficient. Carrying was less efficient at 2 M Th, protactinium decontamination factors ranging from 5 to 16 over the range 0.5 M HNO_3 to 0.3 M acid-deficient.

It is planned to extend these studies to full-level, employing as feed 2000 g/T material cooled 90 to 100 days. These studies will provide further information as regards the radiation stability of manganese dioxide. Full-level studies are also planned with lead dioxide and stannic oxide carriers.

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TBP could be used as a solvent for thorium-U-233 processing in the Redox plant if the dispersion characteristics could be modified to permit its use in packed columns. Hexone as a diluent will provide the necessary dispersion characteristics, as shown by the low interfacial tension values for the systems TBP-hexone against pure water. The Harkins drop-volume method was used. The TBP-hexone mixtures were equilibrated with water before each experiment, and interfacial tension values of 13.0, 10.2, 9.76, 9.24, and 7.20 (dynes/cm) were obtained for 0, 10, 20, 40, and 100 volume percent TBP in hexone, respectively. Twenty percent TBP-hydrocarbon mixtures give about twice the interfacial tension as twenty percent TBP-hexone.

Some attention and laboratory effort was devoted to scouting the possibilities of a precipitation process for U-233 recovery which could be installed in an existing Bismuth Phosphate plant. The present scheme consists of thorium oxalate precipitation to remove thorium, concentration of U-233 from the supernate by hydroxide precipitation with a ferric hydroxide carrier, a by-product ferric hydroxide precipitation in which the uranium is retained in solution as the hydroxylamine complex, and a fluoride precipitation cycle (product and by-product) for added decontamination. Experiments have established that the thorium is readily precipitated in a dense, crystalline, easily filtered precipitate. The thorium content of the centrifuged precipitate is ca. 460 grams thorium per liter of precipitate. The precipitation is quantitative, less than 10 mg thorium per liter remaining in the supernate. Precipitation of ferric hydroxide from the oxalate supernate carries uranium quantitatively and affords a concentration of up to one-hundredfold.

A hot run was carried out to evaluate the decontamination potential of this process. Feed for this run was prepared by diluting 200-day-cooled, 3200 g/T thorium one-hundredfold with cold thorium and uranium. Decontamination was followed by beta and gamma counting and gamma spectrometer scanning. Beta and gamma decontamination factors over the above-described process were 3700 and 1.1×10^4 , respectively. The only gamma activities found in the product were Pa, Zr-Nb, Ru-Th, and Cs-Ba in approximately equal amounts. The over-all decontamination factors for these were 3×10^4 , 1.5×10^5 , 1.3×10^3 , and 7×10^3 , respectively. Very little decontamination was realized across the thorium oxalate precipitation (beta and gamma decontamination factors of 1.6 and 1.3, respectively). Gamma decontamination factors of about 100 were obtained for both the hydroxide cycle and the fluoride cycle, most of this decontamination occurring in the by-product steps.

The over-all decontamination obtained in this run is considered sufficiently encouraging to warrant further experimental effort. An area of considerable uncertainty at the present time, however, is the processing rate which could be obtained with such a process in an existing Bismuth Phosphate plant and attention will have to be given to such engineering aspects before further experimental work can be profitably undertaken.

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FLUREX

Four metal reduction runs have been made on the KUF_5 material from the first run of the 1/2 kg/day Flurex cell. Results were inferior in percentage metal yield ($\sim 75\%$ vs. $\geq 95\%$), appearance of the slag, and in coalescence of the metal to similar reductions made on sodium double salt material produced by reduction with ferrous ion. Substitution of potassium for sodium in the ferrous reduction method yielded a double fluoride which on reduction again showed inferior coalescence. Analysis of the ferrous-reduced potassium salt is not yet available for calculation of metal yield. Tentatively, it appears hopeful that the inferior reduction results to date with the Flurex salt are ascribable to the use of potassium rather than sodium in the preparation. The sodium salt is now being prepared by the Flurex method to check this point.

ISOTOPE

Isotopic analyses have been completed of copper samples obtained from the electromigration of fused cuprous chloride. Substantial depletion of the lighter isotope, Cu-63, was observed near the $CuCl-PbCl_2$ interface in three of the four runs. In the best of these, the normal 69% Cu-63 content was reduced to 62 percent in 1.5 percent of the charge, and to 63.5 percent in the first 10 percent of the charge. Approximately 60 grams of $PuCl_3$ have been synthesized for investigation of plutonium isotope separation by this fused salt electromigration method.

Thermal diffusion separation of uranium isotopes in a molten UNH system has been demonstrated. The rate of U-235 enrichment was almost constant and amounted to an increase from 0.7115 to 0.7147% U-235 during the first week of operation after which cooling system failures occurred. This rate of enrichment is almost identical with that previously observed using an aqueous UNH system in the same stainless steel column (0.25 mm annular space; 52 ml column volume). However, significant improvement in performance is represented in the molten UNH case over the aqueous UNH system, in that the product removal rate was fivefold higher and the wall temperature difference threefold lower. These translate into proportionate reductions in column residence times and energy requirements, respectively, for practical economic purposes.

Several preliminary ion exchange runs have been made in which plutonium(III) was adsorbed on Dowex-50 resin and then eluted with tartrate solutions. These experiments indicate that kinetic effects are more important than batch equilibrium distributions in defining conditions for separations. Accordingly, experiments are now under way to determine both kinetic and equilibrium parameters under various conditions directly from column data. These studies will be extended to include other complexing agents, e.g., versene and α -hydroxy isobutyric acid.

A UNH zone melting run is now in progress which will be operated for 500 cycles (ca. 2 weeks). The previous difficulty with crystal outcropping is being reduced in this run by the addition of nitric acid to the system.

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NEPTUNIUM CROSS-SECTION

The neutron capture cross-section of neptunium-239 has been measured in cooperation with Experimental Physics personnel. The cross-section for Hanford pile neutrons was found to be 53 ± 25 barns, equivalent to 60 barns for thermal neutrons. This small value for the cross-section has the important implication that higher goal exposures are permitted for the production of a given metal quality (Pu-240 content) by irradiating at higher fluxes. Two isomeric Np-240 activities with half-lives of 7 and 60 minutes were produced by direct irradiation of Np-239. The cross-section for formation of the 7-minute activity by Hanford pile neutrons is 28 ± 10 barns. A tentative value of 25 ± 15 barns is estimated for the 60-minute isomer. The latter value is uncertain because the decay scheme of this activity is not known exactly.

ANALYTICAL DEVELOPMENT

The study of the spectrographic method for impurities in water was continued and an evaluation of the effects of electrode type, sample size, exposure time, resin column elution rate, and citric acid concentration was made. Using optimum conditions based on these studies, working curves for a group of six selected elements are being prepared. The reason for previous negative results with zirconium in water was found to be due to loss of the ion by hydrolysis and adsorption. Under proper conditions zirconium is collected on Dowex-50 column, apparently by adsorption, and elution occurs in an earlier fraction than for other elements studied.

An attempt is being made to set up a spectrographic method for gallium in plutonium in the normal alloy range. The proposed procedure consists of hexone extraction from a 5 N hydrochloric acid solution with plutonium and iron in their lower oxidation states followed by spectrographic analysis of the extract. Factors studied were gallium content of sample, iron concentration, aqueous-organic ratio, pH, and amount of reducing agent used. All of these factors except the amount of reducing agent were found to be critical, and close control of the analytical conditions is necessary.

The source enclosure for spectrographic analysis of radioactive samples which was recently constructed has been tested, and some insulation problems have arisen. High voltage insulators of "Scotchcast" resin were tried, but they have insufficient high temperature stability. New insulators of "lavite" will be tried.

Experiments in quenching of uranium fluorescence indicate that the optical characteristics of the melt are significant since the transmittancy of the melts for either the ultraviolet or the visible emission is significantly reduced by such quenching agents as iron, thorium or nitric acid.

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A study of the relationship between the x-ray diffraction pattern and the reactivity to hydrofluorination of uranium trioxide is being conducted. In the case of samples of material prepared by the continuous screw calcination process, the intensity of the 17.84 and 25.86 degree lines appears to be directly related to the reactivity. A diffraction line of uranium dioxide or any one of three selected uranium trioxide lines may be used as an internal standard. The effects of sample hydration and of particle size appear to be significant and are under study.

A survey of the Recuplex process analytical requirements was made and all available control methods were judged to be in order. A review of current plutonium counting methods for low ngs production was made, and as a result, higher dilution of the 6-1-MS sample for direct mount AT determinations was recommended to eliminate probable self-absorption errors.

A series of graded density neutral filters has been prepared for use as reference standards in the Recuplex Pu(IV) waste alarm. These filters have been photometrically calibrated for relative density with both the 490 mμ and the 560 mμ interference filters in the system. This completes preparations for the in-line testing of the alarm during cold runs in the Recuplex equipment.

A laboratory study of the determination of uranium in Purex process HA and LA feed type samples by the specific gravity method was completed, and an equation was developed that accurately relates the specific gravity to the concentrations of uranium and nitric acid. This equation differs slightly from that which is applicable to Redox process feed solutions. The complete data are to be published.

IN-LINE ANALYSIS

In the Hot Semi-Works, line sampler modifications were designed and completed. These samplers appeared to be functioning well at the end of the month although minor plumbing repairs may be required.

A study of sampler air-lift orifices was completed and on the basis of the results, 24 mil orifices are being fabricated for "A" and "C" systems to provide about 30 to 60 percent liquid in samples. The uranium photometer consoles were wired into the master programmer system, and synchronization with the gamma monitors was accomplished. The units operated on-stream whenever samples were available during the last two plant shake-down runs, and some improvements in panel arrangement, elimination of a power transient difficulty, and replacement of two sensing units which failed were accomplished. The uranium polarographic sensing units were replaced with an improved model, and the units were run on-stream during the last two plant shake-down runs with good "waves" being obtained. No interference from iron or nitrite was encountered in the plant solution (normal uranium make-up). Several process samples which were giving unusual polarographic waves in the plant were collected and studied in detail in the laboratory. Findings pertaining to the hydrogen overvoltage on mercury, the organic content, and the benefits of a longer jet cycle were of value. The jetting cycle time was lengthened to eliminate difficulties due to accumulation of mercurous compounds in the cell.

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Twelve acid recovery samples (C-4) from the oxide plant were studied spectrophotometrically to collect design information for an in-line uranium analyzer for the C-4 stream. A Beckman flow colorimeter has been ordered for probable application to this stream.

The gamma monitors on the REU and RCU samples in the Metal Recovery plant, which have operated without difficulty for nearly a year, were checked during the month for preventative maintenance reasons, and energy thresholds were reset. The RCU monitor sensing unit was removed for a major overhaul. Two gamma absorption photometers were assembled, calibrated and prepared for plant installations. Studies with the thulium-170 sources gave results indicating that the gamma absorption method can be used for uranium monitoring of the Hot Semi-Works organic streams, including the HAP, without unacceptable interference from the sample activity. A trial installation is planned, since this instrument is likely to be more reliable than the color photometers presently used.

The continuous oxygen analyzer for pile gas monitoring was unitized with the gas train and cell mounted in a constant temperature box. In several weeks of operation, the instrument showed a precision of about ± 2 percent and good stability. Standardization is accomplished by routing the sample through a scrubber which removes oxygen completely and then through a generation cell where a known amount of oxygen is added by electrolytic generation.

LABORATORY SERVICES

Activities of Laboratory Services may be summarized as follows:

One million gallons of "retention" level waste was processed to ground at the 300 Area.

Ninety thousand (90,000) gallons of "cribbing" level waste were transported to 200 West Area for discharge to 200 SL cribs. Average plutonium analysis was 1.2×10^{-4} uc/ml. Average gross beta analysis was 9.0×10^{-2} uc/ml.

One 5,000-gallon crib waste trailer was used by Manufacturing, Separations, for five days to transport waste generated in the cleanup of silica gel absorbers. The absence of this trailer from 300 Area necessitated nine hours of overtime work by waste disposal personnel in order to keep up with 300 Area waste hauling requirements.

Regrading at 300 North (Technical) Burial Ground was started to allow greater dumping access. In the last two months, large amounts of trash from the modification of 3706 Building has made routine dumping difficult.

Twenty gallons of thorium cutting oil waste from Fuel Technology, 303 Area, was picked up and concreted. Thorium waste cannot be discarded via the 303 system since this system has been designated to handle uranium waste only.

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Solutions containing 80 grams of plutonium were composited and transported to Redox Plant for return to Process.

A finger pump was installed in the decontamination room to be used in adding radioactive liquids to concreting barrels. This will result in greater capacity for waste per barrel since dilution water from aspiration will be eliminated.

Four slug cut-off and cell filters from 327 Building were disposed of by concreting at 300 North Burial Ground. Radiation level of these units was about 500 rads/hr at 6 inches.

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

CONTACT ENGINEERING UNIT

Recommendations were transmitted to the Manufacturing Department for the installation of capacitance interface detection instruments on the Purex HC and IO Columns in lieu of air purge devices. The planned conversion of the internals in these columns from sieve plate to nozzle plate before plant start-up requires that capacitance probes be used due to the adverse effects of increased pressure drop through the nozzle plate cartridges on the air purge system. Capacitance probe installations on all other Purex C-Type columns were also recommended for uniformity throughout the plant.

Activities on the installation of a prototype continuous uranium calciner in 224-U Building have included layout studies for accommodating the unit equipment and architectural changes required. A drive motor and switch gear have been located on site. Requisitions have also been prepared for the reduction gear drive unit and material for the calciner dunnage.

TECHNICAL SHOPS UNIT

Mechanical Shops

The physical moving of the Electronic Construction Shop to 328 Building has been delayed pending the approval of a project proposal submitted by the Fuel Technology Sub-Section which includes the vacating of the mock-up space in 328 Building. Action to establish an experimental cold graphite machining facility in the 300 Area has been initiated. The landlord has been contacted and asked to reserve for this purpose a steel sided permanent type hutment Building 3746-D located in the western section of 300 Area. The project section will be asked to draw up a proposal to establish this facility utilizing selected pieces of 2101 Building equipment. The proposed action will assure the availability to the Technology Sections of an adequate experimental machining facility for graphite work operated under the direction of the Technical Shops Unit.

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Buildings and Grounds

During this period occupancies and rentals in the Works Laboratory Area were reviewed to assure equitable rental distribution. Engineering services in connection with modifications to laboratories were furnished. Project CG-576, General Improvements to Laboratory Area Buildings, showed progress in both design and construction in excess of the schedule. At month's end, detailed design was actually 60% complete as compared with 50% scheduled. Construction was estimated at 45% complete as compared with 43% forecast. A survey of the Technology Sections warehousing requirements was made with the result that 3000 sq. ft. of inside storage and 6000 sq. ft. of outside enclosed storage were requested in the proposed 300 Area warehouse 3717 Building. 1500 sq. ft. of the inside storage will be utilized for graphite storage requiring protection from moisture and dust.

Drafting and Design

Total productive man-hours for the month was 2138 with an estimated backlog of 1200 man-hours. 72 overtime hours were worked to permit the completion of urgent projects. Current work includes charts and graphs for the Physics Research Sub-Section which are intended to be presented at the Geneva conference.

Glass Shop

Total productive man-hours for the month was 1137 with a small backlog existing at all times. A total of 126 jobs were completed, 16 of which involved the working of quartz.

Photo Laboratory

Reduction in the photography rates has resulted in a substantial savings to the Technology Sections. Listed below are the charges that were incurred for the month of March using the old rates versus the charges for the month of April using the reduced rates.

	<u>March</u>			
	<u>Orders</u>	<u>No. of Negatives</u>	<u>No. of Prints</u>	<u>Total Cost</u>
Pile Technology	61	443	5688	
Separations Technology	7	23	286	\$4279.70
	<u>April</u>			
Pile Technology	58	295	4811	
Separations Technology	6	47	110	\$1355.30

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ANALYTICAL LABORATORIES UNIT

General Chemical Laboratory

Aluminum nitrate constitutes an interference in both the titrimetric and X-ray photometric analysis of thorium. Aqueous thorium samples containing aluminum in significant quantities were analyzed after liquid-liquid extraction with 30% TBP in spray base. The extractions, which were carried out in separatory funnels, were effective when the nitric acid concentration was between 4 and 12 molar. Extractions were complete after contacting the aqueous phase four times with equal volumes of organic. When the acid concentration was dropped to 2 molar, extraction was incomplete after as many as seven contacts.

Excess oxalic or nitric acid interferes with the colorimetric determination of thorium. Two methods of pretreatment were formulated to eliminate the interference. Oxalic acid was eliminated by heating with permanganate, followed by decomposition of the excess permanganate with hydroxylamine hydrochloride. Nitric acid was removed by fuming with perchloric acid. When both oxalic and nitric acid are present, digestion with aqua-regia followed by fuming with perchloric acid is effective.

A new Jarrell-Ash Company fluorimeter for uranium determinations was received during the month. Preliminary evaluation by members of Chemical Research indicates the instrument is linear from its detection limit of about 5×10^{-10} grams of uranium through 5×10^{-6} grams. The precision is equal to that of the modified HAPO fluorimeter being used for research and the instrument appears to be excellent for routine analysis, although the detection limit is not as low, nor its range as great as the research instrument. It is being "checked out" further by laboratory personnel prior to use in routine operation.

An operating improvement was achieved during the month by substituting a micro buret for a micro pipet as the instrument for adding the uranium spike in the fluorimetric uranium procedure. The buret method is much more rapid and eliminates a tedious step from the procedure. Overall accuracy of the determination was unchanged.

Radiochemical Laboratory

Gross gamma counting of liquid samples in the well-type scintillation counter, as reported last month, was continued. Use in uranium product specification analyses is suggested because pulse height selection can be used to discriminate against U-237.

A preliminary investigation has indicated a possible means of calculating MWD on fuel samples. A 1400 - 1600 MWD thorium sample exhibited a $\frac{\text{Cs-134}(0.80 \text{ Mev g})}{\text{Cs-137}(0.66 \text{ Mev g})}$ of 0.15 while samples of less than 800 MWD uranium have shown such a ratio to be 0.01 to 0.02.

Pu-240 measurements by fission counting have been delayed due to instrument failure. By the end of the month the fission counter had been repaired and a standard having an accepted 2.68% Pu-240 content was analyzed and 2.69% Pu-240 was found. The sizeable backlog of work is now being processed.

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Four scintillation pre-amplifiers have been rebuilt in accordance with circuit changes recommended by R. E. Connally, of Chemical Research, thus making the pre-amplifiers interchangeable for all operations.

Spectrochemical Laboratory

The major efforts of the laboratory were in support of UO_3 calcining studies, as a result little progress was made on the installation of the enclosed arc-spark source enclosure.

Mass Spectrometry Laboratory

The Consolidated-Nier isotope-ratio mass spectrometer was moved from the 108-B Building to the 325 Building, completing the relocation of the Mass Spectrometry Laboratory. Work is now progressing towards start-up of this instrument.

A vacuum apparatus was constructed for the assay of hydrogen occurring in the 0.7 to 300 ppm range in metals. Samples accepted as standard were evaluated and divergence was observed to be 15% and 5% at the low and high ends of the range. A vacuum fusion apparatus for gas in metal analyses is about 90% complete.

Water Quality Laboratory

The Water Quality Laboratory was moved to new quarters in the 1706-KE Building, completing the removal of all our facilities from the 108-B and 1703-B Buildings.

Work volume statistics for the Analytical Laboratories Unit is as follows:

<u>March</u>		<u>April</u>	
<u>No. of</u>	<u>No. of</u>	<u>No. of</u>	<u>No. of</u>
<u>Samples</u>	<u>Determinations</u>	<u>Samples</u>	<u>Determinations</u>

Research and Development

Pile Technology				
Metallurgy Research	56	782	62	681
Pile Materials	148	1032	56	875
Fuel Technology	26	500	45	257
Physics Research	2	84	0	0
Separations Technology				
Chemical Research	212	363	333	915
Chemical Development	528	2015	544	2476
Plant Processes	17	26	10	10
<u>Process Technology</u>	354	815	268	1065
<u>Customers</u>	128	482	74	301
Totals	1471	6099	1392	6580

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VISITORS AND BUSINESS TRIPS

G. S. Daniels of Panellit, Incorporated, Skokie, Illinois visited Hanford April 4th through 8th to inspect temperature monitoring equipment.

D. B. Roberts and T. G. Glassen of the Knolls Atomic Power Laboratory visited Hanford April 6, 1955 for consultation on the Navy-Westinghouse Test Loop.

Everett Harrington of Bonneville Power Administration, Portland, Oregon visited Hanford April 15, 1955 to discuss proposed electrical system fault tests.

R. C. Mann of the General Electric Company, Idaho Falls, Idaho visited Hanford April 15, 1955 to discuss alpha monitoring equipment.

E. H. Wakefield of the Radiation Counter Laboratory, Skokie, Illinois visited Hanford April 17th through the 19th to inspect gamma water monitor equipment.

J. V. Werme of the Minneapolis-Honeywell Regulator Company, Philadelphia, Pennsylvania visited Hanford April 18th through 22nd for consultation on instrument problems for the thermo loop.

C. S. Slenning of the Brown Instrument Company, Richland, Washington visited Hanford April 18th through 22nd for consultation on instrument problems for the thermo loop.

E. J. Hancock of the Radiation Counter Laboratory, Skokie, Illinois visited Hanford April 25th through 30th for engineering assistance on gamma monitor spectrometer units.

R. B. Gunia of the United States Steel Corporation, Pittsburgh, Pennsylvania visited Hanford on April 25th and 26th for discussion of stainless steel products and specifications.

G. M. Roy of the Atomic Power Study Group, General Electric Company, Schenectady, New York visited Hanford April 25th through 27th to discuss reactor design.

R. Merritt and H. Gunderson of Ron Merritt, Inc., Seattle, Washington visited Hanford April 28, 1955 to discuss transducers for flow monitor and strain gage application.

R. N. Conner of the Baldwin-Lima-Hamilton Corporation, San Francisco, California visited Hanford April 28th to discuss transducers for flow monitor and strain gage application.

N. R. Hart and L. F. Dobyms of the United States Steel Corporation, Seattle, Washington visited Hanford April 30, 1955 to discuss stainless steel specifications.

M. H. Russ visited the General Electric Foundry, Everett, Massachusetts on April 4th and 5th to confer on pump castings; Chapman Valve Company, Indian Orchard, Massachusetts on April 6, 1955 to discuss design of cone valves; General Electric Company, Schenectady on April 7th and 8th; and E. I. duPont de Nemours, Wilmington, Delaware on April 11th to discuss pumps and electric motors.

H. J. Bellarts visited the Western Gear Company, Seattle, Washington April 7th and Boeing Aircraft Corporation, Seattle April 8th to obtain technical information on lathe tracer attachment.

E. Hollister visited the Kearney & Trecker Company, Milwaukee, Wisconsin; Clearing Machine Company, Chicago, Illinois; and Cincinnati Grinders, Inc., Cincinnati, Ohio to discuss point-closure press and finishing equipment; and the Sun Pipeline Company, Pontiac, Michigan to discuss operational experience of an Edison "Omniguard" installation on April 10th through the 16th.

L. R. Michels visited the Lummus Company, New York, New York on April 11th through 14th for approval of designs.

C. O. Clemetson visited Panellit, Incorporated, Skokie, Illinois; Universal Oil Products, Skokie, Illinois; Swartout Company, Cleveland, Ohio; Manning, Maxwell and Moore, Stratford, Connecticut; General Electric Company, Idaho Falls, Idaho; and the Westinghouse Corporation, Idaho Falls, Idaho on April 11th through 18th to discuss control instrumentation for 1706-KER Facility.

C. A. Mansius visited the ILCO Tube Bending Works, Los Angeles, California April 12th through 17th to furnish design assistance in the fabrication of special stainless steel connectors.

J. C. Wood visited the Rockwood Sprinkler Company, Worcester, Massachusetts April 15, 1955 to inspect and test ball valves and hydromotor operation of prototypes.

E. S. Day, Jr. visited Panellit, Incorporated, Skokie, Illinois April 17th through 21st to confer with vendor on proposed pressure monitor design change.

E. A. Rees visited the General Electric Company, Cincinnati, Ohio to interview for transfer on April 18th through 21st.

E. R. Rudock visited the Resistoflex Corporation, New York, New York on April 19th and 20th; Pratt Whitney, Inc., Long Island, New York on April 21st; General Electric Company, Aircraft Gas Turbine Division, Hartford, Connecticut on April 25th; The Aeroquip Corporation, Cincinnati, Ohio on April 26th; and the Titeflex Company, Jackson, Michigan on April 22, 1955 to investigate materials for flexible reactor connectors.

G. R. Wilde visited the Pacific Scientific Company, Portland, Oregon on April 19, 1955 to confer on design of deep freeze cabinet.

H. G. Johnson and J. B. Fecht visited the Phillips Petroleum Company, Idaho Falls, Idaho on April 18th and 19th for inspection of chemical separations plant contact maintenance facilities.

D. A. Conley visited architect and engineering companies in the Los Angeles and San Francisco, California areas April 20th through the 30th for a wage comparison study.

R. C. Hoffman visited the Westinghouse Corporation, Pittsburgh, Pennsylvania on April 26, 1955 to approve vendor drawings; and the General Electric Company, Schenectady, New York on April 27th and 28th to discuss relay problems.

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ORGANIZATION AND PERSONNEL

	March 31			April 30		
	Exempt	Non-Exempt	Total	Exempt	Non-Exempt	Total
<u>Personnel Statistics:</u>						
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	71	12	83	70	12	82
Design Planning Unit	16	14	30	17	14	31
Design Engineering Sub-Section	85	12	97	84	12	96
Design Drafting Unit	8	84	92	8	83	91
Total Section Personnel	182	123	305	181	122	303
Technical Graduates (Rotational)	-	5	5	-	7	7
Total	182	128	310	181	129	310
Accessions - 4						
Separations - 4						

GENERAL

Design Section engineering and drafting effort for April was distributed approximately as follows:

	Engineering Man Months Expended	Drafting Man Months Expended	% of Section Effort
1952 Hanford Expansion Program	20.7	12.2	13.0
Reactor Plant Modification for Increased Production	21.8	18.1	15.6
4-X Program	20.8	13.5	13.4
Design Development	66.1	9.3	30.8
Other Design Projects	19.2	16.9	14.0
Customer Work and Miscellaneous	17.6	16.4	13.2
	166.2*	86.4*	100.0

*Equivalent man months expended included 312 hours of engineering and 48 hours of drafting overtime, which represents 0.8% of the Section based on the total available hours for a normal 40 hour week. Major six-day work included design liaison in support of 100-K Plant start-up and detailed design for the Metal Conversion Plant expansion.

The Design Drafting Unit production for April was 210 new drawings and 549 drawing revisions for an equivalent of 6.7 man days per drawing.

DESIGN DEVELOPMENT

Statistics:

The total number of engineering and drafting man months applied to design development activities during April were as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
Metallurgical Design Development	3.2	4.8	0.4	4.3
Reactor Design Development	33.8	51.1	5.5	59.1
Separations Plant Design Development	25.7	38.9	2.3	24.8
Chemical Processing & Reduction Design Development	1.7	2.6	.2	2.1
234-5 Design Development	1.7	2.6	.9	9.7
	66.1	100.0	9.3	100.0

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Metallurgical Design Development

Further study was made during April on the problem of excessive noise associated with the 313 Building semi-automatic cut-off machine. An enclosure lined with "ultra-coustic" fiberglass is being fabricated for testing on the cut-off machine.

Preliminary studies are in progress to determine the optimum air flow required for proper ventilation of the 300 Area welding machines. The air flows are critical because air disturbance of the welding arc results in welding rejects.

A proposed development program for the automatic processing of fuel elements by the point closure method has been completed for review and evaluation.

Reactor Design Development

The program for development of an improved inlet tube connector for the 100-K reactors continued throughout the month. Procurement of prototype connectors is well advanced. Tests are planned or in progress for evaluating stainless steel connectors as well as flexible connectors for comparison with the presently used aluminum connectors.

Study continued on an interim temperature monitoring system for existing reactors. A 225 point system monitoring selected process tubes appears favorable over a 120 point system because of (1) increased protection, (2) potential production gain, and (3) small difference in cost or installation time.

Work was started on a study for power recovery at 100-C reactor. Several systems are being considered. These include heat recovery by (1) heat exchangers, (2) ammonia cycles, and (3) a water flashing system.

Preparation of preliminary design scope for continuous charge-discharge facilities at 100-C reactor advanced during April and is scheduled for May completion.

Contacts were made with Corps of Engineers, North Pacific Division Laboratory to determine the cost of conducting an extended test program for high density concrete. It is proposed to determine the physical behavior of various types of high density concrete when subjected to temperature cycles in the range of 100°C. to 350°C.

Mechanical development studies active during the month included: resistance temperature detectors; process tube flow monitoring; reactor tube removal equipment; and ruptured slug detection.

Separations Plant Design Development

Work on Thorex separations studies was curtailed because of information received concerning problems with thorium metal production, the presence of gamma emitting impurities in U-233, and thorium products.

Preliminary scope was prepared for the installation of a second intercycle stripping concentrator for the TBP Plant.

Studies were continued on low cost methods of disposing of TBP Plant waste sludge. Several types of inexpensive tanks and pits for storing sludge are being explored. The present emphasis is being placed on an underground "vault type" square concrete tank capable of storing approximately five million gallons of non-boiling waste.

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Preliminary design scope continued on the Purex Plant capacity expansion. Studies of the minimum operating capacity factors for plant instrumentation under both HW #3 and HW #4 Flowsheet conditions were completed.

A study is in progress to develop improved design for radio-iodine removal facilities in existing separation plants. Preliminary investigation has been directed toward installation of larger silver reactors for the Redox Plant. Attention is also being given to improvement of the recharging facilities.

Preliminary design scope for an outside nitric acid recovery facility for Redox was continued with emphasis on the acid adsorption tower and the routing for the recovered acid.

Preliminary scope was completed for an automatic wash-down system for the Redox Plant canyon ceiling, roof trusses and upper wall sections.

Work was started on a study for Phase III Redox Plant capacity increase. A review is being made of capacity limitations of major process equipment including the crane. Revised Engineering Flow Diagrams were approved and released for reproduction.

Work was continued on the program to provide improved metal liners for underground waste storage tanks. Test specimens of low-alloy high-strength steels are being prepared and designs for installation of the exposure units is scheduled to start in May.

Mechanical development studies which were active during April included column interface monitor, in-line alpha monitor, and ultrasonic decontamination of separations equipment.

Chemical Processing and Reduction Design Development

Testing of the vertical, replacement type, Task II furnace was completed. All problems concerning the heat cycle characteristics have been resolved and excellent performance was achieved.

The study of the special feeder-type furnace is continuing. Consultation with vendor companies indicates that fabrication and operation of such a feeder presents no difficult problems.

234-5 Development

A preliminary design was completed for a method of adapting permanent mold casting to the existing Task IV equipment. This design together with one showing conversion of the Task VII units to permanent mold casting were transmitted to the Manufacturing Department for comment.

The fabrication of special lathe tools for testing the feasibility of remote machining with a horizontal lathe in Task V was completed. Test pieces have been cast and shop testing is scheduled to start in May.

Engineering Standards & Materials Development

Cost to date for development of engineering standards for the current fiscal year is \$66,623.

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Status on progress of standards and studies during the month is as follows:

- a. Basic work continued on process specifications for jumpers fabricated on-site, non-code vessels fabricated on-site, off-site fabrication of non-code Class I vessel, and replacement agitators and pumps for 200 Area.
- b. Revisions to existing standard specifications for austenitic stainless steels advanced to 80% complete.
- c. The preparation of a standard specification for electrical wire and cable is 50% complete. This specification will include high voltage cables of several types and multi-conductor control cable.
- d. Work was started on the preparation of a standard specification for 600 volt polychloroprene jacketed and thermoplastic insulated wire and cable.
- e. A study is in progress to determine the economic feasibility of using plastic floor markers to designate plant areas. Markers being tested show little wear after approximately one month's service.

DESIGN PROJECTS

Statistics:

Engineering and drafting effort of the Section on projects for the month of April was as follows:

	<u>Engineering</u>		<u>Drafting</u>	
	<u>Man Months</u>	<u>% of Total</u>	<u>Man Months</u>	<u>% of Total</u>
1952 Hanford Expansion Program	20.7	20.7	12.2	15.8
4-X Program	20.8	20.8	13.5	17.5
Reactor Plant Modification for Increased Production	21.8	21.7	18.1	23.5
Other Design Projects	19.2	19.2	16.9	21.9
Customer Work and Miscellaneous	17.6	17.6	16.4	21.3
	<u>100.1</u>	<u>100.0</u>	<u>77.1</u>	<u>100.0</u>

CA-512- 100-K Area Facilities

Design assistance in support of the 100-K reactor start-up program was substantially reduced following successful start-up of the 105-KE reactor. Principal design effort in April included preparation of construction as-builts and the processing of minor design revisions. The 100-K as-built program advanced to 81% complete. During the latter part of the month design assistance was furnished in the planning and execution of repairs to the reactor effluent water system.

Design for the 1706-KER Facility advanced to 96% complete. Major emphasis was placed on the completion of instrument and electrical design drawings. Other design activity included the preparation of purchase specifications, processing design revisions, and continuation of the test program for design components.

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CA-513 - Purex Separations Facility

Design activity was limited to miscellaneous design revisions for Purex and design of the disposal facilities for failed process equipment.

CA-514 - 300 Area Expansion

The revision of 313 Building equipment layout drawings to include latest vendor information was completed.

CA-539 - Additional Waste Storage Facilities

Status of detailed design for Project Revision No. 5 is as follows:

Part A - Design for the manifold facility condenser facility is completed.

Part B - Design for the emergency water facility is 50% complete.

Part C - Design was completed for the special jumpers, water shielding tanks and cover slab modifications.

CA-546 - Fuel Element Pilot Plant

Design for the development equipment is approximately 43% complete. Design for the equipment installation advanced to 38% complete. A structural check of the building frame in the electroplating room indicates that the proposed 2-ton power driven crane can be installed.

CG-551 - Expansion of 234-5 Building Facilities

Design activity was completed during April.

CG-558 - Reactor Plant Modification for Increased Production

Total design advanced on schedule to 76% complete, an increase of 6.5% during April. Design scope is complete and detailed design 72% complete.

The design scope was revised to delete sampling of the remote filter effluent.

Design for the 190-B and 190-D Annex Buildings has been completed. Design for the other 190 Buildings is well advanced. The detailed plans for the 183 Building modifications (filter plant) and for the 181 Buildings (river pump house) are essentially complete.

Further progress was made during April on the 151 Sub-Stations and the effluent water system. The downcomer design for the 105 Buildings is complete and the "C" elevator modification design is in the comment stage.

CG-578 - Effluent Water Monitoring Improvements, 100-B, D, DR, F and H Areas

Detailed design remained at 98% complete. All plans and specifications have been approved and acceptance test procedures issued for comment. All design is expected to be complete early in May.

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CG-579 - Effluent Water Monitoring Improvements, 100-C Area

Detailed design advanced to 87% complete, an increase of 23% during April. A total of 23 drawings are scheduled for the project, of which 21 have been approved and 2 drawings are incomplete pending receipt of vendor information.

CA-586 - First Capacity Increase - 230 KV System

Detailed design for additions to the 230-KV System advanced on schedule to 45% complete. Purchase specifications and requisitions for the transmission towers were prepared and issued. Routings for the control cables and location of the control cubicle have been established.

CG-598 - Purex Vacuum Fractionator

General Electric design for the project advanced to 63% complete. Work in progress includes 202-A Building modifications, acid fractionator building addition, and associated outside facilities. The vendor design for the fractionator was reviewed and approved.

CG-599 - Hanford 4-X Program - 100 Areas

Scope and detailed design work for the project was completed during April. Revisions of the production forecast resulted in deletion of the flatcars, cask cars and the bucket storage facility in the Redox Plant.

CG-600 - 100-C Alterations

Detailed design advanced 7% during April to 90% complete. Design progress during the month was influenced by the pending scope revision and project proposal to include new pumps which will provide the required pumping capacity without overloading existing motors.

CG-603 - Hanford 4-X Program - Bismuth Phosphate Plants

Detailed design advanced to 98% complete. Plans and specifications are essentially complete with the exception of the F-10 load-out facility, scavenging facilities for TBP stored wastes, and miscellaneous details.

CG-613 - Hanford 4-X Program - Metal Conversion Plant

Detailed design for the Metal Conversion Plant expansion advanced 16% during the month to 37% complete. Design for Phase II, the lump sum portion of the 224-UA (new annex), is progressing on a priority basis in order to meet required date for invitation to bid.

Design for the annex has been scheduled in three phases:

- Phase I - Foundation and concrete work to be accomplished by Minor Construction forces.
- Phase II - Building Structure and calciner foundations to be done by a lump sum contractor.
- Phase III - Installation of the equipment, piping, instrumentation, and electrical work scheduled to be done by Minor Construction forces.

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The design criteria for the continuous calciners was prepared and submitted for approval. Struthers-Wells Corporation was selected as the fabricator for the six calciner units including drives and furnaces. They will also furnish design consultation for specific problems associated with the calciner.

CG-614 - Hanford 4-X Program - 300 Area

Detailed design advanced to 90% complete based on 60 required drawings. Portions of design were delayed pending study of design problems in the ventilation of the furnaces and welding machines.

CG-616 - Installation of Acid Feed Equipment, 100-B, C, D, DR, F and H Areas

Design activity was limited to design scope and preliminary engineering pending authorization of detailed design by HOO-AEC.

CG-617 - Additional Air Drying Facilities - Building 234-5

Detailed design advanced to 70% complete. Two drawings have been completed and issued for comment. Orders have been placed for all engineered material.

CG-621 - Redox Contamination Control Facilities

Design for In-Cell Ozonization advanced to 45% complete. All critical material and equipment have been ordered with the exception of a dew-point recorder and a scintillator counter. Drawings completed during April include the ozone generator arrangement, foundations and piping, and Tank 124 modifications.

CG-625 - Additional Waste Storage Facilities - 200 Area

Design was started during April for Phase I to include an eight tank farm addition to the existing 241-SX Tank Farm. To date 26 drawings of a required 45 drawings are in progress. This phase of the work is 21% complete and the total design is 11% complete.

D. O. 100757 - "As-Built" Area Maps

Due to more urgent work, this assignment was inactive during the month. Design drafting progress remains at 88% complete with 327 drawings started out of 370 scheduled.

B. O. 100946 - Foxboro Dewcel Moisture Monitoring System (CG-583)

A total of 21 drawings have been approved for the installation of Foxboro dewcels in 105-B, D, F, H and DR. Remaining design work includes preparation of one purchase requisition and design field liaison. Design is 95% complete.

D. O. 101036 - Moisture Monitoring System, 105-C Building (CG-584)

Design is 90% complete. All required drawings have been issued for comment.

D. O. 101039 - H-4 Oxidizer Redesign

At the request of the Manufacturing Department, a new design has been started. The ten drawings required, including 8 jumper drawings, are scheduled for completion during May.

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D. O. 101045 - Discharge Area Television Viewer, 105-B Building (CG-593)

Vendor drawings for the closed circuit television chain were approved and returned to the vendor during the month. Design is 80% complete.

D. O. 101063 - Alum-Activated Silica Water Treatment Facility, Phase II

Project proposal preparation for this work has been delayed due to the need for further review of the proposed scope of work for the 100-D and 100-F areas.

D. O. 101147 - FY 1956 and FY 1957 Plant and Equipment Budget

Revisions to the FY 1957 and Revised FY 1956 Plant and Equipment Budget for projects to be managed by the Engineering Department were completed following Management review.

D. O. 101190 - Irradiation Test Facility - HTRE Fuel Tests

A report was prepared during the month which summarizes the concept of a test facility for the proof-testing of HTRE fuel elements. This completes Design Section effort on this proposal.

D. O. 101212 - Classified Scrap Disposal

The design covering the installation of a paper pulper in the 300 Area Library for classified scrap disposal is 80% complete.

D. O. 101218 - General Improvements to Laboratory Area Buildings (CG-576)

Detailed design advanced during the month to 90% complete.

D. O. 101249 - Gage for MEF Slug Breaker, 105-C

The design was essentially completed for the installation of a transducer on the slug breaker for metal examination facilities at 105-C. It is expected that fabrication will be completed during May and testing completed in June. The over-all status of this work is 40% complete.

D. O. 101283 - Building 327 - Cell for Tensile Testing Machine

Design for the installation of a shielded cave in the Radio-Metallurgy Building advanced to 90% complete.

D. O. 101230 - Irradiation Facility - WAPD Fuel Test Program

During the month, the engineering feasibility report for the installation of a pressurized water cooled test facility for the Westinghouse Atomic Power Division was released.

D. O. 101325 - Additional Service Facilities - Redox Plant - Scope Design

Preparation of preliminary design was started for additional service facilities for the Redox Plant, including a new office addition, a storage room, a new SWP change room, and miscellaneous modifications to existing facilities. This work is 8% complete.

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D. O. 101331 - Additional Service Facilities, Redox Plant - Project Proposal

A project proposal was started during the month covering additional service facilities for the Redox Plant.

Design Work Completed During April

D. O. 101103	Hanford 3X Program - 300 Area (CG-573) - As-Built Drawings
D. O. 101136	Painting 100-DR Water Plant Structure
D. O. 101139	Agitator for Redox Process Vessels, 202-S
D. O. 101158	Review KAPL - 120 Instrument Panel Purchase Requisition
D. O. 101162	E-12 Pump Discharge Jumper, 202-S
D. O. 101163	Jumpers - G-1 to G-3, 202-S
D. O. 101170	Cask Car Well Lid
D. O. 101195	Replacement of Existing 313 Building Roof (CG-610)
D. O. 101200	Redox Plant - Condenser & Wind Tunnel Exhaust
D. O. 101201	"T" Plant Instrument Stand
D. O. 101215	Redox Plant - Jumper Revisions to H-4 Vessel
D. O. 101235	Redox Plant - Centrifuge Shroud - Detail Design
D. O. 101237	Standards Unit Design Services
D. O. 101240	Hanford 3X Program - 100 Areas (CA-574)
D. O. 101244	TBP Plant - Cell Conversion
D. O. 101268	Redox Plant - Stack Spray Pump - Scope Design
D. O. 101272	234-5 Building Metal Laboratory - Equipment Modifications
D. O. 101278	Redox Plant - Design Door for Stack Liner
D. O. 101279	Redox Plant - Capsule for Burying Tower
D. O. 101280	High Pressure Flow Loop, 189-D
D. O. 101292	Redox Plant - Jumper Design, 241-S Storage Tank
D. O. 101295	Redox Plant - Jumper Design, Waste Tanks
D. O. 101298	Chute Liner Replacement 105-B, D and F
D. O. 101299	TBP Plant - Agitators for 241-UR Tanks
D. O. 101300	"T" Plant - Jet Jumper, 221-T
D. O. 101307	Process Waste Disposal - Pump Revisions
D. O. 101314	Waste Disposal - Diversion Box Jumper, 241-SX
D. O. 101315	Waste Disposal - Diversion Box Jumper, 241-S
D. O. 101317	"T" Plant - Revision of Agitator Drawings

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:md

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ENGINEERING 12 MONTHS
PROCESS ENGINEERING SUB-SECTION

Description	Work Time		Backlog Start of Mo.	Sch'd Dur. Mo.	Spent % of Total Effort	Month End of	12 MONTHS					Bal. of FY 1956 & Later	Total
	Mo.	Mo.					May	Jun.	Jul.	Aug.	Sep.	Oct.	
1952 Exp. Program*	62.6	9.3	13.0	53.3			7	6	5	4	4	3	53.3
CG-558 and CG-600	15.2	5.0	4.2	16.0			4	3	2	2	2	2	16.0
4-X Program	30.5		3.3	27.2			3	3	2	1	1	1	27.2
Reactor Design Develop.	95.9		28.3	67.6			29	29	28	27	26	26	370.0
Sep. Design Development	51.9		18.4	33.5			19	19	20	20	20	20	278.0
Met. Design Development	4.4		2.3	2.1			2	2	2	2	2	2	34.0
234-5 Design Development	10.4		1.1	9.3			1	1	1	1	1	1	20.0
Weapons Design Develop.	4.6		0.7	3.9			1	1	1	1	1	1	14.0
Other Proj. & Misc.	21.4		3.8	7.6			5	5	5	5	5	5	70.0
Ant. Future Work								2	4	6	7	8	107.0
Totals		5.0	71.4	100.0			71	71	70	69	69	69	989.5

DESIGN ENGINEERING SUB-SECTION

1952 Exp. Program*	79.3	13.8	17.5	65.5			12	10	7	6	5	4	65.5
CG-558 and CG-600	206.6	15.5	19.6	191.1			15	15	15	15	14	13	191.1
CG-578 and CG-579	8.1	1.3	1.6	6.8			1	1	1	1	-	-	6.8
CG-586	15.8	1.2	1.5	14.6			2	2	2	2	2	1	14.6
CG-598	19.4	2.9	3.7	16.5			4	4	3	2	1	1	16.5
CG-621	15.4	1.9	2.4	13.5			3	3	2	1	1	-	13.5
CG-625	47.0	0.9	1.1	46.1			4	5	4	4	5	4	46.1
4-X Program	62.4	5.0	15.3	52.1			16	13	9	5	3	2	52.1
Design Develop. Program	39.0		11.5	27.5			11	13	13	14	14	14	192.0
Other Maj. Minor, Misc.	76.4	12.0	14.7	73.7			10	10	10	10	10	10	140.0
Ant. Future Work							1	3	13	18	21	25	303.0
Totals		17.0	79.0	100.0			79	79	79	78	76	74	1041.2

Present Total Backlog is distributed over the five engineering branches in terms of man months as follows:

Authorized Projects Anticipated Future

	FY 55 & FY 56	FY 55 & FY 56	Totals
Arch. & Civil	150	51	201
Mechanical	190	136	326
Electrical	125	39	164
Instrument	197	61	258
Standards	76	16	92
Totals	738***	303	1041

*Includes 1706-KER Recirculation Facilities

**Includes Minor and Miscellaneous work for FY 1956

***Includes Budgeted FY 1956 Design Development Work

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MONTHLY NARRATIVE REPORT, APRIL 1955
PROJECT SECTION

I. SUMMARY

A. Organization and Personnel

Following is a summary of personnel changes in Project Section during the month:

	<u>March 31, 1955</u>	<u>April 30, 1955</u>	<u>Net Change</u>
Employees on payroll	360	356	-4
Technical Graduates, Rotational	3	1	-2

The end-of-month status involved these changes:

	<u>Project Section</u>	<u>Technical Graduates Rotational</u>
Payroll additions	8	
Payroll removals	7	
Transfers into Section	5	
Transfers from Section	10	2
Transfers within Section	6	

B. Scope of Activities

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

<u>Project No.</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
CA-512	100-K Area Facilities (excluding 1706-KER which has not been scheduled)	100%	99.2%
CA-513-A	Purex Facilities, Part A	100	99.2
CA-514	300 Area Expansion	81*	87*
CG-535	Redox Capacity Increase, Phase II	100	100**
CA-539	Additional Waste Storage Facilities, Redox	90	87
CA-546	Fuel Element Pilot Plant	97	65***
CG-558	Reactor Plant Modifications	11	7
CG-603	Hanford 4X, Bismuth Phosphate Plants	22	45

* In accordance with schedule transmitted to AEC March 24, 1955, for approval.

** Completed with minor exceptions.

*** Based on original scope. Schedule is being revised when project proposal is approved.

C. Craft Labor

There were no appreciable labor problems in the field. However, a grievance was submitted by Central Printing against the Reproduction shop because of jurisdictional problems. The grievance concerned some work which was inadvertently

performed by Reproduction, and it was resolved satisfactorily at an informal Step II hearing on April 22, 1955.

D. Safety and Security

Eight regular meetings for discussions of safety, security, and health topics were attended by about 200 Project Section employees. Four Monday morning tool box and six mass safety meetings were conducted in the field for service contractor personnel. Special Hazards orientations were given to all new and re-hired employees. One major injury was suffered by a construction laborer, and the injury broke the 23-month record at 2,045,311 safe man-hours.

E. Highlights

Project Auxiliaries Sub-Section

Engineering Files distributed almost 196,000 prints during April, including 11,822 for Reactor Modification Program. The tracing and print rehabilitation program was initiated with a monthly budget of \$1,500. This program is being conducted with assistance from the Drafting Unit, and it will be evaluated after one year of experience. Estimating completed 20 estimates, of which four were for project proposals. Field Surveys completed survey work on the 313 Building spur line, and on the alignment of pump unit #4 in Building 190-C. This Unit also continued work on design data for Reactor Modification Program, and with assistance for the re-survey of Richland. Property evaluations were completed on five projects, and reports were forwarded to Plant Accounting. Reproduction shop output was 396,406 square feet, with major work being done on Reactor Plant Modification and 100-C Area Alterations.

Inspection Sub-Section

The inspection workload continued its slight upward trend to a total of 447 assigned orders valued at about \$11,360,000. Evaluations under the Corrosion Testing Program remained about level at 152, plus seven chemical determinations. Data on corrosion testing are being compiled for processing through the 702 IBM Calculator. Principal inspection work was concerned with resistance thermometers for 100-K Area, the process water pumps and equipment to furnish the fixed price contractor for the Reactor Modification Program, equipment for the 4X Program, and 175 orders for which inspection is being performed for the operating organizations. One order for tubing to be used in tube bundles for Redox Capacity Increase was finally rejected, and the tubing was procured from another vendor.

Minor Construction Sub-Section

Minor Construction forces performed a major portion of emergency work on the 100-K Effluent Lines as described below in Reactor Projects Sub-Section. Also responsibility was accepted on work orders to complete Purex Facilities which have been released by the construction contractor. The Sub-Section completed assigned work on 21 work orders and three projects: Redox Capacity Increase, Phase II; Activate Task I, RMA Line; and TBP Waste Scavenging. Work was accepted on 42 new work orders. The contract force for the labor service contractor averaged 970-980, and at no time exceeded the limit of 1,000.

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Project Engineering Sub-Section

Work was done on 40 projects, two informal requests, and miscellaneous engineering requests. The Sub-Section completed assigned work on Redox Capacity Increase, Phase II; Redox Waste Water Disposal Basin; 105-C Metal Examination Facilities; Recuplex Installation; Expansion of 234-5 Building Facilities; Ammonia Scrubbers, Redox; and ERA-3119, Renovation of Rooms 36, 38, and 40, 3706 Building. Three projects were received from Separations Projects Sub-Section, and new work was accepted on four engineering requests. A Notice to Proceed was issued by AEC for construction of annexes to Buildings 190-B and D, under Reactor Modification Program. Other important projects in progress include 300 Area Expansion, Additional Waste Storage for Redox, Fuel Element Pilot Plant, Effluent Water Monitoring, Hanford 3X Irradiation, and 100-C Alterations, and Hanford 4X, Bismuth Phosphate Plants.

Reactor Projects Sub-Section

Minor Construction work at 105-K to provide connections for 1706-KER Facilities was completed before start-up, and the construction contractor completed structural work at the same time. The 1706-KE Water Quality Semi-works was turned over to the user, Pile Technology, on April 12, 1955. Extensive emergency work was done on the east line of the 100-K Effluent Lines after this 84-inch steel pipe moved from its bed in the river on April 25. Both 100-K Reactors were shut down while the line was being re-anchored with loose aggregate and with concrete blocks suspended from used railroad rails. Additional anchors were made from bundles of rails laid across both effluent lines. A diver was employed to inspect the lines, and a break around about three quarters of the circumference of the east line was found about 350 feet from shore. The reactors were returned to service on April 28, and plans for repairing the line have been completed.

Separations Projects Sub-Section

The transfer of remaining Purex work from the construction contractor to Minor Construction forces was accomplished on April 13, 1955. Principal work was concerned with design changes and exceptions. Operability testing was begun late in the month. Requisitions were prepared for part of the engineered equipment necessary for the Purex capacity increase to a factor of 2.75. All marked-up drawings have been received from the construction contractor, and 215 as-built drawings have been completed. Official acceptance of construction transfer papers have been processed on these parts of 202-A Building: Storage Gallery, Crane Cab Gallery, Roof of 202-A, P.R. Room Vault, Regulated Shop, Trap and Pump Pits, Acid Storage, East and West Switchgear Rooms, Analytical Laboratory, Aqueous Make-up, R.M.U. Room, and Slug Storage Basin. Detailed design for Purex Acid Fractionator was completed by Lummus Company.

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.

[Signature]
J. S. McMahon, Manager, Projects

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II. STATISTICAL AND GENERAL

A. Significant Assignments

1. Initial Reporting

ERA-1227, Provide Additional Storage and Shop Space in the 105-B, D, and F Buildings

Scope drawings are complete. A scope estimate was prepared, and the project proposal is being prepared.

ERA-1229, Installation of Raw-water Cross-tie, 105-C

Manufacturing Department has requested preparation of an informal request for the installation of a raw-water cross-tie for 105-C Building.

ERA-3120, Remodeling of Facilities, Kadlec Hospital

At the request of the Industrial Medical Sub-Section, a project proposal is being prepared for the remodeling of Kadlec Hospital facilities.

ERA-3122, Replacement of Steam Plant Deaerator, 384 Building

Manufacturing Department has requested a project proposal for replacement of the steam plant deaerator in the 384 Building.

2. Final Reporting

CA-187-D-III, Redox Cooling Water Disposal Basin

With the official concurrence of Manufacturing Department, the project is being closed out with exceptions. Information for the Physical Completion Notice has been issued.

CA-431-C, Metal Examination Facility, 105-C

The project has been closed out with exceptions. Information for the Physical Completion Notice is being assembled. Expenditures exceeded the authorized funds, but are within the allowable over-run limits.

CG-496, Recuplex Installation, 234-5 Building

The project has been completed with exceptions. Information for the Physical Completion Notice has been issued.

CG-535, Redox Capacity Increase, Phase II

The project was completed on April 29, 1955, with minor exceptions which are covered by work order to Minor Construction. Start-up items were covered by a work order to Plant Forces. Information for the Physical Completion Notice is being assembled.

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CG-551, Expansion of 234-5 Building Facilities

The project was completed and prepared for close-out during the first part of May 1955. Start-up is to be accomplished on a work order basis. Information for the Physical Completion Notice is being assembled. The project was completed before the directive completion date and with about 10% over-run.

CG-558, Ammonia Scrubbers, Redox

The project has been cancelled. Information for the Physical Completion Notice has been assembled.

ERA-3119, Renovation of Rooms 36, 38, and 40, 3706 Building

At the request of the Technical Information Unit, the informal request for this work has been cancelled, and the work order has been closed out.

3. Current Projects

CA-512, 100-K Reactor Facilities

Design work was done on the planning and execution of repairs to the effluent water system and the preparation of construction as-built drawings.

Shop equipment which is to be held for future use has been moved to its permanent location in 2101 Building and the Heavy Duty Equipment Shop. Transfer to Purchasing and Stores Section is to be accomplished during early May 1955.

On April 25, 1955, at approximately 9:00 a.m. the east river effluent line was observed to have risen to the water surface from the shore to a point about 200 feet in the river.

To secure the lines against further dislodgement it was decided during the afternoon of April 25 to cover them with aggregate obtainable from a borrow pit located just east of the K Areas. The reactors were shut down, and placing aggregate on the lines started about 7:00 p.m. on that date.

Additional anchoring in the form of large concrete blocks suspended from the ends of used rails were laid across the lines ahead of the fill from a point about 180 feet from shore to the end of the fill, which is about 270 feet from shore. Intermediate anchors made up of bundles of rails laid transversely across the two lines were also used. The fill was completed April 28.

Inspection of the exterior of the east effluent line was made by a diver during the afternoon of April 27. A break was discovered at a point about 350 feet from shore. This break was later determined, by inspection of the interior of the line, to extend around approximately three quarters of the circumference, leaving about five feet of unbroken skin in the top-downstream quadrant.

Blanking off the east line was initiated during the afternoon of April 27 and the blank was in place early April 28 afternoon. Flow tests were conducted by Operations at 3:00 p.m. to establish the adequacy of the west line for the combined flow of KE and KW. The test results were favorable, and operation of both reactors was resumed about 6:00 p.m. on April 28. Total reactor down time was thus limited to three days.

External examination of both lines was continued to the ends on April 29 with the use of a special cage constructed to provide protection for the diver from the strong mid-stream current. Air bubbles were observed to be coming up through the gravel cover over the west line in an area located about 60 feet off-shore from the break in the east line. The extent of damage, if any, to the west line is not known.

Internal examination of the east line, made April 30 showed some flattening of the line (about nine inches maximum) and severe wrinkling at a point about 200 feet out from shore. No breaks in addition to the one previously located were found. Repairs are planned for the break only. The wrinkling and flattening is not believed to present a serious impairment of the line's usefulness.

The break in the line was observed through underwater television, and line anchor placements were inspected by the diver on April 30. The installation of these anchors, except for 60 feet at the point of the break in the east line, was nearly complete to the terminum on this date. Preparations were being made to repair the east line, and to cover the dyke with rip-rap.

1706-KEER Recirculation Facilities

Minor Construction forces completed work inside 105-KE Building for connection to the 1706-KEER Facilities. The construction contractor completed structural work at the same time. Further work must await delivery of equipment and materials. Piping work has been tested, and lines in the effluent tunnel have been installed.

CA-513-A, Purex Facility

Design work consisted of revisions and design changes in support of the Purex plant. All marked-up drawings have been received from the construction contractor, and 215 as-builts have been completed. Requisitions amounting to about \$60,000 were prepared for part of the engineering equipment necessary for increasing Purex capacity to a factor of 2.75. The principal work was accomplishment of design changes and the beginning of operability testing. The latter was interrupted late in the month by reworking of pulse mechanisms. Work by construction contractor craftsmen was completed on April 13, 1955, and full responsibility for completion of Purex was transferred to Minor Construction.

"Transfer of Construction" papers have been processed on these completed parts of 202-A Building: Storage Gallery, Crane Cab Gallery, Roof of 202-A, P.R. Room Vault, Regulated Shop, Trap and Pump Pits, Acid Storage, East and West Switchgear Rooms, Analytical Laboratory, Aqueous Make-up, R.M.U. Room, and Slug Storage Basin. Cells A, B, C, D, and E are complete.

The contract work for the 241-A Contact Condenser System was 86% complete. The condensers have been set, and work is progressing on the main water lines. Instrument panels have been installed in the Control House and Valve Pit. Concrete work has been completed, and electrical work was about 65% complete.

Meetings are conducted each week to coordinate phases of start-up, and to obtain prompt agreement on design changes.

Calibration and operability testing by Plant Forces was on schedule. Of the 65 canyon vessels, 13 have been calibrated. The outside and surface tank calibration

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has been completed, and operability testing of the dissolver cell equipment was started on April 25.

CA-514, 300 Area Expansion Program, Production Facilities

Design had been completed previously; construction progressed 13% to a total of 87%. A directive dated April 6, 1955, authorized increased funds of \$5,900,000, with the General Electric portion being increased to \$5,188. The requested increase was based upon a complete re-estimate which indicated an over-run of \$1,115,000. This over-run was reduced about \$300,000 by deletion of some equipment and by reduction of design and contingency estimates.

Equipment layout drawings for 313 Building were revised to include late information from the vendor.

Acceptance testing has been performed on the pickle machines. The sleeve-cleaning machines were completed except for electrical connections. Installation work was continued on the slug recovery monorail and the cap and can machines. The furnace area conveyor system was completed except for the powered kick-off devices. The radiographic machine has been installed and is operating.

Work was continued on remaining structural portions of the 313 Building and its utilities. Renovation of the 3706 Building was essentially completed. The principal remaining work was balancing of the heating and ventilating units.

CA-539, Additional Waste Storage Facilities for Redox

Design progressed 2% to a total of 98%; overall completion of construction was 87%. Work by the lump sum contractor was about 20% complete, and work on the condenser system was about 37% complete.

Detailed design was completed for the manifold facility, condenser facility, special jumpers, water shielding tanks, and modifications to cover slabs. Design for the emergency water facility was 50% complete.

The contractor began work on the job site in early April. The sequence of work was: excavation started April 6; reinforcing steel was delivered on April 8; the first concrete was placed on April 20; installation of the three-inch pipe was begun on April 25; and the first seven vapor line supports were placed April 26. Backfilling was started on April 28. It was decided to withhold about 8,000 cubic yards of backfill which would require re-excavation on subsequent tank farm projects.

The scheduled beneficial use date of the last nine tanks and the vapor system is July 25, 1955. Minor Construction work is being delayed by lack of design. Construction completion date for the contractor is July 3, 1955, and this may be delayed by slow delivery of materials.

CA-546, Fuel Element Pilot Plant

According to the schedule which has been submitted for approval, design was 65% complete; however, design for the equipment installation was about 38% complete. Construction schedules have been revised according to the revised scope of work. The present estimate was 65% complete. A revised project proposal is being processed to

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eliminate the semiworks equipment, and the cost estimate is being revised accordingly.

Rehabilitation of the 3730 Building was completed during early April 1955. Minor Construction forces continued with relocation of equipment from Buildings 3730 and 3732. The swaging machine was tested satisfactorily under the supervision of the vendor's erection engineer.

CG-558, Reactor Plant Modification for Increased Production

Design progressed 8% to a total of 72%; construction progressed 2% to a total of 7%. Design work consisted of completed 190-B and 190-D Buildings, essentially completing 181 Buildings and 183 Buildings modifications, and doing additional work for substations, water systems, and reactor components.

Following approval of the revised project proposal by the Washington AEC office, a directive is being issued.

The replacement of horizontal rods in 105-DR was started on April 18, and has been essentially completed. The transformers and switch gear for 190-DR have been temporarily located, and excavations were made for underground power lines and feeders. At 181-D the #5 pump is being installed and tested. Discharge lines 1, 2, 3, 4, and 5 have been completed.

Minor Construction work has been completed in 100-F.

In 100-R preparatory work for the rod shutdown was completed.

In 100-B Area, work consisted of excavation, fabrication of piping, relocation of pipe, and site preparation for construction of the 190-B Annex. Effluent lines are being connected to the junction boxes, and backfilling is progressing. Other installation and relocation work is being expedited.

Construction contracts were awarded for the 190-B and D Building Annexes on April 26, 1955, for a low bid of \$1,392,985.

CG-603, Hanford 4X Program, Bismuth Phosphate Plants

Scoping and design are being managed by Design Section, and design was about 98% complete; construction progressed 30% to a total of 45%.

On April 6 a preliminary issue of a revised project proposal was submitted to the AEC. The proposed revision was returned to Engineering Department without action on April 22. On April 28, GE was informed by the AEC that work on the rehabilitation of the "B" Plant was to be continued. Accordingly, the revised project proposal is being processed for approval by AEC.

In the progress of construction, work was continued on repairing and testing valves and piping, regasketing of cell jumpers, and placing underground lines. Relocation of 221-B vessels was about 90% complete. Installation of C-9 Tank in 224-T was completed by Plant Forces, and this represents about 50% of the work in 224-T. Replacements to A-1 and D-1 Tanks in 224-B have been installed.

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Minor Construction work on "T" Plant in-farm first cycle scavenging was continued. Overall work was about 80% complete.

CG-613, Hanford 4X Program, Metal Conversion Plant

Scoping and design are being managed by Design Section. Design work was 38% complete, and ahead of schedule. Design for the 224-UA (New Annex) is proceeding on the basis of three phases: foundation and concrete work to be accomplished by Minor Construction; building structure and calciner foundation to be done by a lump sum contractor; and installation of the equipment, piping, instrumentation, and electrical work to be done by Minor Construction.

An interim authorization in late April provided funds of \$1,100,000 for design and procurement, and the increase was attributed largely to the increased cost of calciners.

The fabrication of calciners was awarded to the Struthers-Wells Corporation on an AEC maximum price supply contract, at a total price, including spares, of \$680,000. Bids have been received for the Absorber Tower and Gas Cooler.

B. Other Assignments

CG-187-D-II, Redox Production Plant

Design had been completed previously; construction progressed 13% to a total of 45%. Work is being delayed by procurement of Backcycle Evaporator D-14. A thorough analysis of the financial status of this project is being made because an overrun of project funds has been indicated.

CA-533, Hanford Works Official Telephone Exchange

Design had been completed previously; construction progressed 11% to a total of 93%.

An installation engineer from the vendor arrived on April 18 to make a general inspection and to assist with testing and trouble shooting. GE operating personnel have been on the job site since April 13 to witness testing. Minor repairs and readjustments are being accomplished during final installation and testing.

CG-543, Replace Sanitary Tile Field, 200 West Administration Area

Design had been completed previously; construction progressed 55% to a total of 90%. W-1 Field has been put into operation. Both fields are being given final grading, and barricade fences are being installed.

CA-548, Reactivated Project Proposal for New VSR Test Tower

With preliminary design completed, the project proposal is being routed for GE approval signatures.

CG-549, Activate Task I, RMA Line, Building 234-5

Design had been completed previously; construction progressed .4% to a total of 99.4%. Work continued on work orders which covered exceptions at the time of

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acceptance by Manufacturing Department. Piping for the heat exchangers, to be installed in the reactor cooling system, has passed corrosion tests. The completed heat exchangers are expected on site during June 1955.

CA-555, Graphite Hot Shop and Storage Building

Design completion was revised downward to 90% in accordance with revisions of the design drawings. The AEC project proposal review board deferred action until their meeting of April 29 to determine whether deleted items were to be submitted later as a revision or as a new project proposal. Their decision was not announced.

CG-562, Waste Metal Recovery Plant Modifications

Completion status remained at design 100%, construction 97%. The instruments which were delaying completion of the work have arrived and are being installed. The project is being prepared for close-out during early May 1955.

CG-572, Particle Problem Animal Exposure Equipment

Completion status remained at design 100%, construction 32%. Procurement for Phase II work was continued, and construction is to be resumed during July 1955.

CG-574, Irradiation

Design had been completed previously; construction progressed 2.8% to a total of 98.8%. Initial acceptance papers are being circulated for signatures. Remaining exceptions are the air mask systems in 105-DR and 105-H, and the as-built drawings.

CG-576, General Improvements to Laboratory Area, 300 Area

Design progressed 15% to a total of 60%; construction progressed 7% to a total of 45%. Design work was directed principally toward shielding for the tensile machine, building modifications, and changes to facilities.

Work has been started on the floor for Cobalt-60 Source in 325 Building and the under-water lighting for the wet storage basin in 327 Building. Work was continued on electrical installations in 325 Building and renovations in 328 Building. Installation of walls by Minor Construction forces has been started in Rooms 128 and 316 of 328 Building.

CA-578, Effluent Water Monitoring Improvements, 100-B, D, F, DR, and H Areas

Design was about 99% complete. All plans and specifications have been completed, and preparation of acceptance test procedures was well advanced. Construction progressed 4% to a total of 9%.

All turrets, cooling ducts, and enclosed tubing have been installed in the sample rooms at 105-H. Fabrication of cooling ducts and enclosed tubing was completed for 105-DR. Preparatory work for Panellit installation was continued in 100-H and DR Areas. Removal of instruments from existing panels was started on April 11, 1955, and permanent installation can begin when the new panels have been received. Schedules for panel installation are being revised to coincide with the Reactor Modification Program. Representatives of GE and the vendor are resolving final engineering details before fabricating the remainder of the spectrometers.

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CG-579, Effluent Water Monitoring Improvements, 100-C Area

Scoping and design services in the field are being managed by Design Section. Representatives of GE and the vendor are resolving final engineering details and fabricating the remainder of the spectrometers.

CG-586, First Capacity Increase, 230-KV System

Design progressed 17% to a total of 42%. Purchase specifications and requisitions for the transmission towers were prepared and issued. Routing of control cable and location of the control cubicle have been established. Specifications for the steel towers of the 230-KV transmission line were reviewed on April 15, and procurement of the 26 towers was started on April 29. The cost estimate for installation by Minor Construction of control cables in the 165-KE-KW Tunnel has been prepared for inclusion in the work authorization.

CG-587, TBP Waste Scavenging

Design had been completed previously; construction progressed 15% to a total of 97%. All Minor Construction work has been completed. Drilling of test wells was continued by two drilling crews. One crew is attempting to remove the perforator that is stuck in Well #2.

CG-589, Dejacketing and Ultrasonic Equipment, 105-C Building

Design had been completed previously; construction progressed 9% to a total of 10%. Field releases and work orders are being issued to appropriate crews for piping and equipment installation.

CA-590, Fly Ash Collection Equipment, Building 384

The project proposal is being changed to provide tie-ins to be made by other than Plant Forces. The project cost estimate is being revised accordingly, and the allowance for contingencies is being increased from 10% to 20%. This increases the project estimate from \$35,000 to \$38,000.

CA-595, Car Pullers, 184 Building Coal Yard, 100-B, D, F, and H Areas

Design had been completed previously; overall construction was estimated at about 85% complete. Capstans have been installed on the foundations. Motor starters and wiring are being installed, and tie-ins are being completed in preparation for testing.

CA-596, Central Mask Washing Station, Building 2723-W

Detailed design has been completed, and the invitation for bids has been issued by AEC with a bid receipt deadline of May 12, 1955, and an addendum to the project directive has been issued to increase GE funds by \$2,600, with no change in the total project cost of \$22,000.

CG-598, Purex Acid Fractionator

Detailed design was 61% complete, and ahead of schedule. This work consists of modifications to the 202-A Building, addition to the acid fractionator building, and revisions to associated facilities.

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Detailed design of the fractionator was completed on April 14, 1955. A maximum bid was offered by the designer, Lummus Company, and is being evaluated before decision to award or to advertise for competitive bids.

A work order has been issued to Minor Construction to perform work which is integrated with Purex Facilities.

CG-599, Hanford 4X Program, 100 Area

Scoping and design are being managed by Design Section. A bid was received for the well car; however, the requisition was cancelled by Design Section on April 22, 1955, with the understanding that no further work will be required. A revised project scope is being circulated for approval.

CG-600, 100-C Alterations

Scoping and design are being managed by Design Section; design progressed 5% to a total of 89%. The project proposal is being revised to provide new 10,700 gpm pumps which will provide required pump capacity without overloading existing motors.

Construction remained at .3% complete, and installation work was scheduled to be resumed in July 1955.

CA-601, 300 Area General Improvement Program

Preliminary design was 85% complete. The project proposal, which was transmitted to the AEC on February 7, 1955, is still awaiting authorization.

CG-608, Redox Crane Viewing Room

Design had been completed previously; construction progressed 16% to a total of 40%. A revised project proposal has been prepared to request \$11,500 of additional funds to overcome the shorter working time limits. Placement of concrete was completed, and additional work must await its curing.

CG-610, Replacement of 313 Building Roof

Detailed design progressed 55% to a total of 75%. The final tracings were transmitted to Manufacturing Department for approval. A work order was issued to Minor Construction during late April 1955.

CG-611, Mobile Laboratory

With preliminary design completed, the project proposal is being reconsidered by AEC.

CA-612, Alteration of 713 Building for Electronic Data Processing Machine

Scoping and design are being managed by Design Section. Construction was 38% complete, and on schedule. All material and equipment to be procured by GE has been received except one air washer, three control valves, and a portion of the instruments. These remaining items are in transit. Representatives of the IBM factory visited the plant on April 25 to discuss increased power requirements for the equipment.

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CG-614, Hanford 4X Program, 300 Area

Scoping and design are being managed by Design Section. The revised project proposal which was prepared by Design Section is being routed for GE approvals.

Shop drawings on the autoclaves have been received, approved as marked, and returned.

CA-615, Mechanical Maintenance Shop Centralization, 100 Areas

At the request of AEC, Operations Research Study is conducting a study to determine the feasibility of providing one central shop to service all areas. Preliminary design had been completed previously.

CG-616, Installation of Acid Feed Equipment, 100-B, C, D, DR, F, and H Areas

Scoping and design are being managed by Design Section. A revised project proposal is being circulated for GE approvals.

CG-617, Additional Air-drying Facilities, Building 234-5

Scoping and design are being managed by Design Section. Procurement orders have been placed for all engineered items.

CA-619, Alterations to 186-D Building

The project proposal, which was transmitted to AEC on March 10, 1955, is still awaiting authorization.

CG-620, Melt Plant Modifications, 314 Building

Detailed design was 18% complete, and ahead of schedule. A design model is being fabricated to obtain data on heating coils within the vacuum furnace on 110-volt power before the detailed design is complete.

CG-621, Redox Contamination Control Facilities

Design was 40% complete. Critical materials for E-Cell Ozonization are being procured. The AEC is issuing an internal authorization of \$50,000 additional funds to permit installation of ozonization equipment in E-Cell.

CA-625, Additional Waste Disposal Facilities, 200 Area

Preliminary and detailed design, including field surveys, are being managed by Design Section. The current proposal includes only that portion of the work relating to the first eight tanks to be added to the 241-SX Tank Farm.

IR-183, Study of Classified Scrap Disposal Problem, 300 Area Library

Design work has progressed satisfactorily. A defective part which was discovered in the pulping machine has been replaced by the vendor.

IR-184, Tocco Induction Heating Unit, 314 Building, 300 Area

Fabrication by Plant Forces of covers for the work stations is approaching completion. Testing of the installation is scheduled to begin May 16, 1955.

SECRET

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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-761, Decontamination Facilities, First Aid Station, 100-H and 200-W Areas

The approved engineering report was issued in late March 1955. The Industrial Medical Sub-Section has requested a determination of what decontamination facilities can be added to the new 300 Area First Aid Station without major structural changes.

ER A-765, Painting Water Plant Structures, 100 DR Area

A rough draft of the project proposal is being prepared for comments during May 1955.

ER A-1219, 105-KW Laboratory

The rough draft of the project proposal is being prepared.

ER A-1220, Minor Construction Fabrication Shops Modifications

The final draft of the project proposal is being routed for GE approvals.

ER A-1121, Modifications to 105 Transfer Areas

The drawing for a 47-foot, 6-inch cask car was approved, and the manufacturer submitted an estimate for remodeling the cask cars previously purchased as a portion of the Purex Facility.

ER A-1223, Irradiation Facility for HTRE Fuel Testing Program

A Stop-charge Notice has been issued. Further progress is awaiting authorization of additional funds.

ER A-1224, Westinghouse Atomic Power Division, Feasibility Study

The feasibility report has been issued, thus completing this phase of the job. Further activity must await action by Westinghouse.

ER A-1225, Continuous Charge-discharge Facility at 105-C

Scoping and preparation of the project proposal are being managed by the Design Section. Work was suspended to permit completion of additional studies and development of information.

ER A-2756, FY 1955 Water Tank Replacements, 100-200 Areas

The project proposal is being routed for GE approvals.

ER A-2760, "T" Plant Second Cycle Waste Facilities

Scoping and preparation of the project proposal are being managed by Design Section.

DECLASSIFIED

HW-36440 SEL

ER A-3113, Development of Independent Water Supply Source, 300 Area

This request has been closed out with all charges to be absorbed by the Manufacturing Department. The project proposal was completed except for approval signatures. The Manufacturing Department has requested that work be suspended.

ER A-3114, Relocate Oxide Burner North of Building 314

The Engineering Department has requested that the informal request be postponed until further notice.

ER A-3117, 321 Building Fire Protection and Staging Study

The informal request is being routed for GE approvals.

ER A-3118, Replacement of 300 Area Fence

The project proposal is being routed for GE approvals.

C. Related Functions

The inspection work load was slightly higher with a total of 447 assigned orders valued at about \$11,360,000. Proposal inspection work was concerned with resistance thermometers for use in 100-K Areas, process water pumps and related equipment to be used in the Reactor Modification Program, equipment for the Hanford 4X Program, and about 175 orders for equipment being inspected for operating organizations. Total evaluations under the Corrosion Testing Program remained about level at 152, plus seven chemical determinations. Considerable attention was given to one order for tubing to be used in tube bundles for Redox Capacity Increase. The order was finally rejected, and the tube was procured from another vendor.

Following is a resume of inspection activities during the month:

<u>Item</u>	<u>Number</u>	<u>Value</u>
New orders received during the month	148	
Total orders for items requiring inspection	494	
Cumulative orders assigned to inspectors	447	\$11,360,000
Orders assigned to inspectors this month	137	517,749
Orders completed during the month	109	1,511,963

Reproduction output dropped to a total of 396,406 square feet. The major work was done on Reactor Plant Modification Program and 100-C Alterations. Engineering Files distributed about 196,000 prints during the month. A program for rehabilitating prints and drawings was initiated with a monthly budget of \$1,500. This program is to be continued for one year, after which an evaluation will be made.

Estimating completed 20 estimates during the month. The completed estimates comprised the following: project proposal, 4; construction, 4; preliminary, 4; study, 5; informal request, 1; and fair cost, 1. A study of estimating procedures was completed, and a draft was prepared for final reviews and issue.

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Field Surveys Unit completed assigned work on the 313 Building spur line and on the alignment of equipment in 190-C Building. This Unit continued work on design data for Reactor Modification Program and with the re-survey of Richland.

Property evaluations were completed on five projects, and reports were forwarded to Plant Accounting. Additional work was done on five major histories.

D. Craft Labor

See Summary above.

III. REPORT OF VISITORS

A. To Hanford, April 1955

L. P. Sharts, L. H. Butcher Company, Seattle, Washington, visited P. J. O'Neil on April 4-7, and on April 30, to assist with start up of equipment.

S. J. Talian, Metalwash Corporation, Elizabeth, New Jersey, visited P. J. O'Neil on April 4-7 to assist with start up of equipment.

G. K. Bernhart, Fenn Manufacturing Company, Newington, Connecticut, visited E. S. Davis on April 5-6 to assist with start-up of equipment.

N. A. Rasmussen, Fryer-Knowles, Seattle, Washington, visited P. J. O'Neil on April 8 for design review of equipment.

B. Visits to Other Installations, April 1955

R. C. Hollingshead visited Huntington Rubber Mills, Portland, Oregon, on April 4 for engineering consultation.

J. M. Heffner and W. C. Royce visited DeLaval Pump Company, Everett, Massachusetts, on April 6 to discuss specifications and requirements for process water pumps.

G. C. Gabler visited General Electric Company, Ontario, California, on April 13-14 for engineering consultation.

F. H. Ames, Jr., visited General Electric Company, Cincinnati, Ohio, on April 13-15 for engineering consultation.

Leonard Pihlfeldt visited General Electric Company, Cincinnati, Ohio, and Schenectady, New York, on April 18-22 for engineering consultation.

D. A. Hoover visited Rockwood Sprinkler Company, Worcester, Massachusetts, on April 15 for engineering consultation on ball valves for the Reactor Modification Program.

W. D. Richmond visited Panellit, Incorporated, Skokie, Illinois, on April 18-20 to discuss revised specifications for Panellit gauges.

R. M. Griffith visited Fruit Packers Supply, Yakima, Washington, on April 28 to expedite the furnace area conveyor for 300 Area Expansion.

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HW-36440

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DECLASSIFIED

ADVANCE ENGINEERING SECTION

MONTHLY REPORT

APRIL, 1955

A report on incentives for sodium cooling of graphite-moderated plutonium-producing piles is being issued as Document HW-36274. Studies are now in progress directed toward a similar report on boiling in plutonium-producing piles. This series of reports is based on a review and interpretation of off-site developments to aid in scoping of research and development programs at Hanford.

A survey of Hanford requirements for analogue computers, conducted in cooperation with personnel from other Sections, was essentially completed during April.

W. H. Woods

Manager, Advance Engineering
ENGINEERING DEPARTMENT

[REDACTED]
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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

MONTHLY REPORT SUMMARY-APRIL, 1955

PERSONNEL PRACTICES SECTION

Ninety-one per cent of the available employees participated in the 1955 Attitude Survey. The management report and the report to employees will be distributed the week of May 23.

The number of applicants interviewed in April was 1,971 as compared with 2,137 for March. In addition, 133 new applicants applied by mail. Open, nonexempt non-technical requisitions decreased from 286 at the beginning of the month to 208 at month end. One hundred and sixty-two employees were added to the roll and 112 removed during the month. The separation rate for fiscal month of April was 1.00% and for fiscal month of March 1.14%. These rates when converted to annual rates are 13.04% and 11.89% respectively. During April 87 new requests for transfer to other type work were received by Employment, and 66 transfers were effected. Attendance recognition awards were distributed to 236 employees in April, including 23 who qualified for five-year awards.

Three employees retired during the month of April and two employees died. One hundred and nine visits were made to employees confined to Kadlec Hospital, and 22 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98.4%, in the Insurance Plan 99.4%, and the Employee Savings and Stock Bonus Plan 51%. At month end there were 561 non-veterans registered under Selective Service and 645 military reservists were on the roll. Since August 1, 1950, 402 employees have terminated and entered military service, of which 150 have returned, 36 have not claimed re-employment rights, leaving 216 still in military-leave status.

One hundred twenty-eight adopted suggestions were approved for awards in April, resulting in cash awards totaling \$1,809 with a total net savings of \$12,904.89.

One hundred and eight-nine offers have been extended to BS/MS graduates for the R.T.P. and there have been 55 offers accepted to date and 70 rejections. Acceptances have been received from 12 experienced candidates yet to report; there are 7 open offers and 10 other candidates are under active consideration. A total of 7 PHD candidates have accepted offers since October 1, 1954 and 119 candidates have accepted invitations to visit HAPO during the current season.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION

The News Bureau issued 50 releases during the month, 15 of which were especially planned for national publicity purposes and were sent to the Schenectady News Bureau. Eleven manuscripts were approved for publication and 23 technical papers received all required approvals. Arrangements were made for four speeches to be delivered before public groups. The Community Newsletter was written and distributed to community leaders in Pasco, Kennewick and Richland. Four Management NEWS Bulletins were developed and distributed to all exempt personnel during the month.

The article and pictures for the story on burial of radioactive material was completed and forwarded to LIFE. It has appeared in the May 5 issue.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS (Continued)

A tour of the 100-H Area was made with a representative of the Reactor Section to arrange "Inside Hanford" radio shows. Three programs, one each of the Reactor, Power, and Maintenance, were developed in broad outline. These broadcasts will be the first tape-recorded features made inside the Reactor buildings and are slated for National Network release by CBS.

A successful plant tour of 300, 100-KW, and Purex was conducted on April 14, for 21 visitors from the Atomic Power Development Associates.

SALARY AND WAGE ADMINISTRATION SECTION

The 1955 Northwest Area Wage Survey was completed and results of the study are being forwarded to the participating companies. A member of the Section is presently conducting wage comparison studies among architectural, engineering and chemical companies in the San Francisco and Los Angeles area.

A preliminary issue of the report on the Nomenclature Study has been issued to members of the Task Force for review. The final report will be issued within the coming month.

Completed report on the study of first-line supervisory differential in the Manufacturing Department was issued. Information pertaining to the Financial Department has been compiled, but work remains to be done in the Employee and Public Relations Department.

Salary range information was obtained from several other AEC establishments and employment bureaus in connection with the pricing of a position which has periodically posed a problem for the past four years. Information was also developed in connection with other positions to determine influences affecting turnover rate and procurement problems.

UNION RELATIONS SECTION

A formal hearing was conducted in Richland on April 5 by the National Labor Relations Board to decide the appropriateness of a unit composed of Laboratory Assistants in the Manufacturing Department. A transcript of the meeting together with exhibits were forwarded without recommendation to the NLRB in Washington for their determination. The parties have likewise submitted briefs summarizing their respective positions.

A consent representation election involving 22 Field Inspectors A, B, and C in the Regional Radiation Measurements Unit, Radiological Sciences Department was conducted by the NLRB on April 6 with seven votes cast for the union and fourteen against.

On April 19 the Hanford Atomic Metal Trades Council charged the Company with an unfair labor practice in connection with the closing of the Prosser Barricade and, at the request of the NLRB, we have forwarded to them a summary of the Company's position in the matter.

As previously reported, the Hanford Guards Union and the Company agreed to arbitrate a dispute involving an alleged violation of the call-in procedure and the respective cases are now before the arbitrator.

UNION RELATIONS (Continued)

Discussions have been held with all four bargaining units during the month concerning modifications in our dependent insurance coverage.

One negotiating session was held with the Material Expeditors and Take-Off Men in April.

In connection with the settlement of the Oak Ridge strike of last fall, D. L. Cole was named chairman of a committee to study labor-management problems at AEC installations and recently C. A. Sprague, J. T. Dunlop and J. W. Nickerson were named to serve with Mr. Cole on that committee.

EDUCATION AND TRAINING SECTION

A new course in Blueprint Reading, specifically requested by Purchasing and Stores as an aid to their work, is being conducted evenings with 35 students who have paid tuition.

Our training programs have been described in a new booklet which groups them in relation to audiences of experienced or inexperienced personnel. This, plus our expressed willingness to devise training to meet specialized needs has brought a heavy response from various departments.

Improvement and revision are being completed among the longer and more intensive programs including Supervisory Orientation, PMS, Conference Leading and Secretarial Training.

Nine Rotational Trainees were permanently placed during the month of April, one entered the military service and five new graduates reported on the Program during the month.

HEALTH AND SAFETY SECTION

Dr. Norwood was elected a director of the Industrial Medical Association, a professional organization with some three thousand physician members.

Since the first of the year 30% of our industrial medical examinations have been for construction employees. This is resulting in a curtailment of the program for General Electric employees.

There were no major injuries and this brings operations hours of exposure since last major injury to 4,394,715 which will qualify us for the National Safety Council Award for the seventh consecutive year.

Dispensary services in the 300 Area began operation in new and remodeled facilities in the 3706 Building. One more claim alleging hearing loss from noise exposure was filed.

The AEC Award of Honor was presented to the General Electric Company for the outstanding safety record of operating 9,437,211 man-hours without a disabling injury to any employee achieved during 1954.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

The total number of unaccounted for documents was reduced from 229 to 223 by declassification of one document and location of five.

Fire experience continues to be unusually good. There were no fires during the month.

Vacant dormitories W-17 and W-21 were released by AEC for temporary office use. Plans are under way to revise the lighting and to move occupants of Buildings 101 and 87 into this space as soon after June 1 as practicable, so that the 101 Building group can be released to the Army.

COMMUNITY SECTION

Effective April 11, responsibility for mosquito control work in the community was transferred from the Public Health Unit to the Public Works Unit. Consultation service from employees who will be retained by Public Health has been arranged, and material and equipment involved in the work has been transferred to the custody of the Public Works Unit.

Employee and Public Relations

PERSONNEL PRACTICES

General

Good progress is being made in analyzing the results of the recently administered Attitude Survey questionnaires. It is expected that the management report will be ready for distribution during the week commencing May 23 and the report to all employees will be ready for distribution about the same time. Ninety-one percent of the available employees participated in the 1955 survey and considerably less than 1% of those completing questionnaires removed the coding stickers.

Employment

March, 1955

April, 1955

Applicants interviewed

2,137

1,971

429 of the applicants interviewed during April were individuals who applied for employment with the Company for the first time. In addition, 133 applications were received through the mail.

March, 1955

April, 1955

Open Requisitions

Exempt

1

1

Nonexempt

286

208

Of the 286 open, nonexempt, nontechnical requisitions at the beginning of the month, 215 were covered by interim commitments. Of the 208 open, nonexempt, nontechnical requisitions at month end, 147 were covered by interim commitments. During April, 88 new requisitions were received requesting the employment of 106 nonexempt, nontechnical employees.

March, 1955

April, 1955

Employees added to the rolls

222

162

Employees removed from the rolls

84

112

NET GAIN OR LOSS

+ 138

+ 50

Separation Rate:

Fiscal Month
March, 1955
Male Female

Fiscal Month
April, 1955
Male Female

.74% 3.01%

.69% 2.42%

Over-all Separation Rate:

Fiscal Month
March, 1955

Fiscal Month
April, 1955

1.14%

1.00%

Employee and Public Relations

PERSONNEL PRACTICES

During April, 13 employees left voluntarily to accept other employment, 6 left for business for self, and 9 left to enter military service.

Transfer Data

Accumulative total of requests for transfer received since 1-1-55	306
Number of requests for transfer received during April	87
Number interviewed in April, including promotional transfers	98
Transfers effected in April, including promotional transfers	66
Transfers effected since 1-1-55, including promotional transfers	175
Transfers effected in April for employees being laid off	--
Number of stenographers transferred out of steno pool in April	4
Transfer requests active at month end	312

ADDITIONS TO THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
New Hires	5	134	--	139
Re-engaged	-	--	--	--
Reactivates	3	18	--	21
Transfers	--	2	--	2
TOTAL ADDITIONS	8	154	--	162

TERMINATIONS FROM THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
Actual Terminations	17	57	--	74
Removals from rolls (deactivates)	2	31	--	33
Transfers	4	1	--	5
TOTAL TERMINATIONS	23	89	--	112

GENERAL

	<u>3-1955</u>	<u>4-1955</u>
Photographs taken	331	213
Fingerprint impressions	215	177

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	<u>3-1955</u>	<u>4-1955</u>
General Electric cases	205	224
Facility cases	14	40
TOTAL	219	264

Employee and Public Relations

PERSONNEL PRACTICES

Copies of the Evaluation of the General Electric Supervisory Selection Program, based on a study conducted at Evendale, were distributed to department and section managers with large enough groups to utilize the program to stimulate further interest in this effective management tool.

Advertisements were run in the HOUSTON POST on April 2, 3, and 4, for instrument technicians and as a result, we received eight inquiries of which three have completed formal applications. We also advertised in the April issue of INSTRUMENTS AND AUTOMATION magazine and so far have received eleven replies from prospective instrument technicians.

Personnel Records and Investigations

<u>INVESTIGATION STATISTICS</u>	<u>3-1955</u>	<u>4-1955</u>
Cases received during the month	372	209
Cases closed	443	174
Cases found satisfactory for employment	404	183
Cases found unsatisfactory for employment	66	18
Cases closed before investigation completed	56	24
Special investigation conducted	10	17

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	5134
One-year awards made in April for those qualifying in March	51
Total two-year awards to date since January 1, 1950	2836
Two-year awards made in April for those qualifying in March	55
Total three-year awards to date	1584
Three-year awards made in April for those qualifying in March	57
Total four-year awards to date	683
Four-year awards made in April for those qualifying in March	50
Total five-year awards to date	153
Five-year awards made in April for those qualifying in March	23

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	5091
Five-year Service Recognition Pins presented during April to Exempt personnel	17
Five-year Service Recognition Pins presented during April to Non-exempt personnel	20
Ten-year Service Recognition Pins presented during April to Non-exempt personnel	1

During April, 11 people whose continuity of service was broken while in an inactive status were so informed by letter.

Employee and Public Relations

PERSONNEL PRACTICES

Employee Services

The following contacts were made with employees during the month:

Employee contacts made at Kadlec Hospital	109
Salary checks delivered to employees at Kadlec Hospital	15
Salary checks delivered to employees at home	7

At month end, participation in the Benefit Plans was as follows as compared with last month's participation:

	<u>March</u>	<u>April</u>
Pension Plan	98.3	98.4
Insurance Plan	99.4	99.4
Savings and Stock Bonus Plan	50.4	51.

Fourteen letters were written concerning deceased employees and their families during April, regarding payment of monies from the Company and answering questions.

Since September 1, 1946, 165 life insurance claims have been paid totaling \$1,084,513.

Three employees retired during the month of April, namely:

Bernard A. Young	W 8975	Normal Retirement
James D. Thompson	W 4477	Normal Retirement
Albert J. Tiroux	W 9046	Normal Retirement

One optional retired employee died during the month of April:

Beulah B. Taggart	4/27/55	Optional Retirement
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All necessary arrangements have been made to settle all matters of business in connection with this deceased employee at an early date.

Two employees died during the month of April, namely:

Spilman, Harold J.	M 6442	4/10/55	Financial Department
Hilton, Harry L.	W 11514	4/18/55	Employee & Public Relations

During April, 52 letters were written concerning retirement and retired employees, providing information of a general or specific nature. To date 342 employees have retired at Hanford, of which 176 are continuing their residence in this vicinity, 150 are living elsewhere, and there are 16 deceased retired employees.

A total of 148 new employees attended Orientation Programs given by members of this group during the month of April. Of this number, 99% have signed to participate in the Pension Plan, 100% have signed up to participate in the Insurance Plan, and 89% have signed up to participate in the Good Neighbor Fund Program.

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Service

Total number of non-veteran employees subject to military service training through Selective Service System. 561

Number Classified 1A	104
Number Classified 2A	107
Number Classified 3A	222
Number Classified 4F	78
Number Classified 1D	47
Number Classified 4A	-3
	<u>561</u>

Number of Technically Trained & Engineering Personnel for whom deferments are currently being requested 102

Number of Non-Technically Trained & Engineering Personnel for whom deferments are being requested 4

Accumulated total of deferments requested 1465

Accumulated total of deferments granted 1177

Current number of deferment requests Pending 33

Current number of deferment requests Denied 2

Current number of deferment requests Granted 10

During Month of April

Number of deferment requests pending at Local Board Level 23

Number of deferment requests pending at Appeal Board Level 9

Number of deferment requests pending at Presidential Appeal Level 1
Total 33

Number of deferment requests denied by Local Boards 2

Number of deferment requests denied by State Appeal Boards 0

Number of deferment requests denied by Presidential Appeal Board 0
Total 2

Number of deferments granted by Local Boards 9

Number of deferments granted by State Appeal Boards 1

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Services

Number of deferments granted by Presidential Appeal Board	Total	<u>0</u> 10
Number of Technically Trained & Engineering Personnel denied, or requesting no further appeal, now pending induction		24
Number of Technical Graduates with over two years of deferments		77
Number of Selective Service vulnerable Technical Graduates Enlisted		2
Number of Selective Service vulnerable Technical Graduates Drafted	Total	<u>5</u> 7
Reservists Data - Total Number of Reservists on Roll		
Number of Active Reservists		160
Number of Inactive Reservists		471
Number of employees in the National Guard	Total	<u>14</u> 645
Reservists and National Guard members subject to drills, tours of duty, Cruises, Summer Camp and/or Weekly or Monthly meetings		243
Military Service Leaves of Absence - August 1, 1950 through April 30, 1955		
Reservists		124
Selective Service System		271
Female Employees Enlisted	Total	<u>7</u> 402
Total number returned to roll		150
Reservists	68	
Selective Service System	82	
Known number not claiming reemployment rights		36
Number of employees still on military leaves		216

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

<u>Suggestion Plan</u>	<u>March</u>	<u>April</u>	<u>Total Since 7-15-47</u>
Suggestions Received	281	255	16676
Acknowledgements to Suggesters	316	234(a)	
Suggestions Pending Acknowledgement	53	62	
Suggestions Referred to Departments for Investigation	417	324	
Suggestions Pending Referral to Departments	93	100	
Investigations Completed and Suggestions Closed	332	424	
Suggestions Adopted - No Award	2	7	
Adopted Suggestions Approved by Board for Award	88	121	
Total Net Cash Savings	\$18,000.64	\$12,904.89	
Total Cash Awards	\$2,260.00	\$1,809.00	
Total Number Suggestions Outstanding to Departments	707	662	

R. C. Reed, Employee Benefits Services, Schenectady, requested information pertaining to results of the 4-S Program and its relationship to our Attitude Survey. He plans on using this information in a National Association of Suggestion Systems Conference in Buffalo on May 7. The information has been forwarded to him.

Operation 4-S, which covered the period September 10 through November 30, 1954, was designed to improve the quality of suggestions, and increase the volume of suggesters participating in the Suggestion Plan. The immediate effects of volume were apparent with November being the highest suggestion submission month in HAPO history. The effects of Operation 4-S with respect to quality are now being felt by virtue of 128 suggestions being adopted during the month of April. This is the highest adoption month in HAPO history.

Life Insurance

Code information which is known only to Home Office Life Underwriter's Association has been furnished 69 insurance companies and investigation agencies during the month of April, 1955. This is in accordance with an arrangement with the Underwriters whereby employees on this project might be insured on the same basis as those working elsewhere.

Insurance Statistics

Claims reported to Department of Labor	<u>March, 1955</u>	
	<u>Long Forms</u> 77	<u>Short Forms</u> 762
	<u>April, 1955</u>	
	<u>Long Forms</u> 49	<u>Short Forms</u> 581

Total Since September, 1946 - 25,901

(a) Adjusted - resulting from complete inventory on 5-2-55

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Insurance Statistics (Continued)

Claims reported to
Travelers Insurance Co.

March, 1955
16

April, 1955
* 12

Total Since September, 1946 - 976

Liability Insurance

- a. John R. Meloy vs. General Electric Company and David Casey, B-6835755

The motions in the Meloy case were argued before Judge Hamilton in the Benton County Superior Court on April 1, 1955. The judge denied motions by the plaintiff and the defendant for judgement in their favor notwithstanding the verdict of the jury. He found, however, that the plaintiff had sustained general damages for which he had not been compensated and ruled that a new trial would be granted unless the defendants consented to the entry of judgement in an additional sum of \$350 for general damages over and above the special damages (\$330) awarded by the verdict. General Electric consented and the court denied the plaintiff's motion for a new trial. John Gavin has advised that he does not expect the plaintiffs will appeal.

- b. 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

Notice of Appeal by plaintiffs to Washington State Supreme Court has been served on the Riste and Swearingen cases. It has been agreed to consolidate the two cases to conserve time and expense. According to our information, the case probably will not be heard until the May-June term and perhaps not until September.

- c. Warren H. Worthington and Josephine W. Worthington, his wife vs. General Electric Company, a New York Corporation, B-6835908

A Summons and Complaint was served upon the General Electric Company on behalf of Warren H. Worthington on April 6, 1955 alleging damages for personal injuries sustained by Mrs. Worthington as a result of the escape of sewer gas at the Worthington residence. The amount claimed is \$5,608 with costs and disbursements. Mr. Worthington is a General Electric Company employee assigned as a Plumber, Steamfitter and Welder Journeyman to the Separations Section of the Manufacturing Department. The matter has been referred to the Travelers for defense.

*Of the claims reported to Travelers Insurance Company during the month of April eleven were property damage, and one was a bodily injury claim.

Employee and Public Relations
PERSONNEL PRACTICES

Technical Recruitment

Campus recruiting of BS/MS candidates for the Rotational Training Program may be summarized as follows:

<u>Field</u>	<u>Offers Extended</u>	<u>Offers Accepted</u>	<u>Offers Rejected</u>	<u>Estimated Requirements</u>
Engineering:				
Chemical	57	15	20	27
Mechanical	41	11	17	28
Electrical	28	8	12	17
Chemistry	27	13	7	36
Physics	20	4	12	21
Metallurgy	12	2	2	15
Other	<u>4</u>	<u>2</u>	<u>—</u>	<u>—</u>
Totals	189	55	70	144

With the exception of return visits to a small number of Northwest schools, the campus recruiting of technical graduates is completed for the current year. A total of 51 universities were visited by HAPO representatives during the spring season. Twelve Engineering Program members were interviewed in Schenectady during April.

Experienced drop-in candidates interviewing in the office totaled 23 during April. Other experienced activities during the month may be summarized as follows:

<u>Field</u>	<u>Open Invitations</u>	<u>To Visit</u>	<u>Open Offers</u>	<u>Acceptances, but not OTR</u>	<u>Offers to be Extended</u>	<u>On the Roll</u>
Engineering:						
Electrical		1	1	2		
Mechanical	1	1	2	3		
Chemical			1	1		
Industrial				1		
Chemistry			2	1	1	1
Metallurgy				1	1	
Physics		1			1	
Other	<u>—</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>1</u>	<u>3</u>
Totals	1	5	7	12	4	4

A total of 460 PhD cases have been reviewed, with 193 visit invitations extended to date. Of this total 119 candidates have accepted, 57 have rejected, and 17 invitations remain open. During April, 22 PhD candidates visited HAPO, bringing up to 78 those who have completed their visits. A total of 7 PhD acceptances have been received since October 1, 1954.

During April there were 23 terminations of technical or major exempt employees. Six entered military service, 4 transferred to Schenectady, 11 for other jobs or business for self, 1 for personal reasons (may return), and 1 deceased.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

During the month of April the News Bureau issued 50 releases. The breakdown by category, distribution and content was as follows:

<u>Subject</u>		<u>Distribution</u>	
Pay and Benefits	6	Hanford Area	33
Employment Services	14	West Coast Area	2
Good Will	2	National	15
Technology & Research	16		
Safety and Fire	2	<u>Content</u>	
Security	1	Information	5
Real Estate	2	Pictures	5
Administration & Legal	1	Short	31
Recreation	1	Long	2
Richland-Hanford Protection	1	Feature	7
Education & Library	1		
Health, Medicine	1		
Plant Services	1		
Organization Changes	1		

The following eleven releases were sent to the Schenectady News Bureau with carbon copies to N. P. Jackson for use for national publicity: story and picture on Hanford experimentation with the problem of catching and retaining dust outdoors to prevent it from becoming radioactive and spreading; picture and outline of a rat being tube-fed tiny amounts of a radioactive element as part of a biology experiment; story and pictures describing the storage facility for hot samples in Hanford's Radiolometallurgy building; a feature with pictures and color transparencies on a former Hanford area farmer who now works on GE's Hanford biology animal farm; a picture and outline to use with the above story on the ex-farmer at Hanford; LIFE pictures and story on the Hanford burial; a picture and outline illustrating a heavy lucite box used for underwater maintenance of small equipment; a story and picture of an atomic ray device to analyze chemical solutions continuously and automatically; a picture with outline showing a test made on an uranium slug; a picture and outline of a burial pit in which contaminated furniture, glassware, and other equipment from the Hanford labs is buried; and a feature with pictures on the removal and disposal of equipment from a reactor.

At the request of LIFE magazine, photographs were taken of a burial of radioactive equipment in 200-W Area. Manufacturing Department agreed to hold a dry-run of the burial on April 1 and photos were taken of both the dry-run and the actual burial on April 2. A complete story about the burial, 13 pages in length, was prepared and it was cleared along with prints of the more than 100 photos with Manufacturing Department and AEC. The cleared article and photos were taken to LIFE on April 13. Additional information was provided the Seattle TIME-LIFE representative later by telephone and the story was scheduled to appear in the LIFE issue that will be on sale May 5.

At the request of Schenectady, several pictures and outlines on peacetime uses for atomic energy were sent to a representative of the United States Information Agency, Washington, D. C.

An article with pictures based on the bio-assay program conducted by GE at Hanford was sent to the editor of TODAY'S HEALTH for possible publication.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

A request was received and two glossy photos of Hanford sheep which appeared in LIFE were sent to a representative of IGE publications in New York City.

Seven Hanford stories rewritten by the Schenectady News Bureau were received by us, approved and resent to Schenectady for possible publication. They include: pipe measuring story, metallograph, mouse monitor, soup bowl counter, double diffraction x-ray spectrometer, lifting iron curtain, and temperature taking typewriter.

Proofs of an article describing General Electric's aquatic biology activities at Hanford were received for approval from FIELD AND STREAM magazine. Four photographs will be used. The article gives credit to General Electric scientists for doing basic work in the prevention of atomic pollution of rivers.

On April 12, Senator Magnuson announced to the Spokane Chamber of Commerce that a power reactor would be built and operated at Hanford by General Electric to produce power for the Northwest power pool. We were asked for a statement by a SPOKESMAN REVIEW reporter. We said we had no knowledge of such a project. The statement was repeated for the local papers. We also informed the Schenectady News Bureau of this development. Senator Magnuson said he received his information from the Joint Committee. Several days later, one of the Senator's aids at Washington stated that the Senator's remarks had been misinterpreted.

At the request of the editors, two color transparencies of the Radiometallurgy building were sent to DUNS REVIEW & MODERN INDUSTRY for consideration as possible cover shots. An extended outline for each picture was also furnished.

Two daily releases were sent to the local list. They consisted of: a safety record awarded by the AEC to the General Electric Company, and the story of H. M. Parker who received the Janeway Medal for his work in radiology. Six pictures with outlines of the safety award were also sent to R. W. Jackson at the San Francisco office.

Information was given to the TRI-CITY HERALD and the COLUMBIA BASIN NEWS concerning the refund from the State of more than \$1 million of Business and Occupation Tax.

Interviews have been completed with all of those in Manufacturing who turned in topics for possible signed articles. The original list of 264 topics has now been cut to about 180. This revised list will now be returned to Manufacturing so that authors can be chosen and a schedule can be setup for each of the topics.

Eleven manuscripts were approved for publication and 23 technical papers and abstracts received all required approvals during the month.

A total of 56 abstracts have been submitted from Hanford for consideration for the Geneva Conference on Peaceful Uses of Atomic Energy. Twenty of these abstracts were submitted as confidential undocumented. Eleven of the classified documents have been completely declassified since they were submitted.

Final arrangements were made and communicated to authors for obtaining required approvals at Hanford and Schenectady for the 17 papers to be presented at the Geneva, Switzerland Conference in August.

Copies of the 1954 Annual Report were sent to all persons on the community mailing list with a tip-on signed by the General Manager.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

The April Community Newsletter was written and mailed to community leaders in Pasco, Kennewick and Richland.

Additional copies of Mr. Cordiner's NAM talk were furnished the principal of one of the Richland Junior High Schools at his request.

Public Communications has been asked to handle the mailing of invitations and the writing and mailing of letters to the schools concerning the Kadlec Open House to be held next month. Printed invitations were mailed to 30 Tri-City clubs and organizations on April 14. Printed invitations to community leaders and letters of invitation to the schools will be mailed early in May.

The film, "The Atom Goes to Sea," was sent to a Milton-Freewater, Oregon PTA group for showing at their April meeting.

Copies of the March 1955 issue of the GE REVIEW were sent to all educational leaders on the community mailing list. This issue contained reprints of the two latest GE educational aids booklets, "Why Work?" and "Why Stick to Your Studies?"

The copy of the film, "Here's Hanford," was loaned for showing at the Columbia High School science club meeting April 18. This was considered a test showing, and since the students' comments were favorable, it is expected that the film will be borrowed in the near future for showing to all science students at Columbia High.

Arrangements were also made to provide the science classes with appropriate Science Forum and Here's Hanford tapes to be used in conjunction with the Spring curriculum.

Arrangements were made for a representative of the Radiological Sciences Department to take the model train, protective clothing, and instrument display to the Washington State College Engineering "Open House" on April 22 at the request of the college.

Initial arrangements were made with Manufacturing to prepare two additional plastic suits for display use by the AEC's Washington, D. C. office.

Maynard Hicks, a Journalism Instructor for WSC, visited Hanford on April 15 with three students from his technical journalism class. Methods used at Hanford for encouraging technical writing for clearing technical manuscripts and for placing them with publications were reviewed with this group.

Letter for the signature of the Manager-Biophysics, concerning Company viewpoint on Union representation, was prepared and mailed to 22 field inspectors in Radiological Sciences Department prior to the April 6 NLRB election. Following the election, in which Union representation was rejected by a 14-7 vote, a follow-up letter requesting a meeting with the Manager-Biophysics, concerning job conditions, was prepared and mailed. All field inspectors in the Section attended the meeting, which was held on April 11.

Display recruitment advertisement for instrument technicians was prepared and submitted for publication in the May issue of "Instruments and Automation" magazine of the April 30 and May 1 and 2 issues of the BIRMINGHAM ALABAMA NEWS.

April 14 visit of Atomic Power Development Associates was aided through developing a program and providing revised copies of the "Here's Hanford" booklet.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Arrangements were made for distribution through Section and Sub-Section management of copies of the Company's 1954 "Annual Report to Shareowners" to all exempt people not participating in the Employee Savings and Stock Bonus Plan.

The April health bulletin, "Down But Not Out" and the April safety bulletin, "Inside the Office Too" were distributed during the month.

Four Management NEWS Bulletins were produced and distributed to all exempt personnel.

Proposed \$25 "deductible" feature to be added to dependent insurance was further explained to all members of Management through a letter developed for the signature of the Manager - Employee & Public Relations and through a series of questions and answers.

The GE NEWS featured among other items: J. A. Jones Construction Co., under direction of GE's Minor Construction Sub-Section, sets safety record of 2,000,000 man hours without a major injury; lapel tags sold in Richland to open Cancer Drive; 248 receive award pins for perfect attendance; F. K. McCune reports 65% of the new generating installations in US will be atomic by 1980; six HAPO people receive promotions; advanced first aid course available to HAPO people; Prosser Barricade to be limited in operation; record blood drawing for year; HAPO credit unions open drive for members; GE authorized dealer develops new service for GE small appliances; HAPO families urged to have chest X-rays taken by mobile unit; Hanford children prepare to hook 2,000 rainbow planted at Wellspan Lake; GE sales gain seven per cent over same period in 1954; extension of Savings and Stock Bonus Plan proposed; over 3,000 attend GE's 63rd annual stockholders meeting; GE organizes new Department in atomic energy for peace time use; medical head cites value of GE's medical program; National retail process will no longer be established by the Major Appliance Division; 236 HAPO people win attendance pins; North Richland closing schedule is announced; H. M. Parker wins Janeway Medal; Electronic Data Processing Machine to be installed at Hanford; and announced that a "burial" feature would be published in LIFE magazine.

Commercial artwork included revised layouts and final artwork for the booklet, "Radiation and Your Job"; layout and final artwork for new air raid signal poster, and layout for dashboard sticker showing evacuation routes; 18 rough sketches of cartoons for forthcoming Employee Attitude Survey report were developed; newspaper column head, "atomic footnotes," re-touching of three photographs and extensive air brush retouching on a fourth photograph; revising editorial cartoon on income tax; retouching photographs; layout and final art for the May health bulletin and May safety topic; cover layout and final artwork for Rotational Training program booklet; and layouts for newspaper and magazine recruitment advertisements for Instrument Technicians.

Four editions of the HAPO radio program, INSIDE HANFORD, were written, recorded, cleared and released for broadcast during the month. These included features on the Information Section ... the reproduction, handling and distribution of classified documents; Transportation Facilities, paint shop, wash rack and vehicle testing apparatus; the Van DeGraaff accelerator, the "atom smasher"; and the Stenographic Services Unit.

A tour of the 100-H Area was made with a representative of the Reactor Section. Three programs, one each on the reactor, power and maintenance, were developed. These broadcasts will be the first tape-recorded features emanating from inside the Reactor buildings and are slated for national network release by CBS.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

A format was submitted for an audio-visual publicity program to be developed during the forthcoming visit of President Cordier, Mr. McCune, Mr. LaPierre, and Mr. Harris. This was submitted to the Department Manager for approval and includes radio programming and television filming for use on national network programs.

At the request of the Separations Section, Manufacturing Department, estimates were formulated and submitted on the cost of producing two motion pictures on the Purex facilities. Two 16mm sound-on, black and white motion pictures would cover the subjects of "Remote Handling of Canyon Equipment" and "The Purex Process and Related Equipment." It is the opinion of Manufacturing Department that these two films would greatly facilitate instructing both new and established personnel in the complicated methods of removing, repairing, decontaminating equipment from the cells, as well as remove the abstractiveness of unseen equipment so that operating personnel would have a better understanding of their work. The objective is a tremendous savings in cost and time during emergency operations as well as a reduction in exposure hazards.

The semi-finished narrative for the display-type motion picture on construction of the Separations facility was submitted to representatives of the AEC. Following this a script conference was held by them and members of this Unit for development of a finished narrative. Two films of 800 feet each on construction of Separations facility and 100-K Reactor facility are expected to be completed for the AEC and GE by June 30. Secret and training films on these subjects will then be developed and finished during the ensuing six or eight months.

The HAPO-produced television production "HANDS ACROSS THE ATOM" was submitted for inclusion in the HAPO Catalog being sent to Brookhaven on Hot Laboratory Equipment. This is for final catalog and graphic materials to be sent for use at the Geneva Conference in August.

At the request of the Atomic Energy Commission, arrangements were made through the cooperation of the Radio Maintenance Unit, to completely record, on tape, the entire proceedings of the AEC Auction, held in Pasco, Washington, April 25 through April 28. Some of the 27 tapes have already been used in the settlement of disputes.

Graphics April assignments were distributed as follows:

	<u>Percent</u>
General Administrative (Includes Operations Research)	4
Employee and Public Relations	12
Engineering	38
Manufacturing	8
Financial	10
Radiological Sciences	26
Atomic Energy Commission	2

	<u>March</u>	<u>April</u>
Total assignments completed	49	56
Total assignments backlog	21	42

The Pile Technology Section submitted a request to the Graphics Unit to assist them in the preparation of fifty-six charts and graphs on graphite technology. The finished plates are to be included in a paper for presentation at the Geneva Convention.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Two graphic illustrators were assigned to work in the area with technical personnel in the development, layout and plotting of material. The approved pencil layouts were then forwarded to the 700 Area for inking and rendering. All plates are scheduled for completion by May 2, 1955. This "on the spot" service affords a more unified interpretation of subject matter, a higher degree of accuracy in layout and a far better customer relationship with field personnel.

An additional service for design engineers has been started this month. The work can be best defined as "scope projection". The engineer submits his rough sketches or the draftsman's scope drawings and Graphics project the design into scaled perspective pencil drawings. In each of the three assignments developed this way to date, the engineers have quickly determined design flaws or better mechanical design. The penciled perspective also assists the engineer in transmitting his problems to the draftsman before detailed drawings are started. Work in this field accomplished to date includes development of a Hydraulic Tube Puller, Hydraulic Press and a Slug Finishing Machine.

A new series of large colored visual aids were prepared for the Engineering Department Manager and the Design Section Manager for use in a presentation to the Atomic Power Study Group. Drawings included in this series were as follows: (1) Perspective of reactor piping and process unit, (2) elevation cut-a-way of reactor and facilities, (3) process flow and reactor details, (4) cut-a-way through graphite showing tube and slug arrangements, (5) basic plant criteria, (6) financial summary, (7) heat generating capability, (8) generating capability-December 1955, (9) investment in plant and equipment per employee and (10) investment in plant (gross). Additions to the above series are being prepared for use in a presentation to the Philadelphia Electric Group in the first week of May. The additions include (1) cross section of reactor and facilities, (2) plant view of a proposed twin reactor unit, and (3) plan view of twin reactor unit and facilities.

Four drawings and three charts were prepared for color slide presentation at the American Radiological Society Meeting in California. The drawings illustrated schematically the varying conditions of "Radioactive Fallout" on plant, human and animal life. Charts were of the nuclides showing various elements in color.

Graphics Statistical Summary

	Charts or Graphs	Illustrations	Other
Report Material (Includes Technical Publications)	61		
Technical or Scientific Illustrations		20	
Mechanical Art (Flow charts, schematics, maps, etc. - not for publication)	80	7	18
Lecture Material (Includes plates for slides)	3	4	13
Posters and Signs			
General (Posting of current data, assembly, revisions, etc.)	58	26	43
	<u>202</u>	<u>57</u>	<u>74</u>

A total of 325 photographic assignments were covered for the month of April, and 18,031 prints were produced.

See attached statistical report for Photography Unit.

PHOTOGRAPHY UNIT
MONTHLY REPORT
APRIL

EMPLOYEE & PUBLIC RELATIONS

COMMUNITY

Library

Public Works & Recreation

Property

EDUCATION & TRAINING

EMPLOYEE COMM. &

PUBLIC RELATIONS

Audio-Visual Comm.

Employee Comm.

Photography

Public Comm.

Graphics

HEALTH & SAFETY

Public Health

Safety & Fire Preven.

PERSONNEL PRACTICES

Employment

AUXILIARY OPERATIONS &

PLANT PROTECTION

Security & Patrol

Fire Protection

Telephone

Admin. Area Maint.

ENGINEERING

ADVANCED ENGINEERING

DESIGN

Design Engineering

Process Engineering

ENGINEERING ADMINISTRATION

Technical Information

2" 2" 4" 5" 8" 8 1/2" 11" 11" N 35mm 3 1/4" X 4" 3 1/4" X 4" 16mm
X X X X X X X E b&w b&w M.P.
2" 4" 5" 7" 10" 11" 11" G. Slides Slides Slides Film

12

11

12

88

11

54

7

122

3

8

21

6

923

7,589

96

33

16

3

12

14

62

1

1

1

15

13

7

11

11

11

11

7

199

1

235

1

24

6

203

7

20

16

3

801

3

8

62

1

1

3 1/4" X 4"

3 1/4" X 4"

3 1/4" X 4"

11

11

11

11

7

199

1

235

1

24

6

203

7

20

16

3

801

3

8

62

1

1

16mm

M.P.

Film

2,500'

2

1

6

6

6

97

3

226

12

14

801

12

14

62

1

1

1

(Continued)

PHOTOGRAPHY UNIT MONTHLY REPORT APRIL (Con't.)													
2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8 1/2" X 11"	11" X 14"	N	35mm Color Slides	3 1/4" X 4" Color Slides	3 1/4" X 4" b&w Slides	3 1/4" X 4" 16mm M.P. Film		
ENGINEERING (Con't.)	18	4	28	103	20								
PROJECT													
PILE TECHNOLOGY	231	36	2	48	4,494	322	3	3	3	41			
SEPARATIONS TECHNOLOGY		3	2	105	27					7			
FINANCIAL	52	9											
MANUFACTURING													
Manufacturing Admin.	51												
METAL PREPARATION			16	123	18								
PLANT ENGINEERING		11		147	38								
REACTOR				66	16	40							
SEPARATIONS	576	29	38	22	24								
PURCHASING & STORES			6										
RADIOLOGICAL SCIENCES									9				
BIOLOGY			10		65				63				
Aquatic Biology			14		7				7				
BIOPHYSICS													
RADIOLOGICAL ENCR.													
RADIOLOGICAL RECORDS & STANDARDS	25			57									
A.E.C. SECURITY		1	2										
A.E.C. PUBLIC INFORMATION			12	6									
A.E.C. ENGINEERING						10	2		2				
TOTALS	9,578	226	234	57	1,112	6,617	27	1,414	6	9	75	2,500	

Gb-8 (Continued)

PHOTOGRAPHY UNIT
MONTHLY REPORT
APRIL (Con't.)

TOTAL ASSIGNMENTS	FEBRUARY	MARCH	APRIL
	<u>223</u>	<u>340</u>	<u>325</u>
TOTAL NEGATIVES	1,370	1,914	1,414
TOTAL PRINTS	17,715	19,073	18,031

Employee and Public Relations

UNION RELATIONS

Union Relations - Operations Personnel

A formal hearing was held by the National Labor Relations Board in Richland on April 5 to decide the appropriateness of a unit composed of Laboratory Assistants in the Manufacturing Department. The Company sought dismissal of the petition on the basis that the unit is not sufficiently comprehensive, lacks a community of interest with production and maintenance employees and exercises an analytical control function over the process which precludes its affiliation with the Chemical Workers of the Hanford Atomic Metal Trades Council. The meeting was conducted by a local field examiner from the Seattle office with a transcript of the meeting together with exhibits forwarded without recommendation to the National Labor Relations Board in Washington for their determination. An Employer's Brief supplementing this information has been forwarded to the NLRB in Washington, D. C.

A consent representation election involving 22 Field Inspectors A, B, and C in the Regional Radiation Measurements Unit, Radiological Sciences Department was conducted by the NLRB on April 6 with the following results:

Eligible to vote	- 22
Actually voting	- 21
For the union	- 7
Against the union	- 14

The Hanford Atomic Metal Trades Council, on April 19, charged the Company with an unfair labor practice in connection with the closing of the Prosser Barricade. The charge alleges a violation of the National Labor Relations Act (Taft-Hartley) when it "... unilaterally closed said Prosser Barricade. ." and by taking such action "... without reference to the Unions position and without good faith consideration thereof, has refused to bargain in conflict with the pertinent provisions of the Act." The charge, of course, is entirely without foundation. Representatives of the Board were in Richland on April 28 to make a preliminary investigation to determine whether there was sufficient merit to the charge to warrant the issuance of a complaint. At their request we have forwarded to them a summary of the Company's position in the matter together with our minutes of the April 4 meeting during which the matter was discussed in considerable detail. Our meeting with the Board was quite satisfactory and it appears probable that the Board will dismiss the charge for lack of sufficient evidence of an unfair labor practice.

We have previously reported the fact that the Hanford Guards Union and the Company have agreed to arbitrate a dispute involving an alleged violation of the call-in procedure. The issue was presented to Judge Harold A. Seering, Seattle, as a stipulation of facts jointly agreed to by the Company and the Union. Each of the parties has presented its argument to the arbitrator in the form of a brief. Following an exchange of those briefs, the parties have exercised the option of rebutting the opposing arguments. The respective cases are now before the arbitrator and we are awaiting his decision.

Employee and Public Relations

UNION RELATIONS

Discussions have been held with all four bargaining units during the month concerning modifications in our dependent insurance coverage. In March we served notice on each of the bargaining units of a desire to open our pension and insurance agreements which expire May 16. We have proposed that the agreements be extended to September 30 (terminal date of our local basic agreements) to more nearly conform with negotiations in the East. With respect to dependent insurance which is technically not a part of the pension and insurance agreement but has always been handled informally by letter, we have proposed a \$25 deductible feature in an attempt to bring the cost of this coverage more in line with the premiums charged the employees. The Hanford Atomic Metal Trades Council is in the process of getting the proposal ratified by the 20 odd local unions. It is expected that the other bargaining units will agree to whatever settlement is satisfactory to the HAMTC.

One additional negotiating session was held with the Material Expeditors and Take-Off Men in April. In view of the fact that there have been few concessions that the Company could appropriately make to this group, they have been unwilling to conclude negotiations even though they have been unable to advance any new arguments during the last two sessions.

In connection with the settlement of the Oak Ridge strike of last fall, David L. Cole was named chairman of a committee to study labor-management problems at AEC installations. No further action was taken until recently when three members of the panel - Former Gov. Charles A. Sprague of Oregon, Prof. John T. Dunlop of Harvard, and John W. Nickerson of Giant's Neck, Conn., a labor relations consultant - were named to serve with Mr. Cole.

We reported last month regarding a movement that the Office Employees Union had requested that an organizer be sent in to help build up union membership. There is, of course, no source of office employees outside the General Electric Company available to organize in the Tri-City area. There was no indication during April that any activity in this connection had been initiated by the Union.

Grievance Statistics:

A total of fifty-two (52) grievances were received and four (4) Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

<u>ALL DEPARTMENTS</u>					
	<u>HAMTC</u>	<u>HGU</u>	<u>BSEIU</u>	<u>Total Unit</u>	<u>Total Nonunit</u>
Received this month	50	0	0	50	2
Received this year	177	2	0	179	7

Employee and Public Relations

UNION RELATIONS

ALL DEPARTMENTS (Cont'd.)

	<u>HAMTC</u>	<u>HGU</u>	<u>BSEIU</u>	<u>Total Unit</u>	<u>Total Nonunit</u>
Step I					
Pending March 31	4	0	0	4	0
Settled this month*	42	0	0	42	1
Settled this year	103	2	0	105	2
Pending April 30	0	0	0	0	1
Step II					
Pending March 31	61	0	0	61	0
Settled this month**	19	0	0	19	0
Settled this year	52	1	0	53	4
Pending April 30	53	0	0	53	0
Arbitration					
Pending March 31	4	1	0	5	
Settled this month	0	0	0	0	
Settled this year	0	0	0	0	
Pending April 30	5	1	0	6	
Total Settled this Month	61	0	0	61	1
Total Settled this Year	155	3	0	158	54

BY DEPARTMENTS

	<u>Received</u>		<u>Settled Step I*</u>		<u>Settled Step II**</u>	
	<u>This Mo.</u>	<u>This Year</u>	<u>This Mo.</u>	<u>This Year</u>	<u>This Mo.</u>	<u>This Year</u>
Manufacturing						
Reactor - Unit	34	90	27	52	14	24
Separations - Unit	8	46	8	30	3	12
Nonunit	1	4	1	2	0	2
Metal Preparation - Unit	1	11	4	9	0	4
Transportation - Unit	2	12	0	8	1	5
Electrical Utilities - Unit	0	4	0	1	0	2
Stores - Unit	0	2	1	1	0	1
Employee & Public Relations						
Community - Unit	0	3	0	0	0	2
Aux. Ops. & Pl. Pro. - Unit	4	9	2	5	1	3
Radiological Sciences - Unit	1	2	0	0	0	0
Nonunit	1	1	0	0	0	0
Engineering - Nonunit	0	1	0	0	0	1
Financial - Nonunit	0	1	0	1	0	0

*Grievances brought to Step II prior to February 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 February 1, 1955, are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION RELATIONS

BY SUBJECTS

<u>Unit</u>	<u>Manufacturing</u>		<u>Emp. & Pub. Relations</u>		<u>Radiological Sciences</u>		<u>Engineering</u>		<u>Financial</u>	
	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>
	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>
Recognition	0	1	0	0	0	0				
Discrimination	1	2	0	0	0	0				
Jurisdiction	7	59	2	8	0	0				
Health-Safety-Sanitation	2	6	2	2	1	1				
Hours of Work	3	14	0	0	0	0				
Overtime Rates	8	24	0	0	0	0				
Sick Leave	1	1	0	0	0	0				
Vacations	0	1	0	0	0	0				
Seniority	2	5	0	0	0	0				
Wage Rates	2	8	0	1	0	0				
Miscellaneous	19	44	0	0	0	0				
<u>Nonunit</u>										
Continuity of Service	0	1	0	0	0	0	0	0	0	0
Overtime Rates	0	0	0	0	0	0	0	0	0	1
Wage Rates	0	2	0	0	0	0	0	0	0	0
Holidays	1	1	0	0	0	0	0	0	0	0
Miscellaneous	0	0	0	0	1	1	0	1	0	0

Employee & Public Relations

SALARY & WAGE ADMINISTRATION

In addition to the normal flow of routine work in Salary and Wage Administration, the following work was conducted during April:

1. The 1955 Northwest Area Wage Survey was completed and results of the study are being forwarded to the participating companies. A member of the Section is presently conducting wage comparison studies among architectural, engineering and chemical companies in the San Francisco and Los Angeles area.
2. A preliminary issue of the report on the Nomenclature Study has been issued to members of the Task Force for review. The final report will be issued within the coming month.
3. Completed report on the study of first-line supervisory differential in the Manufacturing Department was issued. Information pertaining to the Financial Department has been compiled, but work remains to be done in the Employee and Public Relations Department.
4. The statistical report to the AEC on the first quarter of operation under the Company salary plan was completed and will be issued within the next week. Lists of position titles effective at the end of the quarter were compiled and distributed.
5. Salary range information was obtained from several other AEC establishments and employment bureaus in connection with the pricing of a position which has periodically posed a problem for the past four years. Information was also developed in connection with other positions to determine influences affecting turnover rate and procurement problems.

Employee and Public Relations Department
Education and Training Section

The report of the Education and Training Section is submitted as follows:

ROTATIONAL TRAINING PROGRAM

Present Assignments

The technical graduates on the Rotational Training Program are assigned to departments as follows:

<u>Department</u>	<u>Last Month</u>	<u>This Month</u>
<u>Engineering</u>		
Pile Technology	3	4
Separations Technology	6	3
Design	5	6
Project	2	1
<u>Manufacturing</u>		
Metal Preparation	3	2
Separations	0	0
Reactor	6	4
<u>Radiological Sciences</u>		
Biology	0	0
Records & Standards	0	0
Bio-Physics	3	3
<u>Financial</u>		
Procedures & Computing	0	1
<u>Employee & Public Relations</u>		
Personnel Practices	1	0
Total	<u>29</u>	<u>24</u>

Permanent Placements

There were nine (9) placements off the Program, as follows:

Separations Technology	3	Project	1
Separations	1	Procedures & Computing	1
Metal Preparation	1	Design	1
Reactor	1	Total	<u>9</u>

Employee and Public Relations Department
Education and Training Section

Three (3) placements are expected in May. The decreased placements expected in May are not due to any lessening of demands but are caused by assignment completion dates being scheduled for June and July to keep a small number on the Program and additional rotational assignments being requested by some of the graduates.

Additions

Five (5) new graduates reported on the Program during April for a total of 13 since January 1. No additions are expected now until June. Present indications are that only about one-half of the 144 graduates requisitioned for the Program will be obtainable by June - July, including the 13 already reported.

A survey is under way to predict the number of new graduates reporting in June who will be without full security clearance. Indications are that a short period (two to three weeks) of training classes in science, engineering, business, and human relations will be necessary to utilize the graduates' time until full security clearance is obtained. Previous programs were operated in 1951 and 1952.

Careful surveys with the sections last fall and again this spring indicated a need of well over 100 graduates from the Program in calendar year 1955. Since the fall survey, approximately 40 graduates have been supplied to these sections. Since it now appears impossible to employ sufficient numbers of qualified science and engineering graduates to meet the balance of the requests, a survey with the sections is under way to determine what steps can be taken to meet their manpower needs.

Selective Service

Two (2) former members of the Program were lost to Selective Service during the month and one (1) present member enlisted rather than wait to be drafted. In 20 months, 54 men have been lost to the "cause", as follows:

Former Program Members	45
Direct Hires	7
Program Members	<u>2</u>
Total	54

It is expected that draft calls will average two-to-three per month for these young technically-trained men.

Information Booklet

The information booklet, "Horizons at Hanford", which lists information on Program procedures and the 84 rotational assignments, is now being printed and will be ready for issuance next month.

Employee and Public Relations Department
Education and Training Section

Technician Training Program

Comments from the major sections on the proposed Technician Training Program have been evaluated and will be given recognition, where feasible, in the operation of the Program. Discussions are now under way with the AEC prior to formal submission for approval. A re-study is being made to establish wage rates which will be competitive and fair. Every effort will be made to obtain approvals for the Program in time to permit employment of qualified high school seniors prior to the completion of the school year.

Summer Programs

Six (6) university professors have been accepted for summer employment and it is hoped that two (2) more will be obtained to fill the quota for eight (8). Three (3) graduate students have been employed and nine (9) college juniors have accepted summer employment offers. The schools represented in this latter program are as follows:

Washington State College
University of Washington
Gonzaga University
Reed College
University of Idaho
South Dakota School of Mines
Oregon State College

SCHOOL OF NUCLEAR ENGINEERING

Spring Semester

A ten-week course in Blueprint Reading was started on March 29 particularly for the people in the Purchasing and Stores Section. The response was overwhelming because 35 men came for the first meeting, paid the tuition, and have been attending the successive sessions. With this class the School of Nuclear Engineering enrollment now stands as follows:

	<u>Total Registered</u>
In Graduate courses	185
In College-level courses	<u>225</u>
Total	410

Over 100 letters have been sent to supervisors at the request of students to record performance in the first-semester courses.

The number of students in college-level courses who have requested college credit during the past two school years has varied as follows:

Employee and Public Relations Department
Education and Training Section

<u>Term</u>	<u>WSC Credit</u>	<u>U. of Wash. Credit</u>	<u>No. of Courses</u>	<u>No. of college-level students</u>
Fall 1953	8	16	7	104
Spring 1954	3	14	9	121
Fall 1954	22	27	8	142
Spring 1955	7	13	15	225

It should be noted that some of the college-level courses that are offered are not given in colleges so that credit is not available.

The large number of credit seekers in the Fall 1954 is due to the large enrollment in Elementary Accounting and the Algebra classes.

Active Students

Through a quick survey of instructors during the past week it was determined that 370 of the original 410 students are still active in class attendance and participation. This means that 90% of the students have found that with all factors considered they are obtaining some worthwhile information from the courses, which to a large degree may be useful in their daily work.

Visits

On April 13 and 14 Dr. S. E. Hazlet, Dean of the Graduate School at the State College of Washington and Dr. H. W. Barlow, Director, Washington State Institute of Technology visited Richland. Dean Hazlet talked with fifteen students who have affiliated with the State College of Washington about their graduate study programs during the two evenings. Dr. Barlow, who has just received a "Q" clearance, made a quick trip to the area to see representative plants. A close relationship will be important since the State College is planning to install a nuclear reactor for research.

On April 14, Professor M. Popovich, Assistant Dean of Engineering at Oregon State College, visited Richland to counsel twelve men who are working toward engineering degrees.

Trips

H. C. Mayer and D. W. McLenegan attended the regional meeting of the American Society for Engineering Education held at Moscow, Idaho on April 15 and 16. One significant item came out of these discussions: The universities are in favor of a two-way exchange of personnel between the colleges and industry. Many opportunities are open to engineering faculty members to work in industry either for the summer or a full year. The college administrators feel that some industry men should be afforded the chance to teach for a year in the engineering schools to provide a better two-way flow of information.

Employee and Public Relations Department
Education and Training Section

Approvals

Oregon State College has approved the curriculum proposed for the degree of M. S. in Nuclear Engineering. This enables their Richland students to take a variety of courses closely related to the nuclear field that may also aid them in their current project work. Accordingly, the active students have been notified. Other affiliated universities have the proposal under study.

PERSONNEL DEVELOPMENT

New Exempt and Supervisors Orientation was presented April 4 to 6 with an attendance of twelve exempt personnel. This 24-hour program replaces the old 40-hour program. Duration and content are satisfactory to most people.

Effective Human Relations for Group No. 1 was conducted Thursday afternoon, April 7. This is the second conference for this group.

Report Writing was presented for the first time on April 1 and April 22. The first group consisted of eight exempt personnel and the second of seven. The program is intended to run for eight hours, but on April 22 we cut it down to approximately five hours. This was done in order to get patrolmen from the other areas, and to give them the whole thing in one session.

Job Relations Development was presented for the first time on the afternoons of April 6 and 7 with six exempt personnel attending. The program provides a foundation of human relations principles so that the relatively inexperienced supervisor will have some assistance in solving his everyday personnel problems.

Job Methods Improvement was started on April 5 and 6 at 100-D area. This was at the request of Reactor Section, and seven supervisors were present. Also attending were two Reactor Section training and development representatives. Because of emergency shutdowns the last two meetings of this program have been deferred until the latter part of April and the first of May.

The GE 9-Point Program was presented to 28 non-exempt employees of the Separations Section on Friday, April 8, and Wednesday, April 20. This meeting was at the request of Separations Section supervision, and was conducted in the 200-W area.

PMS meetings for Group No. 79 were held on the mornings of April 11 to 15 and 18 to 20 in the Pistol Range conference room, with fourteen supervisors completing the course.

On Friday morning and evening, April 22, Customer Relations was presented to 28 non-exempt transportation section employees. This is the beginning of an extended program to cover all bus drivers. There will be 13 groups of approximately 14 people each (about 180 total), and each group will require two meetings. This program is scheduled to run until June 2, 1955. Customer Relations was also presented to 21 Community Section exempt and non-exempt employees on Monday morning, April 25. This meeting was conducted in the Richland Public Library.

Employee and Public Relations Department
Education and Training Section

Your Stake in American Industry was presented Monday morning, April 25, with 20 exempt personnel in attendance. This program is still in the developmental stage but is received favorably. Questionnaires completed by participants will be scanned to indicate improvements and additions.

On Wednesday evening, April 6, V. J. Byron presented a talk on "The Why of Human Relations" to approximately 100 staff members of St. Elizabeth's Hospital in Yakima.

D. G. Dayton attended a "Productive Maintenance" meeting Tuesday morning, April 5, in the 703 Building. This program was sponsored by F. J. Mollerus and H. A. Carlberg, Plant Engineering Section, Manufacturing Department.

R. B. Shoen and D. G. Dayton attended "Work Simplification" meetings in 200-W Area on the mornings of April 13 and 15.

During the week of April 11, training program booklets were distributed to the correspondents of Manufacturing, Financial, and Employee and Public Relations Departments. Numbers of booklets required by the different sections varied tremendously since some correspondents wanted booklets for all of their exempt people, whereas others wanted them only for the higher levels of management.

During the month members of the training group accomplished a great deal of revision of course material, the preparation of Conference Leading notebooks, Effective Human Relations and complete revisions of exhibits for the PMS course.

There were requests for 346 program attendance transcripts this month.

Questionnaires were sent to all correspondents inquiring as to the use and practical value of the Supervisor's Handbook. Answers received to date indicate that the Handbook is no longer serving its intended purpose. Decision will be reached soon as to our future course of action.

Another question asked was whether or not our present records on training program attendance were adequate. Replies received to date indicate that our records are adequate, and will supply all the information needed by correspondents.

During the month a procedure was initiated whereby "reminder" letters will be sent to correspondents ten days before presentation of each major program. Partially as a result of this letter, our program "Your Stake in American Industry" had a better enrollment than any previous program on economics.

On Tuesday, April 19, members of the training group reviewed the new IBM film, "The Right Touch". This will be available for loan for our forthcoming Stenographic-Secretarial program. The film emphasizes the fact that any typist may logically aspire to the top secretarial job if she has the will to progress.

Employee and Public Relations Department
Education and Training Section

Meetings were held with Messrs. Mathis, Peck, MacCready, Stainken, and Meeker to obtain their approval to present the "McGregor" program and J.R.D. to their top supervision. This would be a trial group and would be an appreciation version. If these groups of supervision feel that the programs are worthwhile, it is anticipated that we will carry them throughout the Reactor Section.

GENERAL

To promote interest in science study at high school level, D. W. McLenegan addressed the Inland Empire Science Fair at Spokane, April 6-7. There might be real value to HAPO in promoting locally a Science Fair for 1956. This is being explored with the Public Relations Section, the nearby high schools and the local service groups.

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
APRIL 1955

General

Personnel Changes

Five additions and nine deletions resulted in a decrease to 241.

Employee Relations

Employee attendance at 42 meetings was 272.

Visits

Waring Fitch, of the Washington State Department of Health, and Dr. Phillips, state president of the Society for Conservation of Hearing, visited the Public Health and Industrial Medical Section and offered helpful suggestions to both sections.

Miss Helen Peterson, State Department of Health, visited us in connection with the chest x-ray survey.

Four nurses attended the Washington State Nurses Association annual meeting in Yakima. Mr. Quigley was elected vice-chairman of the Industrial Nurses section.

Dr. Norwood was guest speaker at a dinner meeting of this association.

Dr. Scudder and Dr. Norwood attended the Annual Industrial Health Conference in Buffalo.

Dr. Norwood was elected a director of the Industrial Medical Association, a professional organization with some three thousand physician members.

Industrial Medicine

Dr. Mankowski was added to the staff.

Medical examinations decreased from 918 to 800.

Since the first of the year thirty per cent of our examinations have been for construction employees. Since this was not anticipated in our budget of industrial physicians, a part of our operations program must be curtailed until industrial physician requirements are met.

Dispensary treatments increased from 6428 to 6502.

Sickness absenteeism was 1.79% vs. 1.82% for March while total absenteeism was 2.56% vs. 2.48%. The year to date total absenteeism of 2.44% compares with 2.57% for 1954.

Safety & Fire Prevention

	<u>Statistics</u>		<u>Community</u>	
	<u>Operations</u>		<u>April To Date</u>	
Major Injuries	0	2	0	0
Sub-Major Injuries	5	10	0	0
Total Injuries	497	1807	31	98

While total injuries were less than for March, they are still at a higher level than usual.

Several building code violations were found on a preliminary acceptance inspection of the central transportation facility. We were told that these will be remedied by A.E.C. engineering.

HEALTH & SAFETY SECTION

APRIL 1955

General

Safety & Fire Prevention (Continued)

Consolidation of safety offices in the 100 and 200 Areas has resulted in the elimination of two clerks and considerable rent.

Kadlec Hospital

The average daily adult census decreased from 60.1 to 56.8 as compared with 89.2 a year ago. The combined patient days for March and April as compared with these two months in 1954 is 30%.

The decrease in length of stay accounts for 12% and decreased population served for about 7%. These two items account for 62% of the drop. Other factors are discussed in the more detailed hospital account. The low census resulted in a year to date overrun of about \$28,000 in the hospital budget.

A comparison of average hospital and physician charges for common services in Richland and Schenectady revealed little difference.

Public Health

A slight increase in number of communicable diseases was due to a rise in the incidence of scarlet fever. Details for the merger of the local public health unit with the Bi-County unit were approved by the sub-committee and should be acted upon by the board of the Bi-County Public Health unit in May.

The State Health Council sponsored a very successful two day meeting in Pasco on the problems of family living. Mr. Branchini acted as vice-chairman of the conference, which was attended by about three hundred delegates from all over the state.

Costs-March

	<u>February</u>	<u>March</u>	<u>Mar. Budget</u>
Industrial Medicine	\$42,496	\$45,420	\$47,852
Public Health (Oper.)	9,252	9,686	10,326
Kadlec Hospital (Net)	14,921	25,357	10,649
Hospital Expense Credits	1,374	1,544	2,000
Safety & Fire Prevention	12,850	12,443	20,412
Total Health and Safety	\$80,893	\$94,450	\$91,239

The net cost of operating the Health and Safety Section before charges were assessed to various departments was \$94,450, about \$14,000 more than the February costs and about \$3,000 above the budget. There were underruns in all sections except the hospital, where the overrun was about \$10,000 due to the unexpected drop in patient days.

The low census in March and continued in April resulted in a hasty revision of the 1956 budget with drastic reduction in estimated income and an equal reduction in expense by a planned decrease of about 15 in operating personnel for the hospital.

HEALTH & SAFETY SECTION

APRIL 1955

Industrial Medical Services

The total number of examinations decreased from 918 to 800. General Electric employees sustained five sub-major injuries but no major injuries. Contractor employees sustained one major injury but no sub-majors.

Dispensary visits increased from 6428 to 6502. The 1954 April visits were 5289. Dispensary services on the night shifts were begun in the 200-E and 100-K Areas by rotating and dividing the time equally between these two areas. In the 300 Area there were 1202 visits and in the 200-W Area there were 1728 visits. Visits in the 700 Area were 400. The number of nurses for all areas was 29. There were three nurses who attended the Washington State Nursing Association meeting during the month in Yakima. One of our nursing supervisors, E. J. Quigley, was made vice-chairman of the Industrial Nurses Section.

Waring Fitch of the Washington State Public Health Department and Dr. Phillips, state president for the Society for the Conservation of Hearing, were visitors on April 6th. They reviewed our policies and procedures for testing the hearing of applicants and employees and indicated satisfaction with our methods but made recommendations for improvement of our facilities for hearing testing.

Dr. W. E. Russell will return to our staff beginning September 1st, after two years of army service.

Arrangements were also completed for Dr. Mankowski of the North Richland Medical Center to join our staff on May 1st.

Examination space facilities were reviewed and a request for a project proposal will be made for increasing this space to permit more effective use of physicians' time.

Dr. Norwood and Dr. Scudder attended the Industrial Medical Association meeting held in Buffalo, New York, the week beginning April 25th. They will review the papers heard there for the physician staff on May 25th.

The Health Activities Committee met on April 21st and the health topic on Tuberculosis was presented. Material on this subject was prepared for distribution throughout the plant.

Net costs for March were \$2,203 greater than February costs due to increased salaries and maintenance expense. A slight decrease occurred in continuity of service expense despite the increase in salary costs. This is due to a reduction in the continuity of service rate from 9% to 7½%. Salaries were higher since March had thirty-one days as compared with only twenty-eight days in February. Services rendered the Atomic Energy Commission in connection with Minor Construction employees continued at a level considerably above that anticipated.

HEALTH & SAFETY SECTION

APRIL 1955

Industrial Medical Services (Continued)

<u>Costs-Operations</u>	<u>March</u>	<u>February</u>	<u>Increase (Decrease)</u>
Salaries	\$34,205	\$31,245	\$ 2,960
Continuity of Service	2,565	2,812	(247)
Laundry	179	186	(7)
Utilities, Transportation, Maintenance	4,912	3,930	982
Supplies and Other	<u>4,441</u>	<u>5,124</u>	<u>(683)</u>
Total Gross Costs	46,302	43,297	3,005
Less: Revenue	882	801	81
Expense Credits	<u>11,723</u>	<u>11,002</u>	<u>721</u>
Net Cost of Operation	\$33,697	\$31,494	\$ 2,203

Actual expenses for the first three quarters of FY 1955 are approximately \$18,000 (5%) under budget. It appears that this condition will continue for the balance of the fiscal year.

HEALTH & SAFETY SECTION

APRIL 1955

<u>Industrial Medical Services (Continued)</u>	<u>March</u>	<u>April</u>	<u>Year to Date</u>
<u>Physical Examinations</u>			
<u>Operations</u>			
Pre-employment	213	143	550
Rehire	19	16	71
Annual	74	128	613
Interim	18	19	271
A.E.C.	29	24	100
Re-examination and recheck	200	136	620
Termination	71	105	311
Sub-total	624	571	2536
<u>Contractors</u>			
Annual	35	0	82
Pre-employment	142	112	664
Recheck	68	48	205
Termination and Transfer	49	58	128
Interim	0	11	11
Sub-total	294	229	1090
Total Physical Examinations	918	800	3626
<u>Laboratory Examinations</u>			
<u>Clinical Laboratory</u>			
Government	100	93	380
Pre-employment, Termination, Transfer	3062	2428	10414
Annual	430	703	3377
Recheck (Area)	143	103	1463
First Aid	6	5	42
Total	3741	3332	15676
<u>X-Ray</u>			
Government	15	18	66
Pre-employment, Termination, Transfer	432	335	1535
Annual	123	170	1003
First Aid	94	105	349
Total	664	628	2953
Electrocardiographs	88	97	376
Physical Therapy Cases Referred	242	293	1046

HEALTH & SAFETY SECTION

APRIL 1955

<u>Industrial Medical Services (Continued)</u>	<u>March</u>	<u>April</u>	<u>Year to Date</u>
<u>First Aid Treatments</u>			
<u>Operations</u>			
New Occupational Cases	638	546	2046
Occupational Case Retreatments	1841	1910	6478
Non-occupational Treatments	3045	3295	11487
Sub-total	5524	5751	20011
<u>Construction</u>			
New Occupational Cases	170	121	463
Occupational Case Retreatments	577	435	1526
Non-occupational Treatments	157	195	582
Sub-total	904	751	2571
Total First Aid Treatments	6428	6502	22582
<u>Major Injuries</u>			
General Electric	0	0	2
Contractors	0	1	1
Total	0	1	3
<u>Sub-Major Injuries</u>			
General Electric	1	5	10
Contractors	1	0	1
Total	2	5	11
<u>Nurses' Visits</u>			
Calls made	5	1	8
Employee Personal Illness	3	1	5
No. absent due to illness in family	1	0	1
No. not at home when call was made	1	0	2

HEALTH & SAFETY SECTION

APRIL 1955

Kadlec Hospital

The average daily adult census decreased from 60.1 to 56.8 as compared with 89.2 a year ago. This low census is a continuation of the sharp decline experienced in March. It represents an occupancy percentage of 52.1 broken down as follows: Mixed Service (Medical, Surgical and Pediatrics) 52.4; Obstetrical Service 51.0. A further breakdown of the Mixed Service shows an occupancy percentage of 45.4 on Medical, 65.6 on Surgical and 43.7 on Pediatrics.

In attempting to identify some of the causes for the lower patient load, it becomes evident that there are a number of factors which have an influence. To just what extent each factor contributes to the decrease is difficult to determine. Included in these causes are the following:

1. The average length of patient stay continues to decline, having dropped 23% at Kadlec Hospital during the five year period, 1950-1954, from 5.3 days to 4.1 days. In March 1955, the average length of stay was 3.6 days. Medical advances in diagnostic and treatment techniques, greater use of the so-called "wonder drugs", early ambulation, more widespread health insurance, and a greater awareness on the part of the average individual of the need for early treatment as result of emphasis on health education are among the prime reasons for a shorter patient stay.
2. Greater competition from other communities due to:
 - a. Increased number of physicians (including specialists) having established their practices in other nearby areas.
 - b. A new hospital having been opened in an adjacent area.
3. Kadlec Hospital has a financial arrangement with its radiologist and pathologist which is very unusual for this area and requires that patients be billed separately by the hospital and the specialists for such services. This is resented by some patients whose insurance does not cover a direct charge by such specialists and influences them to seek such service elsewhere. The nuisance factor of two billings where one is normally sufficient also results in a certain amount of ill will from many patients.
4. Kadlec Hospital's charges for services rendered have gradually been increased until they are approximately average with similar hospitals in the area. The former appeal to the patient of lower than average charges no longer exists.
5. Declining construction activities on the project with less people being served has contributed to the recent drop in patient load - 12% decrease in population served during past year.

HEALTH & SAFETY SECTION

APRIL 1955

Kadlec Hospital (Continued)

In addition to the problem of the declining patient load itself, is that of not knowing at what level the load may stabilize. Every effort is being made, however, to keep personnel and other costs in line with the reduced demands of the patient census, as indicated by the budget adjustments discussed below.

The minimum and maximum daily census ranged as follows:

	<u>Minimum</u>	<u>Maximum</u>
Mixed Service	32	59
Obstetrical Service	8	16
Total Adult	40	70

The average daily newborn census increased from 9.5 to 11.4 as compared with 12.0 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	4.03
Obstetrical	4.43
Newborn	3.18

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of March was 2.39. When newborn infants are included, the ratio is 2.06.

The net expense for the operation of Kadlec Hospital for March was \$25,357 as compared with \$14,921 for February. Summary is as follows:

Kadlec Hospital net expense \$25,357
This is an increase of \$10,436 over the month of February. Gross costs increased \$5,652 due primarily to the longer month; revenue decreased \$4,954 as a result of the lower patient census; and expense credits increased slightly by \$170. On a year to date basis, this means that the hospital is exceeding its budgeted net cost by approximately \$16,000 at the end of March due to the drop in patient load.

The consolidation of Pediatrics service with the Medical service begun the latter part of March was changed after two or three weeks experience due to physician and patient resistance. However, it has been possible to preserve the cost reductions represented by the fewer nurses required under this arrangement by providing nursing service from a consolidated Surgical and Pediatric nurses station. Reaction of patients and physicians to this consolidation is more favorable and it is expected to continue.

As a result of the sharp drop in patient census the FY 1956 budget was completely reviewed and new cost and revenue figures established. It has been estimated that the FY 1956 census will average about 58 patients rather than

HEALTH & SAFETY SECTION

APRIL 1955

Kadlec Hospital (Continued)

the previously anticipated 67. Reductions in personnel totaling about 15 employees were arranged for in many hospital units, of which four were effected during April. This revised budget has been submitted to the A.E.C.

Plans were continued for appropriate activities in connection with National Hospital Week, May 8-14, and Kadlec's Open House on May 11.

A new system of patient identification known as the Ident-A-Band system was put into effect on the Medical, Surgical and Pediatric services. It consists of a plastic wrist or ankle band containing patient's name, hospital number, doctor's name, and in the case of pediatric patients, the age. This will be an excellent positive identification during the patient's entire hospitalization. It also provides the additional advantage of identification in the event of large-scale evacuation.

Following is a summary of employee relations meetings held in the Health and Safety Section during the month of April.

	<u>Meetings</u>	<u>Attendance</u>
Hospital	30	177
Industrial Medicine	1	4
Public Health	8	67
Safety & Fire Prevention	1	12
General	<u>2</u>	<u>12</u>
Total	42	272

HEALTH & SAFETY SECTION

APRIL 1955

<u>Hospital Unit (Continued)</u>	<u>March</u>	<u>April</u>	<u>Year to Date</u>
<u>Kadlec Hospital</u>			
Average Daily Adult Census	60.1	56.8	66.7
Medical	14.9	16.8	18.4
Surgical	23.6	21.0	24.7
Pediatrics	11.4	8.3	13.1
Mixed	49.9	46.1	56.2
Obstetrical	10.2	10.7	10.5
Average Daily Newborn Census	9.5	11.4	10.6
Maximum Daily Census:			
Mixed Services	64	59	83
Obstetrical	15	16	19
Total Adult Census	74	70	95
Minimum Daily Census:			
Mixed Services	34	32	32
Obstetrical Service	6	8	3
Total Adult Census	44	40	40
Admissions: Adult	514	445	2019
Discharges: Adult	521	450	2020
Medical	127	110	488
Surgical	229	205	883
Pediatrics	84	62	343
Mixed	440	377	1714
Obstetrical	77	73	302
Newborn	67	71	279
Patient Days: Adult	1864	1705	8000
Medical	463	505	2207
Surgical	733	628	2967
Pediatrics	352	249	1571
Mixed	1548	1382	6745
Obstetrical	316	323	1255
Newborn	293	342	1268
Average Length of Stay: Adults	3.6	3.8	4.0
Medical	3.6	4.6	4.5
Surgical	3.2	3.1	3.4
Pediatrics	4.2	4.0	4.7
Mixed	3.5	3.7	4.0
Obstetrical	4.1	4.4	4.1
Newborn	4.4	4.8	4.5
Occupancy Percentage: Adults	55.1	52.1	61.2
Medical	40.3	45.4	49.8
Surgical	73.8	65.6	77.2
Pediatrics	60.0	43.7	68.9
Mixed	56.7	52.4	63.9
Obstetrical	48.6	51.0	50.0
Newborn	36.5	43.8	40.8
(Occupancy Percentage based on 109 adult beds and 26 bassinets.)			

HEALTH & SAFETY SECTION

APRIL 1955

<u>Hospital Unit (Continued)</u>	<u>March</u>	<u>April</u>	<u>Year to Date</u>
<u>Kadlec Hospital (Continued)</u>			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	4.10	4.03	
Obstetrics	5.25	4.43	
Newborn	3.46	3.18	
Avg. No. Employees per Patient (excluding newborn)	2.39		
Operations: Major	71	55	263
Minor	98	70	328
E.E.N.T.	54	75	252
Dental	2	0	3
Births: Live	65	74	274
Still	1	0	5
Deaths	3	4	16
Hospital Net Death Rate	.17%	.38%	.31%
Net Autopsy Rate	0	0	18.8
Discharged Against Advice	0	0	1
One Day Cases	163	237	717
Admission Sources:			
Richland	79.2	83.8	80.4
North Richland	8.9	4.3	7.2
Other	11.9	11.9	12.4
Admissions by Employment:			
General Electric	74.7	73.1	73.9
Government	3.9	2.9	2.5
Facility	3.9	6.7	5.7
Contractors	8.6	3.6	9.1
Schools	2.1	2.5	1.4
Others	6.8	11.2	7.4
Hospital Outpatients:			
First Aid	424	442	1854
Clinical Laboratory	182	168	674
Bacteriological Laboratory	44	35	221
X-Ray	164	174	635
Physical Therapy	335	313	1302
<u>Physical Therapy Treatments</u>			
Outpatient Treatments	371	330	1351
Hospital	88	107	350
Total	459	437	1701
<u>Pharmacy</u>			
No. of Prescriptions Filled	2522	2351	10540
No. of Store Orders Filled	516	471	2024

HEALTH & SAFETY SECTION

APRIL 1955

<u>Hospital Unit (Continued)</u>	<u>March</u>	<u>April</u>	<u>Year to Date</u>
<u>Kadlec Hospital (Continued)</u>			
<u>Clinical Laboratory Examinations</u>			
Outpatient Examinations	395	410	1718
Hospital	3491	3131	14777
Public Health	0	0	1
Total	3886	3541	16496
<u>X-Ray Examinations</u>			
Outpatient Examinations	164	167	684
Hospital	212	174	884
Public Health	6	24	56
Total	382	365	1624
<u>Electrocardiographs</u>			
Outpatient Examinations	0	1	5
Hospital	19	29	109
Total	19	30	114
<u>Bacteriological Laboratory</u>			
Treated Water Samples	201	183	751
Milk Samples (Inc. Cream & Ice Cream)	38	30	136
Other Bacteriological Tests	496	417	2128
Total	735	630	3015
<u>Patient Meals</u>			
Regulars	2882	2687	11845
Children under 8	744	497	3438
Specials	572	627	3235
Softs	646	602	2534
Tonsil and Adenoid	75	96	354
Liquids	136	147	576
Surgical Liquids	92	76	332
Total	5147	4732	22314
<u>Cafeteria Meals</u>			
Noon	1794	1516	6744
Night	353	264	1198
Total	2147	1780	7942

HEALTH & SAFETY SECTION

APRIL 1955

Public Health Unit

During April there was a slight increase in the number of communicable diseases reported, due entirely to a 50% rise in the incidence of scarlet fever. There was a corresponding increase of field nursing visits and school health services. Immunizations were greatly decreased as they have been largely completed for the year.

A Crippled Children's Clinic was held during the month with C. Don Platner, M.D. attending.

Visitors for the month included: Waring J. Fitch and Dr. Phillips of the State Department of Health, in regard to the hearing program; Miss Helen Peterson, Public Health Nursing Consultant, State Department of Health, in connection with the chest x-ray survey.

From the staff: Stella Wellborn participated in the State Nurses Association Meeting held in Yakima; Mr. Branchini was heavily engaged in the planning for and promotion of a most successful two-day Conference on Family Living held in Pasco.

Conflicts in family relationships continued to be the major problem seen by the social service counselors. During the month, 135 interviews were devoted to discussion of conflicts between parents and their children and 66 interviews were focused on marital conflict.

In 93 instances, children were seen individually, as were 23 adolescents. There were 26 interviews with adults who were disturbed by individual personality problems.

Physical and mental illness were the focus of 15 interviews. One interview was held regarding a community problem.

The bakery, which was operating below standards the previous month, has improved its operation a great deal from the sanitation standpoint. More frequent inspections will be made to see that it continues to improve.

Restaurants were found to be operating satisfactorily. Grade cards will be put up in the near future. The possibility of using decals is being investigated. All food handling establishments in North Richland have terminated their operation.

Bacteriological results of pasteurized milk samples and water samples were found to be satisfactory.

A seminar was held in Pasco for tavern operators in the Tri-Cities. It was conducted by the State Health Department and Richland was well represented. Valuable information was obtained in regard to sanitation of taverns.

HEALTH & SAFETY SECTION

APRIL 1955

Public Health Unit (Continued)

Burning operations of the mosquito control program have been completed. Areas are now being continually checked for mosquito larvae. The program has been transferred to the Public Works Division. The Public Health Unit is continuing to advise and check areas to see that satisfactory results are obtained.

Plans were approved for a swimming pool behind the hotel and construction is under way.

Fifteen dog bites were investigated as a rabies control measure. Several nuisances were also abated and involved care of animals in residential areas.

HEALTH & SAFETY SECTION

APRIL 1955

Public Health (Continued)	March	April	Year to Date
<u>Education</u>			
Pamphlets distributed	15,020	13,986	51,003
News Releases	15	18	33
Staff Meetings	0	2	4
Classes	39	3	64
Attendance	588	64	871
Lectures & Talks	8	3	47
Attendance	518	336	2403
Films Shown	30	23	76
Attendance	860	1384	3581
Community Conferences & Meetings	11	13	54
Radio Broadcasts	8	8	24
<u>Immunizations</u>			
Diphtheria	119	48	226
Diphtheria Booster	51	9	649
Diptussis	0	0	15
Tetanus	0	0	1
Tetanus Booster	0	6	10
Pertussis	0	0	1
Pertussis Booster	0	6	10
Smallpox	488	45	1379
Tuberculin Test	0	10	20
Immune Globulin	19	2	51
Other	0	0	1
<u>Social Service</u>			
Cases carried over	98	104	405
Cases admitted	19	16	60
Cases closed	13	38	87
Remaining case load	104	82	378
Activities:			
Home Visits	1	1	6
Office Interviews	351	359	1351
Conferences	50	44	223
Meetings	21	14	60
<u>Sanitation</u>			
Inspections made	124	129	462
Conferences held	31	32	113

HEALTH & SAFETY SECTION

APRIL 1955

Public Health (Continued)	March	April	Year to Date
<u>Communicable Diseases</u>			
Chickenpox	26	29	153
German Measles	14	7	42
Impetigo	0	0	3
Influenza (U.R.I.)	0	0	4
Infectious Mononucleosis	2	0	9
Infectious Hepatitis	3	0	10
Measles	4	2	15
Meningitis	0	1	1
Mumps	110	113	305
Pinkeye	0	4	6
Pneumonia	1	0	1
Ringworm	5	2	11
Roseola	1	1	8
Scarlet Fever	20	31	97
Strep. Infection (Throat)	0	1	1
Tuberculosis	0	2	3
Whooping Cough	0	4	9
Total	186	197	678
 Total No. Nursing Field Visits	 553	 590	 2104
Total No. Nursing Office Visits	50	50	208

COMMUNITY SECTION

APRIL 1955

ORGANIZATION AND PERSONNEL:

	<u>BEGINNING OF MONTH</u>		<u>END OF MONTH</u>	
	<u>Exempt</u>	<u>Nonexempt</u>	<u>Exempt</u>	<u>Nonexempt</u>
Community Administration	1	1	1	1
Maintenance & Renovation Unit	9	142	9	142
Police Unit	16	31	16	31
Commercial & Residential Property Unit	8	26	8	25
Fire Unit	66	0	63	0
Transfer Study	1	0	1	0
Community Operations Administration	1	1	1	1
Electrical Unit	5	16	5	15
Engineering Unit	7	4	7	4
Water & Sewerage Utilities Unit	5	18	5	21
Library Unit	4	10*	4	10*
Public Works & Recreation Unit	<u>7</u>	<u>41</u>	<u>7</u>	<u>42</u>
	130	290	127	292

	<u>Exempt</u>	<u>Nonexempt</u>
Additions to Payroll	0	8
Transfers In	1	5
Removals from Payroll	0	6
Transfers Out	4	5
Net Decrease	<u>1</u>	

* Includes two half-time employees

MAINTENANCE AND RENOVATION UNIT

April, 1955

	<u>Exempt</u>	<u>Nonexempt</u>
Employees - Beginning of month	9	142
New hires	0	2
Reactivate from illness leave	0	1
Leave of absence - illness	0	1
Terminated	0	1
Retirement	0	1
Employees - end of month	9	142

INTERIOR PAINT REPORT - FY 1955

<u>FOREMAN</u>	<u>PAINTERS</u>	<u>TRUCK DRIVERS</u>	<u>TOTAL</u>
R. A. Chambliss	24	1	25
D. W. Lukins	21	1	22
M. E. Tappan	<u>12</u>	<u>1</u>	<u>13</u>
Total	57	3	60

<u>TYPE UNIT</u>	<u>NO. UNITS SCHEDULED</u>	<u>COMPLETED THIS MONTH</u>	<u>COMPLETED TO DATE</u>	<u>BALANCE TO BE PAINTED</u>
A	92	26	92	0
B	146	38	144	2
C	9	1	9	0
D	0			
E	6	3	6	0
F	31	5	31	0
G	0			
H	55	19	55	0
K	2	0	2	0
L	1	0	1	0
M	1	0	1	0
Q	3	0	3	0
R	1	0	1	0
S	1	0	1	0
T	3	0	3	0
U	18	1	16	2
V	45	2	38	7
Y	95	4	89	6
Z	6	0	6	0
1BP	66	8	59	7
2BP	452	54	405	47
3BP	315	29	295	20
Tract	17	0	9	8
1BR Apt.	12	2	11	1
2BR Apt.	0			
W-13 Apt.	1	0	0	1
<hr/>				
TOTAL	1378	192	1277	101

17 Units added

Est. MH B. F.	47,340	Actual MH B. F.	47,264
Est. MH This Mo.	<u>8,533</u>	Actual MH This Mo.	<u>8,286½</u>
Total Est. MH	55,873	Total Actual MH	55,550½

PLUMBING SHOP

FOREMAN - F. L. ELSENSOHN

JOB DESCRIPTION

NO. COMPLETED

Electric water heaters replaced	13
Laundry trays replaced	9
Shower stalls replaced	10
Miscellaneous plumbing work orders completed	19
Cleared major sewer stoppages caused by tree roots	63
Cleared major stoppages in main sewers	4
Worked on plumbing service orders	58.8 hours
Worked on service orders, planting grass seed where trees were removed	89.4 hours
Radiators completely overhauled in dormitories	26
Plumbing for floor and sink linoleum replacement	111
Steam work orders completed	4

Made routine steam inspection once each week in Government owned facilities, dormitories and apartments.

Dug out cleanouts and laid sewer line in preparation for use of busses used as change houses for exterior paint program in three locations.

Excavated with hand work and backhoe machine for the cleaning out of roots in sewer lines, and to repair all leaking and broken underground piping and backfilled.

Landscaped where sewers were dug out and trees were removed, and seeded excavated portion.

SERVICE ORDER CREW

FOREMAN - L. F. CARPENTER

A. On hand at the beginning of the month	222
B. Received during the month	1965
C. Completed during the month	1833
D. On hand at the end of the month	354

E. A total of 152.4 hours were spent on work orders.

F. Backlog of incomplete service orders by craft:

Electrical	271
Plumbing	36
Carpentry	<u>47</u>

Total	354
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153 service orders from fire inspections.

RENOVATION AND LABOR CREW

FOREMAN - B. C. BAIN

The following services were performed during the month:

Houses renovated	38
Trash pickups	33
Minor carpenter repairs to housing units	34
Minor carpenter repairs to dormitories	7
Dormitory rooms redecorated	2
Renovation minor paint jobs	25
Complete paint jobs	1
Houses sprayed for insect control	2

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	157
Routine furnace inspections	190

Coolers in the Clinic and both theaters have been repadded and serviced for operation.

B. Sheetmetal Crew:

Shower stalls installed	11
Replaced smoke pipes	13
Installed gutters	14
Installed Ranch house bathroom window flashings	60
Coolers repaired (new pad holders)	23

C. Labor Crew:

Tree removal orders	97
Tree pick-up orders (tree removed by tenant)	14
Top soil orders	14

LINOLEUM AND CARPENTER SHOP

FOREMAN - R. M. MARTIN

Replaced bath wall tile	1
Repaired bath wall tile	3
Replaced bath floor linoleum	10
Replaced bedroom floor linoleum	2
Repaired bedroom floor linoleum	2
Replaced living room linoleum	2
Repaired living room linoleum	3
Replaced dining room linoleum	2
Replaced kitchen floor linoleum	30
Repaired kitchen floor linoleum	3
Replaced hall linoleum	1
Replaced steps linoleum	6
Replaced sink top linoleum	108
Repaired sink top linoleum	1
Replaced work bench linoleum	16
Repaired porches	40
Replaced sinks	5
Sash balances	18
Chempoints	153
Paint touch-ups	30
Exterior doors repaired	6
Interior doors repaired	2
Interior house repairs	96
Drilled weepholes	57
Sidewalk forms	1
Repaired floor boards	2
Repaired roofs	48
Ranch house screens	61
Repaired basement steps	1
Ranch House ladders	72

COMMUNITY SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
APRIL 1955

ORGANIZATION

	EXEMPT	NON-EXEMPT
EMPLOYEES - BEGINNING OF MONTH	16	31
TRANSFERS IN	0	0
TRANSFERS OUT	0	0
NEW HIRES	0	0
TERMINATIONS	0	0
TOTAL - END OF MONTH	<u>16</u>	<u>31</u>

GENERAL

DETECTIVES LINKOUS AND MUMPER OF THIS DEPARTMENT CONDUCTED A SERIES OF CONFERENCES THIS MONTH WITH MEMBERS OF THE CHAMBER OF COMMERCE ON THE SUBJECT OF BETTER METHODS OF DETECTING SHOPLIFTING AND THE HANDLING OF QUESTIONABLE CHECKS.

A 1954 CHEVROLET SEDAN WAS RECEIVED THIS MONTH AS A REPLACEMENT FOR AN OLDER VEHICLE RETURNED TO TRANSPORTATION.

TWO GROUPS OF BOY SCOUTS AND ONE CAMP FIRE GIRLS GROUP WERE ESCORTED THROUGH POLICE HEADQUARTERS DURING THE MONTH OF APRIL.

TRAFFIC

	1955		1954		1955	1954
	MAR. APR.		MAR. APR.		TOTAL TO DATE	TOTAL SAME PERIOD
RICHLAND						
REPORTABLE ACCIDENTS	14	16	14	20	81	91
PROPERTY DAMAGE ACCIDENTS	14	15	10	19	73	80
INJURY ACCIDENTS	0	3	4	1	10	11
TOTAL PERSONS INJURED	0	4	4	1	13	11
FATAL ACCIDENTS	0	0	0	0	0	0
ACCIDENTS-DAYLIGHT HOURS	11	14	11	10	54	57
DARKNESS "	3	2	3	10	27	34
ACCIDENTS-BUSINESS DISTRICT	3	7	3	7	18	25
RESIDENTIAL "	8	6	9	11	50	53
OTHER "	3	3	2	2	13	13
ACCIDENTS INVESTIGATED	8	12	9	14	51	50
CRIMINAL COMPLAINTS FILED	5	8	5	14	23	34
VIOLATIONS CONTRIBUTING TO ACCIDENTS:						
NEGLIGENT DRIVING	1	1	3	6	6	19
FAIL. TO YIELD RIGHT OF WAY	1	8	3	4	21	18
FOLLOWING TOO CLOSELY	4	2	3	5	10	20
DRUNK DRIVING	0	0	0	1	2	1
PEDESTRIAN VIOLATION	0	1	0	0	2	0
INATTENTION TO DRIVING	2	0	0	0	2	2
RECKLESS DRIVING	0	1	1	1	1	3
SPEEDING	0	0	0	0	1	1
UNSAFE SPEED	0	0	0	0	18	19
IMPROPER PARKING	0	0	0	0	0	3
IMPROPER BACKING	0	0	3	1	5	4
DISREGARDING STOP SIGN	2	0	0	0	2	0
HIT AND RUN	0	0	0	0	1	0
IMPROPER PASSING	1	1	0	0	2	0
IMPROPER TURN	1	0	0	0	3	1
FAILURE TO SIGNAL	1	0	0	1	1	1
WIDE RIGHT TURN	0	0	0	1	0	1
BICYCLE VIOLATION	0	0	1	0	0	1
DEFECTIVE EQUIPMENT	0	1	0	0	1	0
WRONG SIDE OF ROAD	0	0	0	0	1	0
ANIMAL IN ROAD	1	0	0	0	1	0
NORTH RICHLAND						
REPORTABLE ACCIDENTS	9	0	7	10	27	34
PROPERTY DAMAGE ACCIDENTS	8	0	6	8	25	29
INJURY ACCIDENTS	1	0	1	2	2	5

	1955		AVE. PER ACCIDENT 1955		AVE. PER ACCIDENT 1954	
RICHLAND	MARCH	APRIL	MARCH	APRIL	MARCH	APRIL
ACCIDENT PROPERTY DAMAGE	\$2,015.03	\$3,870.00	\$143.93	\$241.88	\$232.50	\$306.10

TRAINING

ADVANCE TRAINING FOR RICHLAND POLICE MEMBERS AT THE SMALL ARMS RANGE FOR THE PERIOD IN FIELD INSTRUCTION WAS AS FOLLOWS:

.38 CALIBER REVOLVER	1/2 HOUR	QUALIFICATIONS ON THE ARMY-L COURSE AS FOLLOWS:			
TOTAL NUMBER OF MEN REPORTING AT THE RANGE	8	EXPERT	3	37 1/2%	3
NUMBER OF MEN FIRED OVER THE ARMY-L COURSE	8	MARKSMAN	2	25%	0
				UNQUALIFIED	0
					0%

ACTIVITIES	MARCH		APRIL	
	RICHLAND	NORTH RICHLAND	RICHLAND	NORTH RICHLAND
BANK ESCORTS AND DETAILS	1	4	11	3
BICYCLES IMPOUNDED	0	0	0	0
BICYCLE VIOLATIONS, OTHER	0	0	0	0
BICYCLES REGISTERED	31	0	35	0
CHILDREN LOST OR FOUND	20	1	19	0
COMPLAINTS INVESTIGATED	31	1	45	2
DEATHS REPORTED	1	0	0	0
DOG, CAT, LOOSE STOCK COMPLAINTS	1	0	2	0
DOGS, CATS, REPORTED LOST OR FOUND	3	0	4	0
DOORS, WINDOWS FOUND OPEN IN FACILITIES	40	13	50	10
EMERGENCY MESSAGES DELIVERED	8	29	19	25
FIRES INVESTIGATED	18	4	4	0
GUNS REGISTERED	14	0	10	0
LAW ENFORCEMENT AGENCIES ASSISTED	5	0	4	0
LETTERS OF INQUIRY	257	0	185	0
MISCELLANEOUS ESCORTS	9	2	5-	0
PERSONS INJURED BY DOGS	1	0	2	0
PLANT DEPARTMENTS ASSISTED	35	2	16	0
PRISONERS PROCESSED THROUGH JAIL	7	4	7	1
PRIVATE INDIVIDUALS ASSISTED	12	3	18	0
PROPERTY LOST OR FOUND	18	0	27	0
RECORDS INQUIRIES	65	0	60	0
REPORTS PROCESSED THROUGH RECORDS	229	56	238	43
STREET LIGHTS OUT REPORTED TO ELECTRICAL	230	20	117	0
TRAFFIC SAFETY MEETINGS (APRIL ATTENDANCE 185)	11	0	5	0

TOTAL 1047 139 886 84

MONTHLY REPORT
RICHLAND POLICE DEPARTMENT
(RICHLAND-NORTH RICHLAND)

APRIL 1955

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART I								
1. Criminal Homicide	-	1	-	-	-	-	1**	-
a. Murder & Non-Neg. Mans.	7	1	-	-	1	-	3	1
b. Mans. by Negligence	13	-	-	-	3	-	1	-
2. Rape	-	2	-	-	-	2	-	-
3. Robbery	-	4	-	-	4	2	5	1
4. Aggravated Assault	-	-	-	-	-	-	-	-
5. Burg.-Break. & Entry	-	-	-	-	-	-	-	-
6. Larceny Over \$50.00	-	-	-	-	-	-	-	-
Under \$50.00	-	-	-	-	-	-	-	-
7. Auto Theft	20	4	-	-	-	-	-	-
TOTAL PART I CASES								
PART II								
8. Other Assaults	-	-	-	-	-	-	-	-
9. Forgery & Counterfeit	1	-	-	-	-	-	-	-
10. Embezzlement & Fraud	4	-	-	-	1	-	1	-
11. Stolen Prop:Buy:Receive	-	-	-	-	-	-	-	-
12. Weapons:Carry:Possessing	-	-	-	-	-	-	-	-
13. Prostitution	-	-	-	-	-	-	-	-
14. Sex Offenses	1	2	-	-	-	-	-	2
15. Offenses Ag. Fam. & Child	1	-	-	-	1	-	-	-
16. Narcotics	-	-	-	-	-	-	-	-
17. Liquor Laws	-	-	-	-	-	-	-	-
18. Drunkenness	4	-	-	-	2	-	2	-
19. Disorderly Conduct	-	-	-	-	-	-	-	-
20. Vagrancy	-	-	-	-	-	-	-	-
21. Gambling	-	-	-	-	-	-	-	-
22. Drunk Driving	1	2	-	-	-	-	1	2
23. Viol. Road & Driving Laws:								
Speeding	20	6	-	-	5	4	15	2
Stop Sign	23	3	-	-	5	2	18	1
Reckless Driving	3	-	-	-	-	-	3	-

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
Right of Way	5	-	-	-	1	-	4	-
Negligent Driving	11	4	-	-	-	-	11	4
Defective Equipment	17	8	-	-	14	8	3	-
Illegal Passing	1	6	-	-	-	3	1	3
24. Parking	15	-	-	-	12	-	3	-
25. All Other Traffic Violations	29	4	-	-	23	1	6	3
26. All Other Offenses:								
Malicious Mischief	2	1	-	-	1	1	-	-
Vandalism	11	1	-	-	2	-	-	-
Assist to Outside Agency	1	-	-	-	-	-	1	-
Prowler	1	-	-	-	-	-	-	-
Molesting	1	-	-	-	-	-	-	-
Disturbance	-	1	-	-	-	1	-	-
Illegal Shooting	1	-	-	-	1	-	-	-
27. Suspicion	2	-	-	-	1	-	-	-
TOTAL PART II CASES	155	38	-	-	69	20	69	17
PART III								
28. Missing Persons	3	-	-	-	3	-	-	-
Lost Persons	20	-	-	-	20	-	-	-
Lost Animals	8	-	-	-	3	-	-	-
Lost Property	34	1	-	-	19	-	7	-
29. Found Persons	-	-	-	-	-	-	-	-
Found Property	32	-	-	-	30	-	-	-
Found Animals	-	-	-	-	-	-	-	-
TOTAL PART III CASES	97	1	-	-	75	-	-	-

OFFENSES

	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.

PART IV

30. Fat. M.V. Traff. Accid.								
31. Pers. Inj. M.V. Traff. Accid.	3	-						
32. Prop. Dam. M.V. Accid.	13	-						
33. Other Traffic Accid.	-	-						
34. Public Accidents)								
35. Home Accidents)								
36. Occupational Accidents)								
37. Firearms Accidents		No Accurate Statistics Kept						
38. Dog Bites	-	-						
39. Suicides	2	-						
40. Suicide Attempts	2	-						
41. Sud. Death & Bod. Found	1	-						
42. Sick Cared For	-	-						
43. Mental Cases	-	-						
TOTAL PART IV CASES	21	-						

COMPOSITE TOTALS

PART I, II, III, IV CASES	293	43	-	-	148	22	74	18
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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. ** One Burglary cleared arrest for previous month.

Property reported stolen	Richland	\$4,418.32
Property reported stolen	No. Rich.	\$ 180.00
Property recovered	Richland	\$3,458.87
Property recovered	No. Rich.	\$ 180.00

MONTHLY REPORT		RICHLAND POLICE DEPARTMENT					JUVENILES INVOLVED					APRIL
OFFENSES	NO. CASES	JUVENILES	SEX	8	9	11	12	13	14	15	17	
<u>RICHLAND</u>												
Public Intoxication	1	2	M						1		1	
Larceny	3	4	M		1	1	1			1		
		3	F	1					2			
Mischief	1	3	M			1		1		1		
TOTALS	5	12		1	1	2	1	1	3	2	1	

NORTH RICHLAND

Mischief	1	2	M					1		1	
TOTALS	1	2						1		1	

RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
APRIL 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.	
	2	2	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
DEFECTIVE EQUIPMENT	2	2	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
INVALID VEHICLE LICENSE	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
NO DRIVERS LICENSE	8	2	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
NO CERT. OF REGISTRATION	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
INATTENTION TO DRIVING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
NEGLIGENT DRIVING	7	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
NEG DRVG, LIQ INV	7	5	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
RECKLESS DRIVING	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
RECK DRVG, LIQUOR INVOLVED	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
DRUNK DRIVING	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
SPEEDING	17	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ILLEGAL PASSING	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ILLEGAL PARKING	5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
STOP SIGN	19	7	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
DRVG WHILE LIC REVOKED	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
FAIL. TO YIELD RIGHT OF WAY	5	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
FOLLOWING TOO CLOSE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PERM. CHILD TO OP. M/VEH	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
LARCENY BY CHECK	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PETIT LARCENY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
GRAND LARCENY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
THIRD DEGREE ASSAULT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PUBLIC NUISANCE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PUBLIC INTOXICATION	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
VAGRANCY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
TOTALS	96	40	34	11	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1 GRAND LARCENY - BOUND OVER TO SUPERIOR COURT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1 DRVG W/LIC REV - BOUND OVER TO SUPERIOR COURT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1 STOP SIGN - JUDGE HELD LIC 2 WEEKS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1 INATTENTION TO DRVG - JUDGE HELD LIC 4 WEEKS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2 RECK DRVG - LIC SUSP 90 DAYS	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
1 RECK DRVG - DRVG PRIV SUSP 60 DAYS-FILED NOTICE OF APPEAL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1 RECK DRVG - LIC SUSP 30 DAYS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1 RECK DRVG, LIQ INV - DRVG PRIV SUSP 6 MONTHS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
TOTALS	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	
	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	
	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	
	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	
	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	
	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	
	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	
	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	
	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	
	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	
	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	
	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50													

RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
APRIL 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																									
NO DRIVERS LICENSE	4	2			1																					
ALLOW. UNAUTHORIZED PERSON TO USE DRIVERS LICENSE	1																									
NEG DRVG, LIQUOR INVOLVED	3	2			1																					
RECKLESS DRIVING	2	1																								
DRUNK DRIVING	2	2																								
SPEEDING	4	2			2																					
ILLEGAL PASSING	3	1			1																					
STOP SIGN	1																									
FOLLOWING TOO CLOSE																										
TOTALS	23	10			6																					

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT
COMMERCIAL SECTION
April, 1955

PERSONNEL - COMMERCIAL & RESIDENTIAL PROPERTY UNIT:

	<u>April</u>	
	<u>Exempt</u>	<u>Non-Exempt</u>
Beginning of Month	8	26
End of Month	8	25
Net Change	0	-1

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	<u>Commercial</u>		<u>Noncommercial</u>		<u>Total</u>	
	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>
March	1,651	81	120	0	1,771	81
April	<u>1,653</u>	<u>64</u>	<u>120</u>	<u>0</u>	<u>1,773</u>	<u>64</u>
Net Change	/2	-17	0	0	/2	-17

SUMMARY OF ROUTINE ITEMS PROCESSED:

	<u>Commercial</u>		<u>Non-Commercial</u>		<u>Total</u>	
	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>
Work Orders	36	0	2	0	38	0
Back Charges	1	0	0	0	1	0
FY Work Orders	964	354	41	0	1005	354
FY Back Charges	41	1	4	0	45	1
						46

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Leases:

- a. Tide Water Associated Oil Company #2 - a ground lease covering the construction and operation of an automotive service station to be located at the northwest corner of Lee Boulevard and Goethals Drive.
- b. Tide Water Associated Oil Company #3 - a ground lease covering the construction and operation of an automotive service station to be located on George Washington Way south of Newton Street.

2. Supplemental Agreements:

- a. Willard W. Parker - to provide for a new rental schedule and separate payments for utilities and services furnished by General Electric Company in accordance with the recent renegotiation of the lease.
- b. Davis Furniture Company - to provide for a new rent, separate payments for utilities and services, and incorporation of additional required lease articles in accordance with the recent renegotiation.
- c. Colin Bleiler - to provide for the operation of the "B & R" Super Service in North Richland until not later than April 30, 1955.
- d. Food Lines, Inc. - to provide for the operation of the North Richland Facility until not later than April 30, 1955.

3. Business Development:

- a. Invitations to Bid were mailed to eight prospective lessees in connection with leasing the government-owned building located at 89 Lee Boulevard. Two Bids were received and these were opened and read April 20, 1955.
- b. Invitations to Bid were mailed to twenty-five prospective Lessees in connection with establishing trailer court facilities on two plots of land. Site 1, containing approximately 15 acres, is located at the intersection of Stevens Drive and the By-Pass Highway and Site 2, containing 14½ acres, is located at the southeast corner of Stevens Drive and Spengler Road. One Bid was received and it was opened and read on April 12, 1955.

GENERAL:

A. Commercial:

1. Colin Bleiler started construction of his service station building to be located at the southeast corner of Lee Boulevard and Wellsian Way.
2. The following North Richland Commercial Facility Leases were terminated and the respective operations ceased as of midnight April 30, 1955:
 - a. Food Lines, Inc.
 - b. Colin Bleiler d/b/a "B & R" Super Service
 - c. Richland Trailer Coach Supply Incorporated
3. Work was commenced on the addition to the W. D. Gray Building in the Downtown Business District.
4. Work was commenced on the construction of a swimming pool at the Desert Inn Hotel.
5. Building 20, formerly occupied by the North Richland Tavern and Building 2, formerly occupied by Nationwide Food Service, Inc. were transferred to the U.S. Army.

B. Non-Commercial:

1. The deed for the land formerly leased by the All Saints Episcopal Church was turned to the Church April 27, 1955.
2. North Richland Lutheran Church Building was sold to the U. S. Army.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland.

Tavern Operation
Service Station

Mobile Snack Bar
Warehouse

April, 1955

A. Commercial:

Ggc-4

COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

April, 1955

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

B. Noncommercial:

	<u>MARCH</u>		<u>APRIL</u>	
	North		North	
	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>
1. Government-owned Buildings				
a. Churches	1		1	1
b. Clubs and Organizations	5		5	5
c. Government Agencies	2		2	2
Total	8		8	8
2. Privately-owned Buildings				
a. Completed and in Use	10	1	10	11
b. Under Construction	6	0	6	6
Total	16	1	16	17
3. Church Plots and Buildings in Private Ownership	3		4	4
4. Pasture Land Permits	103		103	103

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of March 31, 1955	Orders issued 3-31 to 4-30	Total orders Incomplete as of April 30, 1955
Service orders	509	2134	601
Work orders	1050	444	689
Service charges		205	

Principal work order loads

	Incomplete as of March 31, 1955	Incomplete as of April 30, 1955
Laundry tub replacement	11	19
Tileboard bathroom	32	24
Kitchen floor linoleum	102	98
Kitchen cabinet linoleum	130	62
Shower stall	23	14

114 alteration permits were issued, as compared to 157 issued in March.

Install fence	11	Install TV antenna	17
Install automatic dryer	25	Install automatic washer	18
Install patio	5	Install air conditioner	5
Install exhaust fan	2	Install back door	4
Install basement partitions	1	Install electrical heat	3
Remove cabinets	2	Convert to oil	1
Install fireplace	1	Install tile	1
Build tool shed	2	Install additional wiring	3
Install porch lite	2	Basement excavation	1
Remove partition	1	Remove laundry trays	2
Install driveway	1	Install soft water system	1
Install door window	1	Install dishwasher	1
Install garbage disposal	1	Install partition in kitchen	1
Install walkway	1		

1203 inspections were made, as compared to 1142 in March.

Alteration permits	101	Basement	7
Bathroom	15	Ceiling	7
Doors	17	Fill	6
Floors	17	Laundry trays	24
Linoleum	77	Lot lines	217
Paint	103	Porch	3
Range and refer recall	26	Steps and walks	22
Sink	8	Toilet seats	12
Trees	38	Walls	11
Windows	2	Yard	2
Renovation rechecks	42	Dormitories	195
Miscellaneous	14	Cancellations	78
Renovations	84	Shows (new tenants)	75

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

<u>Merchandise Issued</u>	<u>Total Amount</u>
Shades	774
Reflectors	33
Ice trays	13
Hydrator glasses	6
Drip trays	15
Meat tenders	5
Refer parts	3
Range parts	3
Grass seed, lbs.	25
Door stops	24
Caulking compound	11
Furniture recall	22
Furniture delivery	16

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS -- MONTH OF APRIL

	<u>DELIVERY</u>		<u>RECALLED</u>	
	<u>REFERS</u>	<u>RANGES</u>	<u>REFERS</u>	<u>RANGES</u>
A	2	4	4	4
B	4	3	6	4
F	0	0	1	3
H	0	1	3	2
R	0	1	0	0
U	1	0	2	1
V	0	0	1	1
Y	2	4	1	1
1Br.				
2Br.	6	4	7	1
3Br.	1	1	2	4
Apt.	0	2	1	2
Total	16	20	28	23

IN WAREHOUSE:

17 TA refers 7'
 3 GE refers 8'
 1 GM refer 6'
 1 GM refer 7'
 21 SC ranges
 9 GE ranges
 1 Hot point range
 1 GM range

RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING 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	2225	255	10	394	857	1127	10	54	61	206	35	5234
Comm. Fac.	96	18		26	56	52		6	4	9	2	269
AEC	64	29		19	49	18		3	4	10	3	199
Other Gov't	12	2			3	3						20
Post Office	6				2	8					3	19
Schools	65	1		6	11	44			1	1		129
Comm. Activities	11			2	6	5					1	25
Med. Facilities	4	17			3	2				3		29
Kaiser Eng.	2	6			4	1						13
J. A. Jones	3	3			2							8
Blaw-Knox		2			1							3
Minor Const.					1	1						2
Not Certified	1				1						1	3
Total	2489	333	10	447	996	1261	10	63	70	229	45	5953
Ready to Rent	2					6		1				9
In Renovation	9			3	4	9				1	1	27
Total	2500	333	10	450	1000	1276	10	64	70	230	46	5989

	Begin Month	Moved In	Moved Out	End of Month	Diff.
Conventional Type	2493	+15	-19	2489	-4
A&J Type	333	+1	-1	333	
"T" Type	10			10	
Precut Type	449	+8	-10	447	-2
Ranch Type	998	+7	-9	996	-2
Prefab Type	1257	+37	-33	1261	+4
Dorm Apts.	9	+1		10	+1
A&J Apts.	63	+4	-4	63	
2BR Apts.	69	+3	-2	70	+1
Fourth Housing	230	+1	-2	229	-1
Tracts	46		-1	45	-1
Total	5957	+77	-81	5953	-4

COMMERCIAL & RESIDENTIAL PROPERTY UNIT
RESIDENTIAL LEASES

APRIL 1955

DORMITORY REPORT

Dormitories:

	<u>Beds available</u>	<u>Vacant beds</u>	<u>Occupied beds</u>
Men	477	45	432
Women	381*	100**	281*
Total	858*	145**	713*

*This includes 2 beds used for Dorm offices
**This includes 13 beds vacant in Dorm M-13

Waiting Lists

	Single Rooms	Double Rooms
Men	0	0
Women	0	0

The following Dormitories are in stand-by condition:

W 21	50 beds	W 15	50 beds
W 17	50 beds	M 7	39 beds
W 16	50 beds		

Total beds 239

RESIDENTIAL LEASING

CANCELLATIONS

Voluntary terminations	15
R.O.F.	1
Discharge	0
Transfers	7
Retirement	3
Move off project	22
Divorce	0
Death	1
Move to Wherry house	1
Military Service	4
TOTAL	54

ALLOCATIONS

Houses allocated to new tenants	45
Exchanged houses	14
Moves (within Richland)	26
Turnovers (divorce, death, schools)	3
Wherry house move to GE house	1
Total leases signed	97
Total cancellations	89
Houses assigned "As Is"	30
Houses sent to "Renovation"	46
Applications pending	486

COMMUNITY SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT

April 1955

<u>Organization and Personnel</u>	<u>Exempt</u>	<u>Non-Exempt</u>
Employees beginning of Month	66	0
Transfers In	1	0
Transfers Out	4	0
Terminations	0	0
New Hires	0	0
End of Month	63	0

<u>Fire Protection</u>	<u>Richland</u>	<u>North Richland</u>
Fire Loss (Estimated): Government	\$ 60.00	\$ 0.00
Personal	50.00*	750.00
April Total	\$ 110.00*	\$750.00
Year's Total	893.85*	1480.00

*Does not include April 30, fire damage at Johnny's Minute Man Service Station on which estimate is pending.

Response to Fire Alarms	23	16
Investigation of Minor Fires and Incidents	0	0
Ambulance Responses	25	0
Inside Schools or Drills	17	5
Outside Drills	6	15
Safety Meetings	8	2
Security Meetings	4	2
Fire Alarm Boxes Tested	210	116

In spite of adverse weather, which delayed the residential inspection program, fire companies completed 662 residential hazard inspections during the month of April. Approximately 40-per cent more attempts to make inspections were made and reports turned in marked "No Answer."

Fire apparatus standby for an incoming aircraft was made April 5, at the A.E.C. Airport.

Twenty Cub Scouts were conducted on a tour of the Central Fire Station on April 13.

Monthly Report - continued

The night of April 22, the Fire Department provided emergency flood lighting for Telephone Unit repairmen attempting to make repairs on the major cable break at Williams and Goethals.

Shortly before midnight on April 24, the Richland Fire Department responded with a tank truck to assist the Kennewick Fire Department on a service station fire which threatened other buildings at the Richland "Y".

Fire Marshal's Monthly Report

A total of 250 Richland and 13 North Richland buildings were inspected, resulting in 83 hazard reports being submitted. A total of 444 fire extinguishers were inspected; 33 serviced; 5 installed, and 2 removed. Seven fire hose yard boxes and 15 fire hose standpipes were inspected. Post fire inspections, totaled 3.

Lectured to 75 employees of Project Engineering Section on Home Fire Safety.

Assisted Washington State Surveying and Rating engineer with inspection of four new major buildings nearing completion.

Assisted representative of the Pittsburgh Paint and Plate Glass Company in organizing a demonstration and lecture of fire retardant paints to be conducted May 25, at Central Fire Station and provided names of interested people to receive invitations.

Assistant Fire Marshal completed on-the-job training of each Home Fire Inspector.

Conducted series of meetings and initiated preliminary planning for improvements in Sprinkler and Fire Alarm Systems in Kadlec Hospital, two schools and a church.

Surveyed new High School Science Building for needed fire extinguishers and arranged for their procurement and installation.

Caused architectural change in lighting fixtures at the new Catholic Church to eliminate a potential fire hazard.

Followed up complaints of fire hazards from three residents and requested correction by Maintenance.

Surveyed the old Safeway Building for hazards and unsafe conditions prior to building being used for a public auction.

COMMUNITY OPERATIONS-SUB SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
APRIL 1955

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	<u>5</u>	<u>16</u>
Transfers In	<u> </u>	<u> </u>
Transfers Out	<u> </u>	<u>1</u>
Terminations	<u> </u>	<u> </u>
Total End of Month	<u>5</u>	<u>15</u>

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set	<u>20</u>
Anchors set and guys installed	<u>3</u>
Street lights repaired and steel mast arms installed	<u>4</u>
Street lights relamped - mercury vapor	<u>5</u>
Street lights relamped - 6000L and 4000L, 1100 Area	<u>118</u>
Street lights relamped - 6000L and 4000L, 700 Area	<u>7</u>
Flood lights relamped, 1100 Area	<u>2</u>
Flood lights relamped, 700 Area	<u>0</u>
Stack lights relamped, 700 Area	<u>2</u>
Primary line footage added	<u>400'</u>
Primary line footage removed	<u>0</u>
Transformer KVA added	<u>47</u>
Transformer KVA removed	<u>152</u>
Net transformer KVA installed	<u>320</u>
New Services installed - residential	<u>0</u>
New services installed - commercial	<u>3</u>
TV residential services removed	<u>4</u>
Temporary services installed and removed	<u>2</u>
Scheduled outages - primary	<u>5</u>
Scheduled outages - secondary	<u>7</u>
Unscheduled outages - primary	<u>1</u>
Unscheduled outages - secondary	<u>0</u>
Standby and escort	<u>2</u>
High voltage tree trimming	<u>11</u>
Low voltage tree trimming	<u>41</u>

TRAFFIC SIGNALS

Relamping	<u>3</u>
Operational failures	<u>2</u>
Installations	<u>0</u>
Removals	<u>0</u>

RICHLAND ELECTRICAL UNIT

Routine maintenance checks	<u>61</u>
Routine check R. R. signal at Van Giesen	<u>4</u>
Total signals in operation - automatic	<u>19</u>
Total signals in operation - manual auxiliary	<u>3</u>
Total signals in operation - flasher	<u>3</u>

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	<u>15</u>
Electrical motors checked and serviced - water	<u>39</u>
Electrical motors checked and serviced - sewage	<u>45</u>

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	<u>2</u>
Outside circuit checks	<u>4</u>
Inside faults repaired	<u>0</u>
Outside faults repaired	<u>4</u>
New circuits placed in operation	<u>0</u>
New boxes placed in operation	<u>0</u>

SUBSTATIONS

Main feeder and tie breaker checks - Thayer Drive	<u>4</u>
Main feeder and tie breaker checks - Stevens Drive	<u>4</u>
Secondary and pad located stations - checked jumpers, cutouts, grounds and general condition	<u>26</u>

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	<u>16</u>
Meters tested - customer's requests	<u>3</u>
New meters shop tested	<u>5</u>
Faulty meters replaced or repaired	<u>2</u>
Damaged meters and covers	<u>2</u>
Residential read-ins	<u>172</u>
Residential read-outs	<u>214</u>
Residential disconnects	<u>18</u>
Residential reconnects	<u>18</u>
Meters resealed	<u>8</u>
Radio interference checks	<u>3</u>
Overloaded meters changed out	<u>5</u>
Routine meter tests	<u>28</u>

Consumption and Revenue:	<u>No. of Meters</u>	<u>KWH</u>	<u>Revenue</u>
Residential - Shedule 1	<u>6983</u>	<u>5,859,187</u>	<u>\$57,936.38</u>
Commercial - Schedule 2	<u>402</u>	<u>3,231,330</u>	<u>\$26,834.90</u>
Total	<u>7385</u>	<u>9,090,517</u>	<u>\$84,771.28</u>

RICHLAND ELECTRICAL UNIT

COMMENTS

STREET LIGHTING:

Repaired underground street light wire cut by tenant of 642 Birch while digging for fence posts.
Replaced 4 rotted street light poles on Hunt Ave. between Symons and Thomas.
Replaced wood mast arm to light at Hunt and Sibert
Cleared equipment ground on # 200 street light circuit front of Desert Inn. This trouble also cleared troublesome electronic interference.
Replaced defective photo-cell control to # 500 street light circuit.
1171 transportation area - area lighting - the unit ladder truck spent 2 half days with transportation welders repairing broken mast arm fixtures caused by wind to recently completed area.
Accomplished usual routine relamping to street lights in Richland area.
Repaired faulty South Bend street light protective relay.
Repaired and tested oil to High Voltage street light oil switch.
Changed out 12-1500 W lamps to 90' pole in north end 1171 area.
Rewired bus lane mercury vapor lights to aerial wiring account underground defect.

TRAFFIC SIGNAL SYSTEM:

Made routine service check and adjustments to Van Giesen RR signal, weekly as scheduled.
Made routine service check and adjustments to all Richland traffic controllers.
Repaired dial contact to 1 signal, weekly as scheduled.

FIRE PROTECTION SYSTEM:

Made routine service checks and adjustments to fire alarm auxiliary circuits in dormitories monthly as required.
Fire alarm boxes 531 and 533 were found inoperative due to short-circuited line loop caused by someone throwing wire over line.
Central Fire Station took cell voltage readings on all battery banks - cleaned batteries and battery room.

WATER SYSTEM:

Reconditioned motors and other electrical equipment for use of irrigation stations 5 and 6 and 3, 4, and 1.
Overhauled 75 HP motor to domestic well - Duke well field.
Made routine checks and oiled all domestic well motor bearings.
Serviced River Pump motor and oil switch, changed out oil to high voltage starting switch as it was in bad shape.
Repaired defective outlet circuit at ditch tenders residence at Horn Rapids Dam.
Cleaned and checked rust arrester units at high water tanks.

SEWAGE TREATMENT AND DISPOSAL SYSTEM:

Checked and serviced motor bearings at Main Sewer. Made routine inspection and service checks to motors in all Sewer lift stations.

RICHLAND ELECTRICAL UNIT

OUTSIDE LINES AND STATIONS:

Transformer changes and additions: Installed 25 kva transformer in rear of 1428 Farrell Lane to provide additional capacity and cut over 4 services to the new transformer. Installed 3-50 kva transformers to feed new shopping center at Van Giesen and Wright. Replaced 25 kva with 37.5 kva rear of 801 Cedar, replaced 25 kva with 37.5 kva rear of 1103 Acacia, installed 5 kva and 37.5 kva at new service center at Williams and Goethals, replaced 25 kva with 37.5 kva rear of 408

Cottonwood, replaced 25 kva with 37.5 kva rear of 1408 Haupt, replaced 37.5 kva with 2 - 25 kva rear 413 G. W. Way, replaced 15 kva with 25 kva rear of 407 Benham, installed 25 kva transformer rear of 1425 Goethals to provide additional capacity.

Tested and serviced 10 transformers in Unit Shop.

Secondary services were handled as follows: 3 temporary service disconnects were made to permit customers to enlarge their inside wiring.

Disconnected 4 amplifier services to TV equipment as requested.

Connected permanent services to 2 commercial installations.

Extended 7200 volt primary 2 spans east of Burlin Road and installed 5 kva transformer to supply new ferry landing.

Installed new 7200 volt cutout switches to replace defective ones to switch 14 X 128 south of Lee and west of Wright.

Servicing and checking main power stations were made as follows:

Made routine weekly inspection of both 115 kv stations including feeders and cable pits.

Installed new bearings to guide rail device on breaker cubicles.

Metering - Exchanged 100 Roller Smith residential 15 amp meters with Sangamo which is superior and less subject to maintenance troubles. The 15 amp Sangamo meters were on hand due to substituting 50 amp meters on heavy heating loads. The inferior Roller Smith meters were excessed. The usual load checking was performed as needed.

ESCORT SERVICE:

Escort service was provided for Transportation to move unusual loads under lines on two occasions.

DELINQUENT BILLING DISCONNECTS:

Delinquent billing disconnects were made to 11 customers during month. All were subsequently reconnected.

UNSCHEDULED OUTAGE:

Unscheduled outage to transformer rear of 82 Van Giesen due to blown fuse at 8:40 am.

CALLOUTS:

Three call-outs were necessary during the month as follows:

April 14th 1 man called out to reconnect customer, who was disconnected due to an accounting error.

April 15th 1 man called out to repair service damaged by tenant falling tree.

April 10th 2 men called out to repair broken fire alarm wire at Swett and Stevens.

COMMUNITY OPERATIONS SUB-SECTION
ENGINEERING UNIT
MONTHLY REPORT
APRIL 1955

<u>PERSONNEL:</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Employees Beginning of Month	7	4	11
Transfers Out	0	0	0
Transfers In	0	0	0
Terminations	0	0	0
Total End of Month	7	4	11

BUILDING PERMITS ISSUED IN APRIL

1. R. E. Claunch - Wood Frame Shed - 305 Thayer Drive
2. G. C. Fullmer - Garage - 648 Cottonwood Drive
3. Mrs. J. W. Sadler - Garage - 303 Geo. Wash. Way
4. Hugh Raymond - Roof structure over patio - 2004 Turner
5. J. MacGregor - Wood frame building - 714 Stanton
6. Floyd Hawver - Wood frame shed - 706 Stanton
7. 3 sign permits

NEW MUNICIPAL CONSTRUCTION STARTED IN APRIL

Water Service to Property at Lee Blvd. & Wellsian Way

NEW PRIVATE CONSTRUCTION STARTED IN APRIL

Desert Inn Swimming Pool

R. E. Claunch - Wood Frame Shed - 305 Thayer Drive

G. C. Fullmer - Garage - 648 Cottonwood Drive

Mrs. J. W. Sadler - Garage - 303 Geo. Wash. Way

Hugh Raymond - Roof structure over patio - 2004 Turner

J. MacGregor - Wood frame building - 714 Stanton

Floyd Hawver - Wood frame shed - 706 Stanton

PRIVATE CONSTRUCTION COMPLETED IN APRIL, OR ON WHICH FINAL INSPECTION MADE

NONE

ENGINEERING JOBS COMPLETED IN APRIL

C-1839 - Survey Coal Stockpile

G-01008 -- 6" Water Line, Williams & Goethals

G-03570 - Replace Raw Water Line #5 to Lee Blvd.

ENGINEERING JOBS COMPLETED IN APRIL (Cont.)

- C-11459 - All Saints Episcopal Church (Flat #19 Recheck)
- C-70591 - Legal Description Flot West of By's Burgers
- C-70667 - Murphy Motors, Inc. (Legal Description)
- C-89597 - Review "As Built" Plans for Utoco Service Station - Lee and Duane -
(E. H. Kidwell)

STATUS OF ENGINEERING UNIT PROJECTS

- G-01009 - Knight Street Improvement - Ready for contract.
- G-01010 - Extension Torbett West of Perkins Avenue - Ready for contract.
- G-01012 - Boise Street Extension - Ready for contract.
- G-01015 - Water Service to Commercial Users (7 locations) - 90% complete.
- G-01016 - Water Service to Property at Lee Blvd. & Wellsian Way.
- G-02171 - Automatic Bar Screens Sewage Lift Station - Bid opening April 6,
1955. Award made. Construction not started.
- G-02176 - Comfort Station, Sewage Lift Station - Chlorination Station, River-
side Park - Bids opened 4-25-55. No award to date.

STATUS OF ACTIVE ENGINEERING SERVICE REQUESTS

- I-90914 - Utility Lines, Legal Descriptions and Diagrams for Churches -
85% complete.
- I-91014 - Retirement of Separate Irrigation System - Design 80% complete.
- I-91024 - Retirement of Irrigation Canal - Storm sewer design 60% complete.
- C-0554 - Expansion of Riverside Park North of Lee Boulevard - Project proposal
submitted to A.E.C.
- C-0559 - Park Area North of Newton - Project approved, in part, by A.E.C.
- C-0561 - Street Improvement (FY 1954) Van Giesen Street from Geo. Wash. Way,
East to Hunt Avenue - Project proposal submitted to A.E.C.
- C-11457 - Plat and Legal Description, American Red Cross - 90% complete.
- C-11460 - Plat and Legal Description Christian Science Society - 85% complete.
- C-11461 - Revise Legal Description of 11 Churches - 80% complete.
- C-11462 - Richland Post Office (Plat and Legal Description) - 10% complete.

STATUS OF ACTIVE ENGINEERING SERVICE REQUESTS (Cont.)

C-81020 - "As Builts" - Phase III - 42% complete.

C-89598 - Legal Description for Ferry Landing Site - 95% complete.

C-95450 - Replace Lot Line Corner Stakes - an open active file.

BUILDINGS UNDER CONSTRUCTION

Assembly of God Church - 99% complete. No progress this month.

First Baptist Church (Richmond and Raleigh Sts.) - 92% complete. No progress this month.

All Saints Episcopal Church (Kimball & Symons St.) 95% complete.

Alteration Permits - an open active file.

Television Antennae - an open active file. No permits being issued.

Plans, Specs., Inspections, Church of Nazarene Addition - 95% complete. Work progressing slowly. Building occupied.

Plans, Specs., Inspections, Christ of King Parish (Catholic) - 92% complete. Work progressing slowly. Portion of building occupied.

Plans, Specs., Inspections, Thorsness Service Station and Drive In, SE Corner of Goethals and Williams - 99% complete. Final inspection to be made.

Plans, Specs., Inspections, Uptown Thrifty Drug Store Rehabilitation - 99% complete. Final inspection to be made.

Addition to Uptown Thrifty Drug Store - 80% complete.

COMMUNITY OPERATIONS SUB-SECTION
PUBLIC WORKS & RECREATION UNIT
MONTHLY REPORT
APRIL 1955

<u>ORGANIZATION AND PERSONNEL</u>	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	7	41
Transfers Out	0	4
Transfers In	0	4
New Employees	0	3
Terminations	0	2
Total End of Month	7	42

ROADS AND STREETS

Patching of checks and holes in the By-Pass Highway through application of hot oil and rock was completed this month to prepare the surfacing for a seal-coat treatment which will be applied in early June.

Approximately 90 lineal feet of pavement was replaced in the 1200 block on Benham, and the parking lot drive adjacent to 1205 Benham was repaired concurrently.

A new centrifugal 350 g.p.m. pump was installed on the street flusher to provide 50 psi at the two flushing nozzles. Tests have indicated the pump performs satisfactorily.

All cuts made in street pavement during the winter for water and sewer line installation and repair have been re-surfaced.

Hauling of top-soil to former sites of pre-fabs, and grading of the sites has been completed for the Renovations and Maintenance Unit.

Approximately 600 tons of pre-mix asphaltic surfacing and 3300 cubic yards of crushed rock were added to the materials stock-pile. During the month 160 tons of pre-mix and 30 cubic yards of rock were used.

Blading of all Class C roads is now in process.

Routine seasonal maintenance of streets, drainage systems and street marker signs was continued.

SANITATION

Collection of garbage and trash was continued according to schedule and total weight of waste material collected and disposed of was 1191 tons.

PUBLIC WORKS AND RECREATION UNIT

PARKS AND PUBLIC GROUNDS

Public Rest Rooms were opened at Riverside Park and Columbia Playfield on April 7, 1955, and at Memorial Softball Field on April 26, 1955.

Distribution of hoses and sprinklers to all assigned areas using this type of irrigation has been completed.

Irrigation and mowing of lawn grass areas was started on April 18, 1955.

Irrigation of Shelterbelts was started on April 15, 1955.

Sharpening and repair of lawn mowers was started on a two days per week basis on April 4, 1955.

Distribution of all parks furniture to the various park areas was completed in April.

Responsibility for performance of Mosquito Control functions in Richland was assigned to this unit on April 11, 1955. All necessary burning of ditches, swamps and water holes has been completed, and spraying of larvae will begin as soon as field inspections indicate a need.

Routine maintenance of parks buildings, equipment and grounds was continued.

RECREATION

General

A children's Easter party was staged at the Community House on April 7, 1955 through the co-operative efforts of the Marine Corps Auxiliary and this unit.

The annual concert of the Minnesingers, a boys choral group sponsored by this unit, was held at Chief Joseph Auditorium on April 9, 1955.

A presentation of awards at a Boy Scout Court of Honor was held at Community House on April 14, 1955 with approximately 450 in attendance.

The Hi-Spot Semi-Formal Spring Dance was held at Community House on April 22, 1955.

The softball season was opened at Memorial Field on April 27, 1955 with an exhibition game between King and His Court and Richland Softball Association All-Star Team.

Wellsian Lake was opened for Juvenile Fishing on April 17, 1955. The lake had been stocked with 2400 rainbow trout by the Washington State Fish and Game Department, and the Richland Rod and Gun Club had placed several large bass and trout.

PUBLIC WORKS AND RECREATION UNIT

ATTENDANCE STATISTICS - April 1955

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub Total</u>
<u>A. Community House</u>				
American Legion Jr. Baseball	2	45	16	61
American Red Cross	1		150	150
Boy Scouts	2	125	110	235
Boys of Woodcraft	2	45	25	70
Campfire Girls	1	152	30	182
City Council	2		54	54
Fencing	2		10	10
Games	23	1 474	352	1 826
Gardenaires	1		60	60
Gentrics	1		35	35
Girl Scout Leaders	1		18	18
Hi-Spot	9	2 901	51	2 952
International Folk Dancers	4	3	35	38
Jewish Congregation	1		200	200
Jr. Chamber Rodeo Tests	2	38	7	45
Lake Shore League	1		5	5
Little League Meeting	2	20	32	52
Marine Corps League Auxiliary	1	45	12	57
Minnesingers	2	142	7	149
National Little League	1		10	10
Orthopedic Guild	1		70	70
Pony League	2		55	55
Rainbow Girls	6	154	18	172
Rec-A-Teers	3		208	208
Richland Police Meetings	4		54	54
Richland Softball Meeting	1		17	17
Richland Youth Council	1		5	5
Richland Women's Club	1		25	25
Sewing Classes	19		172	172
Social Security	2		81	81
Stamp Clubs	2	8	17	25
T.B. Association	1		2	2
Umpires' Association	4		78	78
Washington State Music Tryouts	2	48	108	156
Y.W.C.A.	1		37	37
Y Supper Club	2		28	28
Total Community House	113	5 200	2 194	7 394

PUBLIC WORKS AND RECREATION UNIT

Attendance Statistics - April 1955 (Continued)

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Spectators</u>	<u>Sub Total</u>
B. <u>Parks and Play Grounds</u>					
Columbia Playfield					
High School P.E. Classes	130	7 800			7 800
Wellsian Lake	21	1 260		250	1 510
All Playgrounds	360	10 800	500		11 300
Practice Field Bookings	226	3 800	268		4 068
Memorial Softball Field	1		40	500	540
Jefferson Little League	1	60	200	300	560
C. <u>Summary</u>					
Community House and Parks and Play Grounds total for April 1955	<u>852</u>	<u>28 920</u>	<u>3 202</u>	<u>1 050</u>	<u>33 172</u>
Calendar Year to Date					<u><u>72 237</u></u>

COMMUNITY OPERATIONS SUB-SECTION
WATER AND SEWERAGE UTILITIES UNIT
MONTHLY REPORT
APRIL 1955

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	5	18
Transfers Out	0	0
Transfers In	0	1
New Employees	0	2
Terminations	0	0
Total End of Month	5	21

DOMESTIC WATER

Normal operations were continued throughout the month.

Overhaul work on 1100-8 well was completed and the pump returned to service on 4-8-55. 3000-J well pump is out of service awaiting delivery of spare parts to complete overhaul. 3000-L well pump is still in the process of being tested at the Fairbanks Morse Laboratory.

The underground water table has been built up in the 3000 area well field sufficiently to permit all wells to be operated at full capacity.

Recharge water was turned into the Richland well field on April 8 and the underground water table has been built up to normal elevation in this area.

DOMESTIC WATER DATA

	<u>Well Production</u>	<u>Av. Da. Prod.</u>	<u>Total Consumpt.</u>	<u>Av. Da. Cons.</u>
Richland	108,130,000	3,604,300	280,242,000	9,341,000
North Richland	179,050,000	5,968,300	33,111,000	1,103,000
Columbia Field	77,028,500	2,587,600		
300 Area			51,118,000	1,703,000
TOTALS	364,208,500	12,140,200	364,471,000	12,147,000

Maximum daily production, 16,178,400 gallons on April 6.

Maximum daily consumption, 16,704,600 gallons on April 30.

WATER AND SEWERAGE UTILITIES UNIT

SEWERAGE SYSTEM

Operations were abnormal throughout the month, with the No. 1 Sewage Treatment Plant bypassed due to the distributor arm on the biofilter being out of service for repairs. Some difficulty was encountered in getting delivery on the necessary repair parts. The necessary shut down of equipment because of this delay was used advantageously to drain, inspect, and maintain all units of equipment in the No. 1 plant. The necessary repair parts for the biofilter distributor were received, installed, and the plant was returned to normal operation on April 28.

Approximately 45,000 gallons of sludge was pumped to the drying beds during the month.

SEWAGE DATA

Plant No. 1	Total Flow	10,210,000	Average Daily Flow	340,300
Plant No. 2		77,160,000		2,572,000
TOTAL		87,370,000		2,912,300

IRRIGATION CANAL

On the first of April, an inspection of the wood stave penstock that carries water from the main canal to the 3000 Area was made. This inspection made by AEC personnel with assistance from the GE Community Section, revealed several locations on the inside of the penstock were in need of repair. A few excavations were made at corresponding locations on the outside of the pipe to assist in determining the extent of repairs that would be necessary. These excavations revealed some deterioration on the outside of the pipe but did not necessarily correspond to that on the inside of the pipe. Further inspection of the inside of the pipe was made by this section when entering the pipe to make repairs. The inspection revealed considerably more deterioration than had been found on the previous inspection. Repairs were made to inside of pipe by covering deteriorated sections with sheet metal. One major leak in the penstock was repaired with a concrete encasement during the month.

Water was turned thru the main canal into the Richland recharge basin on April 8. Activation of the separate irrigation systems was commenced on April 19. All pumping stations were activated before the end of the month, but many sections of the system have been isolated awaiting repairs.

Considerable difficulty has been encountered due to leaks in the wooden pipe lines supplying water from the irrigation canal to pumping stations Nos. 1, 2, and 3. Stations No. 1 and No. 3 are out of service at present while repairs are being made to supply lines.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
April 1955

<u>ORGANIZATION AND PERSONNEL</u>	<u>EXEMPT</u>	<u>NON-EXEMPT</u>
Employees - Beginning of Month	4	9
Transfers In	0	0
Transfers Out	0	0
New Hires	0	0
Terminations	0	0
End of Month	4	9

GENERAL

Circulation

Books	16,844
Magazines	570
Pamphlets	50
Records	1,076
Inter-Library Loans	39
Grand Total	18,579

Current Book Stock

Books added this month	401
Books withdrawn this month	163
Grand Total	34,704

Registration

Adult	121
Juvenile	40
Grand Total	161
Total Registered Borrowers	19,203

Children's Story Hour Attendance	527 (437 Pre-Sch., 90 El.)
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Meetings in North Hall	12
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The "Freedom Agenda" Discussion Group jointly sponsored by the Richland Public Library as it's participation in the American Heritage Discussion Group Program, and the League of Women Voters, started Monday, April 4, with thirty-five registrations. The leaders for the discussion group are Mr. C. G. Stevenson, Head, G. E. Technical Information Unit and Mr. W. G. Allan, Adult Education Director, Richland Public Schools. The group will continue for six weekly sessions ending Monday, May 10, 1955.

Exhibits of art of Richland elementary school children have been in North Hall this month under the sponsorship of the Allied Arts Association.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT - APRIL 1955

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Increase</u>	<u>Decrease</u>
Staff	2	2		
Administration Area Maintenance	104	104 (a)		
Security and Patrol	479	477		2 (b)
Fire Protection	136	138	2 (c)	
Office Auxiliaries	119	118		1 (d)
Telephone	79	80	1 (e)	
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
TOTALS	919	919	3	3

(a) - Administration Area Maintenance

- 4 - New Hires
- 3 - Transferred out
- 1 - Deactivated

(b) - Security and Patrol

- 4 - New Hires
- 1 - Reactivated
- 5 - Transferred out
- 1 - Deactivated
- 1 - Termination

(c) - Fire Protection

- 2 - Transferred in
- 1 - Reactivated
- 1 - Transferred out

(d) - Office Auxiliaries

- 10- New Hires
- 8 - Transferred out
- 1 - Deactivated
- 2 - Terminations

(e) - Telephone

- 1 - New Hire

FIRE PROTECTION UNIT

Fire Responses

Construction	1
HAPC	3

TOTAL	4	LOSS:	Nil
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All of the above were false alarms caused by defect in alarm system.

Fire Extinguishers

Inspected	1,643
Installed	30
Tested	730
Delivered to new locations	10
Seals broken	19
Serviced	313
Weighed	829

Gas Masks

Inspected	49
Serviced	51

Drills Held During April

Outside drills held	118
Inside drills held	121

40,900 feet of fire hose and 1,771 feet of ladders were used for drill purposes during April.

One Information Meeting was held with seven members attending - exempt and non-exempt.

Thirteen Round Table meetings were held with seven members attending each meeting, non-exempt.

Fire Protection officers held three classes on fire extinguishers which were attended by 25 people of various departments. One class was also held on Chemox masks with ten people in attendance.

One remodeled 750 GPM Howe fire apparatus received from Savannah operations was placed in service on April 28. Two 500 GPM Ford fire trucks were excessed.

OFFICE AUXILIARIES SUB-SECTION

Plant Mail Unit

Internal mail count increased during the past period. U. S. Postal outgoing (all types) increased and incoming postal mail showed a slight decrease. Special assignments included four separate assemblies of material for Union Relations,

Plant Mail Unit

twenty-eight separate distributions of information to supervision which included Health Bulletins, Safety Information, GE Monogram, News Letters, etc. One special assignment included the label stickers applied to the GE Annual Report to all members of Supervision who do not participate in the GE Stock Bonus Plan; also, twenty-two Organization and Policy Guides were addressographed and distributed.

A review of the 3000 Area mail stops revealed only nineteen remaining mail stops in that area; consequently, the 700 Area mail board was revised to accommodate the stops, the 3000 Area mail room was vacated effective April 25, 1955, and the service will continue via 700 Area mail. Ultimately, the remaining stops will be incorporated with an 1100 Area run. This one employee will swing to vacation relief and assist with unusual work loads.

Addressograph work increased slightly during the past period, and two new files were set up - one of three hundred plates for Purchasing and one of five hundred plates for Technical.

<u>Types and Pieces of Mail Handled</u>	<u>March</u>	<u>April</u>
Internal	4,432,996	5,021,983
Postal	82,578	85,254
Special	2,007	2,315
Registered	10,057	11,148
	<hr/>	<hr/>
	4,527,638	5,120,700
 Total postage used	 \$2,876.35	 \$3,216.50
Total teletypes handled	3,592	3,678
Total store orders handled	344	429

Addressograph

	<u>March</u>		<u>April</u>	
	<u>Number of Runs</u>	<u>Total Copies</u>	<u>Number of Runs</u>	<u>Total Copies</u>
Plate name list	114	165,361	116	166,397
Housing list	16	34,983	17	46,534
Payroll list	13	49,359	14	48,321
 Total new plates	 3,141		 2,936	
Total corrected plates	2,931		3,655	
	<hr/>		<hr/>	
	6,072		6,591	

Printing Unit

There was an unusually large number of priority requests handled this month, among which were the monthly attendance reports for the new attendance reporting procedure, vacation, pension plan, employee stock bonus and one large job for Kaiser Engineers. Following are the largest and most significant orders handled:

- 2 orders for Measurement booklets
- 1 order - Absenteeism Charts

Printing Unit (Contin)

- 2 orders - IBM cards - Monthly Attendance Report
- 1 order - Request for Document forms for Stores
- 2 orders - Overtime Lunches form
- 1 order - 500 books of "Here's Hanford"
- 3 orders - form J-827-D Kardex Cards
- 1 order - 32,000 Verification of Purchase for Kaiser Engineers
- 1 order - 10,000 copies of Your Share in the GE Employee Benefit Plans
(Insurance Plan)
- 1 order - 10,000 copies - Ditto (Pension Plan)
- 1 order - 10,000 copies two sides - Ditto (Saving and Stock Bonus Plan)

Extensive renovations were started in the Print Shop this month. Results will be improved working conditions, more storage space and better work flow.

<u>Work Completed</u>	<u>March</u>	<u>April</u>
Orders Received	378	435
Orders completed	404	413
Average orders on hand	75.8	71
Copies printed	1,920,538	1,142,723
Negatives masked	563	569
Negatives processed	593	628
Photo copy prepared	312	254
Litho plates processed	714	714

Stenographic Unit

Five stenographers and two stenographer-typists were assigned to the Stenographic Unit in April. Five permanent transfers were effected to other plant units and seventeen temporary assignments to other offices were made during the month.

One hundred and fifteen work assignments were completed against sixty different cost codes. Productive work totaling 2,160 hours, or the full time of twelve employees, was completed during the month. Included in the larger assignments were 230 hours typing on Attitude Survey material; 112.5 hours on Manufacturing Cost Unit's monthly reports; 154 hours on the completed of transcription of tape recordings for Radiological Sciences Administration Unit; 175 hours on reports and setting up card files for Property Accounting. All work is current at month's end.

<u>Breakdown of Hours</u>	<u>March</u>	<u>April</u>
Dictation and transcription	0	20.5
Meeting Time	7	0
Rough Drafts	0	95.5
Machine Transcription	292	154.5
Letters	50	44.5
Dittos, duplimats and xerography	494	432.5
Miscellaneous	301	620
Training	254	275
Unassigned time	116.5	65.5
Total	1,514.5	1,708
Employees loaned to other units	932	792
Grand Total	2,446.5	2,500

Duplicating Unit

Operation of Embosograf service was started this month. Materials needed in connection with the process were received. Preliminary training of personnel who will operate the equipment was also completed. A total of one hundred and thirty eight signs were produced.

The total number of copies reproduced in all Duplicating Unit offices exceeded the one million mark for the second consecutive month. Eighty-five thousand and thirty-one more copies were reproduced during this period than reported for last month.

During the month, all orders for Spare Parts Stores Catalogues were completed, permitting Stores' personnel to meet the completion deadline of April 30th on this work.

	<u>March</u>	<u>April</u>
Orders Received	3,466	3,824
Orders Completed	3,491	3,675
Orders on Hand	200	343
Offset Plates	17,312	17,660
Offset Copies	1,018,554	1,093,585
Verifax Masters	2,721	2,996
Verifax Copies	8,486	8,214
Ditto Masters	353	435
Ditto Copies	5,706	7,535
Zerox Plates	1,579	1,987
Ozalid Masters	26	75
Ozalid Copies	236	990
Number of copies duplicated	1,032,982	1,110,462

Office Equipment Unit

Office Furniture

The expendable office furniture inventory account 93 was valued at \$14,103 on March 31st, or an average of 2.2 months supply on hand.

A total of 114 service orders were issued to cover cost of minor repairs of office furniture on cabinet locks.

There was a total of 680 debit and credit store orders issued and processed during the month or an average of 33 orders per day.

The following is a detail of number of pieces of furniture handled during the month.

Office Equipment Unit (Contin)

<u>Item</u>	<u>Issued</u>	<u>Received</u>	<u>Salvage</u>
Blackboard	15	1	0
Bookcase	11	10	0
Chairs	299	166	72
Cabinet	77	116	83
Card File	17	43	1
Costumer	19	29	2
Desk	60	44	11
Table	38	32	13
Daveno	0	0	1
Miscellaneous	477	165	7
	<hr/>	<hr/>	<hr/>
	1,013	606	190

Installation of special modification kits on fireproof file cabinets is completed with the exception of 18 cabinets located in warehouse stock and offices where the custodian could not be located.

All backlogged requests for filing cabinets have been filled. Construction contractors are releasing cabinets to operations at a rate adequate to have stock on hand to fill justified needs.

Office furniture requirements for Purex facilities in 200-E Area has been delivered. This is the last sizeable project for which furniture has been stock piled and held in warehouse for issuance.

Office Machines

Two National Cash Register Tellers machines were received and installed in Accounts Receivable. These machines will be used to record receipts of electrical, telephone, rent and miscellaneous funds.

The total number of machines in service and stock as of the 20th of April, 1955, was 4,611 or a net inventory reduction of 107 machines during the month.

Construction contractors' machine inventory was 505 on the 20th of April.

Office Machine Repair Unit

During the month an agreement was reached with Safety & Fire Prevention Unit to the effect that Office Machine Repair Unit will not attempt to carry out a complete changeover of all machines to the three prong cords due to the fact that many buildings are not yet equipped to use the three prong connection. Efforts will be continued to equip as they come in for repair all machines used where three hole wall outlets exist with the three conductor cords.

One additional time attendance recorder was installed in the 713 Building.

A special work order was received to repair and set six levelometers at the 1174 bulk plant and the 1172 service station.

Office Machine Repair Unit (Contin)

A special work order was received to install one hydrogen counter #3, this equipment to be located in the 747 Bio-Assay Laboratory.

Repair tickets were processed as follows:	<u>March</u>	<u>April</u>
	557	649

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

CA-626 Roads, Walks and Storm Sewers - 700 Area: Project proposal returned unapproved by AEC, with request that action be withheld until more definite information is obtained on possible new office building.

Approval was obtained from the Commission to convert Dormitories W-17 and W-21 for temporary office use. Plans are under way to install fluorescent lighting, and to move Accounts Payable, Plant Accounting, Inventory Accounting and J. A. Jones personnel offices from 101 Building area in North Richland shortly after June 1. Arrangements have been made with Community Operations to maintain lawn area surrounding these buildings, charging Administration Area cost code.

Seventeen office moves were made during the month of April.

Six Hauserman office partition installations were made in the 700 Area, and partitioning was provided for one installation in the 300 Area and six in the 200 Areas.

Purchase requisition was executed for approximately 1,598 lineal feet of movable office partitioning, from funds approved in AR-55-EX-6.

Transportation Section is scheduled to start lawn maintenance work in the 700 Area shortly after May 1.

Laundry equipment has been sold and removed from 723 Building. Currently unoccupied portion of this building is being held for possible future shops and storage use, dependent upon AEC action regarding new office building.

Work is proceeding on relocation of 700 Area craft shops in 716 Building, from 722 Building.

As agreed with Community Section, Public Works shops will be moved to vacated space in 722 Hangar, following which the Knight Street hutments will be made available for sale and removal.

It is understood that AEC is continuing its negotiations with GSA, looking toward the possibility of obtaining a new office building under lease-purchase plan.

General Maintenance

Worn Linoleum floor covering in upstairs south vault, 703 Building, was replaced with rubber tile, on AEC work order.

Floor boards were securely nailed to joists, and approximately 1,955 square feet of asphalt tile was laid in nine rooms of the 703 Building.

On order of Transportation Section, office window shades were replaced with 90 venetian blinds in 1170 and 1171 Buildings.

Non-slip floor covering was applied to 432 square feet of shower room floors in 1170 and 1171 Buildings.

Rearrangement of office space in 703, 705 and 722-A Buildings involved removal of 90 lineal feet of partitioning, relocation of 44 lineal feet of Hauserman partitioning, and installation of 123 additional lineal feet from stock.

Central Stores battery room floor was repaired around floor drain.

Access pit was provided for fuel oil tank lines at Central Stores heating plant.

Dock steps on west side of 703 Building were revised and exit door was rehung, to correct safety hazard and repetitive expense resulting from wind conditions.

On order from Transportation, 1,000 feet of hog wire fence was removed from 1131 Area and reinstalled, along with two gates, in revised Stores Excess Yard.

A total of 67 service orders covering minor carpentry repairs in 700 Area were completed during the month.

Interior painting program included redecorating of 14 rooms in 703 Building, four rooms and corridor in 705 Building, two rooms in 761 Building, four rooms in 716 Building, and walls of washroom in 1171 Building.

Numerous miscellaneous items were refinished in paint shop.

Sign work included miscellaneous signs and posters, repainting of three GE monogram signs, fabrication and painting of road and traffic signs, and silk-screening of 100 notebook binders for Purex.

Four fluorescent fixtures were installed in the Hospital, seven in 703 Building and one in the 760 Building.

Steam generated hot water tank was removed from 703 Building and two electric hot water tanks were installed to replace it. This permits shutdowns of steam line to 703 Building during summer months.

One restroom exhaust fan was replaced in 762 Building and one in 703 Building.

Several office buzzer systems were installed and repairs were made to a number of others.

General Maintenance (Contin)

A large double-faced clock was installed outside of Transportation Bus Dispatch Building for benefit of bus patrons and drivers.

Miscellaneous electrical repair work was heavy throughout the month.

Locksmith work included modification of 14 door locks in 105-KE, and repair of two safes and four vault doors in 234-5 Building.

Eleven Farr-Air attachments were installed on conditioners in third and fourth wings of 703 Building. All conditioners in this building, except for two on exterior of vaults, are now equipped with rotor attachments, which makes the use of air conditioning pads unnecessary.

Safety relief valves were installed on hot water tanks in 705, 707, 713, 713-A, and 721 Buildings, to comply with pressure vessel inspection requirements.

Mon-O-Rail and hoist were installed in Central Stores battery charging room to correct safety hazard and to permit better maintenance of electric lift trucks and batteries.

Condensate lines in second wing of 703 Building were regarded, and replaced where necessary, to eliminate line "hammering".

Seasonal overhaul of 700 Area air conditioners has been completed, and systems revised where necessary.

Work has been started on vacuum-cleaning dust accumulation from air conditioner ducts, to prevent dust infiltration in offices during early part of cooling season.

Building Services

Detailed survey was made of sanitation program. Some changes in procedures are being contemplated, with a view to maintaining a consistently high level of building service.

Stripping and resealing of wood floors in 703 Building is being discontinued. It is planned to install asphalt tile on worn floors in this building, on a gradual, continuing basis. Experience to date has shown that cost of maintaining tile covered floors is considerably less than for other floors.

Steam Operation

Nos. 1, 2 and 4 boilers were in service at the beginning of the month, with No. 3 awaiting a tube replacement.

Decreasing heating load permitted withdrawal from service of No. 4 boiler on March 28; this unit then reverted to reserve status.

Tube replacement in No. 3 boiler was completed on March 29, making this unit also available as a reserve.

Steam Operation (Contin)

At the close of the month, Nos. 1 and 2 boilers were in service with Nos. 3 and 4 in reserve.

The quantity of steam generated at 784 Plant was 5.7% greater than for the same period of the previous year.

Operations at Central Stores Heating Plant were normal throughout the month. Time clock controlling operation of boiler was set up on April 7 to shut off boiler on week ends, beginning at 4:00 P.M. on Saturdays and returning to service at 3:00 A.M. Mondays.

Coal consumed: 1,366.60 net tons.

Steam generated:	19,725.5 M. lbs.
Steam leaving plant:	2,489.7 M. lbs.
Steam delivered:	17,235.8 M. lbs.

Total water softened:	2,856,100 gallons
Total soft water sent to Kadlec Hospital:	83,530 gallons
Total soft water sent to 784 Heating Plant:	2,492,570 gallons

TELEPHONE SUB-SECTION

A General Electric proposal for modifying a number of telephone service charges was approved by the Atomic Energy Commission on April 21, which become effective June 1, 1955. The revised charges are covered by Richland Rate Schedule No. 4. Atomic Energy Commission approval was also received during the month to offer colored telephones to residential and business subscribers for an extra charge of \$10.00.

The new 700 Area Plant telephone exchange is now scheduled to be essentially complete by May 14 and will be released by the Stromberg-Carlson Company on that date for the beginning of acceptance tests to be made by personnel of the Telephone Sub-Section. The exchange is scheduled to be placed in service June 17; two weeks later than reported last month, the postponement being due to Stromberg-Carlson Company requiring more than expected amount of time for making their tests, adjustments and circuit corrections.

The first 200 lines of the 300-line 100KBC dial exchange presently being installed by the Automatic Electric Corporation is scheduled to be placed in service May 26 and the remaining 100 lines of equipment (to be salvaged from the existing 100B Area exchange) is now scheduled to be placed in service June 17 at the same time as the 700 Area exchange.

Information required for the next edition of the Plant telephone directory was furnished to the printer during the month. The new directory will be distributed on June 16.

At the request of the Stores Sub-Section, Telephone Sub-Section personnel reviewed a list of all telephone material and equipment held in Spare Parts and tentative plans were made for transferring the majority of these items to other and more appropriate General Ledger Accounts.

Telephone Sub-Section (Contin)

On April 23, two 900-pair size distribution cables in Richland failed as a direct result of water damage and indirectly as the result of physical damage to the cables by personnel of an excavation contractor working at the site of the new Parcell gasoline service station at Goethals and Williams. Approximately 1,000 business and residential subscribers were affected by the cable damage but service to all of them was restored on a temporary basis within 24 hours. Permanent repair work is in progress.

Plant Telephone Operations

At the request of the Atomic Energy Commission, four special telephone circuits serving the U.S. Army radar site near the 300 Area were re-routed to loop through the Army exchange at North Richland.

A cordless type PBX switchboard and all associated stations were removed from the North Richland Construction Medical Center.

Discontinued 6 of 12 "LOOK to Richland" dial trunks and all 6 "LOOK to Richland" operator trunks. This leaves the temporary LOOK switchboard with 6 direct trunks to Richland and 15 similar trunks to the BY tandem office.

As a result of discontinuing the operation of the Blaw-Knox PBX switchboard on March 31, 1955, approximately 150 PBX stations and extensions were removed from service at the Purex plant construction site. Approximately 20 direct dial lines served from the 200-EW exchange were also discontinued and the remaining telephones were relocated to permit removal of the building in which they were located.

In conjunction with cable tie-in work being done for the new 700 area exchange, two trunk cables and several area distribution cables were spliced to the new main distributing frame. This work is scheduled to be complete by May 15.

Twelve "BY to 300 Area" trunks and 12 "Richland to 300 Area" trunks were rerouted from Cable T-1 to Cable T-5. The change was made to provide cable circuits via the T-1 cable repeater station for the purpose of establishing additional amplified trunks needed in connection with the 700 Area exchange.

Installed a time clock circuit to the 713 Building.

Located and cleared a moisture fault in a 26-pair cable which serves the 221-U Building in the 200W Area.

Located and repaired four sheath openings in the "BY to White Bluffs" trunk cable. These openings were found to have been caused by excessive wear at points where the cable was formerly supported in rings.

Repaired a 26-pair cable in the 100B area which was damaged by a hole digger operated by personnel of the Electrical Utilities Section.

Installed an 11-pair cable terminal at the Purex plant to provide service for warehouse and shop buildings being left for permanent use by Operations personnel.

Performed special maintenance work on the PAX telephone systems in the 202S, 202A and 234-5 buildings.

Plant Telephone Operations (Contin)

At the request of Minor Construction, two temporary emergency telephones were installed at the 181KE Building. Each installation required that approximately 6,000 feet of wire be laid on the ground and at other places attached to the area fence.

Modified the 7,800 group of connectors in the 200EW exchange so that they may be used for either regular or trunk-hunting service.

Ten previously used trunk repeaters intended for re-use in the 100-KBC exchange were modified to agree with Automatic Electric Corporation Circuit No. H-61793.

A list of acceptance tests to be made on the 100KBC telephone exchange by Plant Telephone Unit forces was prepared and furnished to the Reactor Project group.

Prepared Job Specification P-55-30 to cover cable rearrangements and half-taps required in the 100-B Area in connection with transferring 100-B and 100-C area telephones to the new 100-KBC exchange.

Plant Telephone Unit assumed maintenance responsibility for the 202-A Building PAX telephone system.

Commercial Telephone Operations

Located and made temporary repairs to damaged Richland distribution cable, Numbers 6 and 11, underground at the southwest corner of Goethals and Williams. These cables were damaged by an excavation sub-contractor of the Elvrum Construction Company while working at the site of the new service station being built, but the contractor-caused damage did not show up until the area was flooded with water from a leaky water main on April 22. Permanent repairs are in progress and will cost approximately \$2,000. All charges incurred by General Electric forces will be back-charged to the Elvrum Construction Company.

Conferred with Richland TV Corporation representatives and jointly inspected numerous cases of TV cable installation and interference with the telephone system.

Inasmuch as traffic between Richland and North Richland has diminished considerably, the number of trunks between the two exchanges were reduced from 48 to 39 and the surplus trunk-terminating equipment from the Richland end was transferred to the 100-KBC exchange.

Radio System Operation

Rebuilt program recording panel located in the recording studio in the 770 Building. Rearranged panels and switching to accommodate one additional tape recording unit.

Installed and operated a portable public address system in the Desert Inn Hotel on April 9 for a Radiological Sciences Department meeting.

Installed and operated portable sound recording equipment at the Pasco Airport on April 25, 26, 27 and 28 to record the public auction of A.E.C. construction equipment.

Removed radio station KKE624, No. 7 from the Prosser Barricade on April 19.

Radio System Operation (Contin)

Installed a permanent wall-type loud speaker in the 705 Building orientation room to be used with a sound projector.

Recorded Science Forum programs on April 5, 13, 20 and 27.

Three radio station outages occurred during the month of April, all three due to tube failure. KKE624, Station No. 14 (100-H Area) was out of service on April 1 from 9:00 AM to 10:14 AM. KKE624, Station No. 2 (Yakima Barricade) was out of service on April 5 from 11:00 AM to 12:13 PM. KEB886, Station No. 2 (251 Sub-Station) was out of service on April 18 from 8:45 AM to 9:40 AM.

Field serviced 58 mobile transmitter-received sets.

Shop-serviced 35 mobile receivers and 31 mobile transmitters.

Field serviced nine fixed-station transmitter-receivers.

Shop-serviced 6 fixed station receivers, seven fixed-station transmitters and three remote-control consoles.

Shop-serviced two pack-type radio sets.

Inspected and serviced one sound projector, one public address amplifier, two intercommunicating systems and three tape recorders.

Removed five mobile transmitter-receiver sets and installed six mobile transmitter-receiver sets.

Statistical Data

	<u>At 20th of April</u>	<u>Change From Previous Month</u>	<u>Change From Year Ago</u>
Residential Subscribers	5941	- 60	- 58
Business Subscribers	481	- 3	- 10
Paystation Telephones	67	- 1	----
Official Subscribers:			
Richland Exchange	985	/ 2	- 44
North Richland Exchange	214	- 2	- 5
Process Area Exchanges	1617	-130	-222
		<hr/>	<hr/>
		-194	-339

New Service Requests Received During the Month:

For Residential Service	79
For Business Service	10
	<hr/>
TOTAL	89

Statistical Data (Contin)

Backlog of Service Requests:

For New Residential Telephones	280
For New Business Telephones	0
For Residential Outside Moves	29
For Business Outside Moves	0

TOTAL	309
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Service Orders Processed:

In Connection with Business and Residential Service	614
In Connection with Plant Service	360

TOTAL	974
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Facilities - Installed, In Service and Available:

	<u>Exchange Lines</u>			<u>Party Lines</u>
	<u>Installed</u>	<u>In Service</u>	<u>Available</u>	<u>Available</u>
Richland	4065	4002	63	354
North Richland	600	351	249	116
Process Areas	2050	1606	444	---
TOTAL	6715	5959	756	470

Radio Stations:

	<u>At 20th of</u>	<u>Change From</u>	<u>Change From</u>
	<u>April</u>	<u>Previous Month</u>	<u>Year Ago</u>
Fixed Stations	34	- 1	/ 16
Mobile Stations	155	/ 1	/ 12
TOTAL	190	0	/ 28

SECURITY AND PATROL SUB-SECTION

Document Report

Number of classified documents and prints unaccounted for as of April 1: 333
(104 of the above 333 documents are chargeable to du Pont Company)

Number of classified documents and prints reported as unaccounted for during April: 0

Number of classified documents and prints either recovered or downgraded in classification during April: 6

Document Report (Contin)

Number of classified documents and prints remaining unaccounted for as of May 1, 1955:

226

(104 of the above 226 documents are chargeable to the du Pont Company)

The Non-Technical Document Review Board held two meetings and reviewed a total of 82 documents. Of this number

- 4 were upgraded to "Confidential",
- 3 were upgraded to "Confidential-Undocumented",
- 19 had their classification retained,
- 51 were downgraded to "Official Use Only",
- 3 were declassified, and
- 2 were not within the scope of the Board.

Security Education

Nine security articles appeared in the GE NEWS during the month.

Three hundred and twenty-eight security meetings were held and attended by 4,643 Hanford Atomic Products Operation personnel. A representative of the Plant Protection Services Unit showed one of the security films at some of these meetings as indicated below:

<u>Film Title</u>	<u>Number of Meetings</u>	<u>Average Attendance Per Meeting</u>	<u>Total</u>
Badge of Honor	17	26	442
Turn Left Across the Bridge	4	32	128
Words Are Weapons	1	15	15
The Tallest Shadow	2	15	30

One thousand copies of the poster with the security slogan "All Classified Documents in the Files?" were designed, printed, and posted in the plant areas during April.

On April 5, 1,200 leaflets with the slogan "A Message for You" were posted on file cabinets in all offices in the plant areas.

On April 7, a memorandum was issued to members of supervision on "Main Control Room, 202-A Building", to the effect that on April 18, the Kardex identification system would be established for entrance into that "exclusion" area.

Prior to April 15, an "Advance Notice to Members of Management" was issued concerning operation of the Prosser Barricade after that date.

Eighty 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 during the month of April. Forty-six employees received an "L" security orientation lecture during the same period.

Statistical Report of Security Patrol Activities

	<u>100-B</u>	<u>100-D</u>	<u>100-F</u>	<u>100-H</u>	<u>100-K</u>	<u>200-E</u>	<u>200-W</u>	<u>300</u>
Pat searches	90	90	21	90	90	0	0	4
Escorts	12	9	6	61	131	2	17	35
Ambulance Runs	2	1	5	3	2	0	5	11
Passes Issued								
One day temporary	19	13	9	5	3	1	40	45
Travel	0	0	0	0	8	0	0	109
Red Tag	111	79	38	28	54	107	363	154
Telephonic	0	0	0	0	0	0	0	8
Supervisors' Post								
Contacts	434	245	184	87	463	132	452	279

Other Patrol Activities (Computed by Hours):

	300 & 700
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File Check	168	226	186.2	397.5	396	272	176	2,220
Building Check	350	48.6	186.2	1039	396	272	176	720

Arrest Report

<u>Violations</u>	<u>Number of Violations</u>	<u>Cont. Cases From March</u>	<u>Cases Cleared</u>	<u>Pending</u>	<u>Fined</u>
Illegal Parking	1	4	0	4	1
No Driver's License	0	1	0	1	0
Speeding	0	1	0	1	0
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
TOTAL	1	6	0	6	1

Citation Tickets Issued: 1
Warning Tickets Issued: 19
Verbal Warnings: 0

Patrol Training Activities

382 Patrolmen received classroom instruction during the reporting period.
197 Patrolmen attended firearms training during the same period.

Patrol Post Changes

Effective April 18, the 202-A Building Rover Post, under supervision of 200-E Area Patrol, was discontinued.

Effective April 18, the 202-A Area Badge House Post was activated with the establishment of the Kardex identification system for entrance into the area. This post is under supervision of 200-E Area Patrol.

The 202-A Tunnel Railroad Gate Post, 200-E Area, was activated on the Number 2 shift only commencing April 25.

Patrol Post Changes (Contin)

The Prosser Barricade Post was transferred from the jurisdiction of 300 Area to the 200-E Area on April 15, 1955. At that time, the barricade operating hours were changed from around-the-clock to 6:30 AM to 7:45 AM and from 3:45 PM to 5:45 PM, Mondays through Fridays.

General

Six hundred and ninety-six audits and inspections of General Electric employees, who are custodians of classified documents and prints, have been conducted since September 1, 1954, through April 30, 1955.

Security Administration

Daily Badge Log Entries	3,301
"Q" Clearances	80
"L" Clearances	46
Formal "P" clearances issued	20
"P" Approval clearances issued	50
Category access granted	40
Category access withdrawn	68
Category access revised	108
Number of photographs for "A" badges	581
Number of photographs for "B" badges	2,737
Number of persons rephotographed	8

Total of 598 photo identification passes were laminated and issued.

Total of 719 "A" badges assembled and distributed to the areas.

Total of 492 "A" badges received from the areas.

Total of 75 "A" badges were received from the areas for repair.

Top Secret Clearances

Clearances for 44 employees were cancelled; 60 employees were granted clearance by the Commission; 36 clearances were requested by General Electric.

HANFORD ATOMIC PRODUCTS OPERATION

General Electric Company
Richland, Washington

REPORT OF VISITS FOR PERIOD ENDING APRIL 30, 1955

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class. Unclass.	Areas
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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

I. Visits to other Installations

T. G. Marshall	Discuss recruitment	R. E. Hunt	4-26-55	4-28-55	X	
to: Knolls Atomic Power Lab.	plans for technical	R. G. O'Brien				
Schenectady, New York	personnel					

ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION

I. Visits to other Installations

C. G. Stevenson	Attend meeting of	W. E. Dreeszen	4-25-55	4-26-55	X	
to: Iowa State College	Technical Information					
Ames, Iowa	Panel					
G. Stevenson	Consultation on appli-	H. D. Young	4-27-55	4-29-55	X	
to: Argonne National Lab.	cation of IBM to docu-					
Lemont, Illinois	ment control problems					

ENGINEERING DEPARTMENT - DESIGN SECTION

I. Visits to other Installations

H. Ames	Consultation on design	S. Cumpston	4-14-55	4-16-55	X	
to: Aircraft Nuclear Propulsion	and development of	A. W. Steinfeldt				
Cincinnati, Ohio	reactors					
L. Pihlfeldt	Consultation on con-	S. Cumpston	4-18-55	-19-55	X	
to: Aircraft Nuclear Propulsion	struction and design	A. W. Steinfeldt				
Cincinnati, Ohio	of reactors					

Name - Organization Purpose of Visit Person Contacted Arrival Departure Restricted Data Class. Unclass. Areas

L. Pihlfeldt
to: General Electric Co.
Schenectady, New York
Consultation on construction and design of reactors
R. E. Hunt
4-20-55 4-21-55 X

L. C. Roos
to: U. S. Atomic Energy Comm.
Savannah River Plant
Augusta, Georgia
Attend annual AEC Safety and Fire Protection Conference
AEC personnel
5-5-55 5-6-55 X

ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS

I. Visitors to this Works

E. F. Adlutori
Knolls Atomic Power Lab.
Schenectady, New York
Discuss KAPL- 120 Loop program and its renovation
G. E. Wade
4-5-55 4-8-55 X
100-B 108-B
100-D XXX
100-H 105
100-K XXX
300-L XXX; 700

H. W. Alter
Knolls Atomic Power Lab.
Schenectady, New York
Discuss Hanford program and separations processes and coating removal waste
R. B. Richards
W. H. Reas
H. H. Hopkins
M. K. Harmon
4-25-55 4-27-55 X
202-A
200-W Redox
300-L XXX

H. J. Bowman
Trent Tube Company
East Troy, Wisconsin
Consultation on Purex process
E. R. Irish
W. P. Wallace
4-5-55 4-9-55 X
202-A
300-L 303

L. F. Coffey, Jr.
Knolls Atomic Power Lab.
Schenectady, New York
Discuss stress analysis problems on Hanford Assistance Program
A. G. Blasewitz
4-5-55 4-7-55 X
100-B 105-B, 105-C
100-D 189
300-L 303; 700

D. H. Cornell
Knolls Atomic Power Lab.
Schenectady, New York
Discuss KAPL- 120 Loop program and its renovation
G. E. Wade
4-5-55 4-8-55 X
100-B 108-B
100-D XXX
100-H 105
100-K XXX
300-L XXX; 700

R. L. Ferguson
Argonne National Laboratory
Lemont, Illinois
Discuss instrumentation and reactor control problems
R. L. Dickeman
D. C. Pound
4-28-55 4-29-55 X
300-L XXX
100-K 105-KE

DECLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
J. Finke Kaiser Engineering Company U. S. Atomic Energy Commission plants	Discuss Separations plant design for Power	F. W. Woodfield R. E. Tomlinson	4-22-55	4-22-55	X	300-L XXX
T. J. E. Glasson Knolls Atomic Power Lab. Schenectady, New York	Conference on KAPL-120 Loop program	G. E. Wade R. H. Beaton (design)	4-5-55	4-8-55	X	100-H 105 100-K XXX; 700
F. B. Huke Norton Company Oak Ridge, Tennessee	Discuss Norton products supplied by Commission	R. J. Anicetti	4-8-55	4-8-55	X	700-703
W. J. Lindsey U. S. Atomic Energy Comm. Washington, D. C.	Discuss continuous UO ₃	F. W. Woodfield R. G. Geier	4-20-55	4-21-55	X	300-L XXX
W. M. Mallott Kaiser Engineering Company U. S. Atomic Energy Commission plants	Discuss Separations plant design for Power	F. W. Woodfield R. E. Tomlinson	4-22-55	4-22-55	X	300-L XXX
W. W. Managan Argonne National Laboratory Lemont, Illinois	Discuss instrumentation and reactor control problems	R. L. Dickman D. C. Pound	4-28-55	4-29-55	X	300-L XXX 100-K 105-KF
P. J. Selak Kaiser Engineering Company U. S. Atomic Energy Commission plants	Discuss Separations plant design for Power	F. W. Woodfield D. C. Pound	4-22-55	4-22-55	X	300-L XXX
G. W. Watt University of Texas Austin, Texas	Separations and Purex problems	R. B. Richards	5-2-55	5-6-55	X	100-D 189-D 202-A 200-W Redox, 221-U, 234-5, 300-L 303; 700
D. E. Webster Norton Company Oak Ridge, Tennessee	Discuss Norton products supplied by Commission	R. J. Anicetti	4-8-55	4-8-55	X	700-703

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclasa. Areas
G. C. Westfall Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL-120 Loop Program and its renovations	G. E. Wade G. E. Wade	4-25-55 4-5-55	4-27-55 4-8-55	X X	100-D XXX 100-H 105 100-K 105-KW 300-L XXX; 700 100-B 108-B

II. Visits to Other Installations

S. H. Bush to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend AEC Metallurgy meeting	L. K. Jetter	4-11-55	4-13-55	X	
S. H. Bush to: Battelle Memorial Inst. Columbus, Ohio	Consultation on zirconium gas reactions	H. A. Saller M. W. Mallett	4-14-55	4-15-55	X	
J. J. Cadwell to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend AEC Metallurgy meeting	L. K. Jetter	4-11-55	4-13-55	X	
J. J. Cadwell to: Radiation Laboratory Livermore, California	Consultation regarding Hanford assistance to Whitney Project	K. Copenhagen	4-27-55	4-29-55	X	
V. R. Cooper to: U. S. Atomic Energy Comm. Oak Ridge, Tennessee	Technical activities in support of Hanford Fuel Element Program	C. Showalter	4-11-55	4-13-55	X	
V. R. Cooper to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend annual Metallurgy Information meeting	L. K. Jetter	4-11-55	4-13-55	X	
V. R. Cooper to: National Lead Company Fernald, Ohio	Discuss uranium metall- urgy and fabrication	F. L. Cuthbert	4-14-55	4-15-55	X	
V. R. Cooper to: Bridgeport Brass Company Adrian, Michigan	Discuss zirconium tubing	R. M. Treco	4-15-55	4-15-55	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
M. V. Davis to: Brookhaven National Lab. Upton, Long Island, New York	Discuss temperature co-efficient measurements, physics of crystalline neutron, scatterers, and neutron monochromaters	I. Kaplan	4-26-55	4-27-55		X
R. L. Dickeman to: Westinghouse Atomic Power Lab. Pittsburgh, Pennsylvania	Discuss high pressure power loops and general physics development	L. Geiger P. Cohen D. Wroughton	4-17-55	4-18-55		X
R. L. Dickeman to: Knolls Atomic Power Lab. Schenectady, New York	Discuss Assistance to Hanford	R. D. Bennett	4-19-55	4-21-55		X
D. J. Donahue to: E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss experimental reactor physics	G. Dessauer	4-26-55	4-27-55		X
A. A. Ferguson to: Carbide & Carbon Knoxville, Tennessee	Present paper at AEC Information Meeting	L. K. Jetter	4-11-55	4-13-55		X
P. F. Gast to: E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Meeting of Reactor Physics Planning Group	G. Dessauer	4-25-55	4-27-55		X
R. G. Geier to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss process problems on calcination and metal dissolution	F. L. Culler S. H. Smiley	4-25-55	4-29-55		X
R. G. Geier to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Discuss calcination process problems	W. M. Leaders	4-28-55	4-29-55		X
O. H. Greager to: National Lead Company Fernald, Ohio	Discuss Hanford Fuel Element program	G. W. Wunder	4-5-55	4-6-55		X

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OFFICE

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
O. H. Greager to: Aircraft Nuclear Propulsion Testing Program Cincinnati, Ohio	Discuss Joint ANP-Hanford	M. C. Leverett	4-7-55	4-7-55	X	
L. A. Hartcorn to: E. I. du Pont de Nemours & Co. graphy Sub-Committee Meeting Savannah River Plant Augusta, Georgia	Attend Uranium Metallurgy	C. L. Angerman	4-4-55	4-6-55	X	
H. Harty to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend annual Metallurgy Information Meeting	L. K. Jetter	4-11-55	4-13-55	X	
H. Harty to: National Lead Company Fernald, Ohio	Discuss uranium metallurgy and fabrication	F. L. Cuthbert	4-14-55	4-15-55	X	
L. W. Lang to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend annual Metallurgy Information meeting and discuss Oak Ridge process in relation to Hanford activities	L. K. Jetter	4-11-55	4-13-55	X	
L. W. Lang to: National Lead Company Fernald, Ohio	Discuss matters relating to Hanford fuel elements	J. H. Noyes	4-15-55	4-15-55	X	
G. A. Last to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend AEC Metallurgy Information Meeting	L. K. Jetter	4-11-55	4-13-55	X	
L. H. McEwen to: Westinghouse Atomic Power loops and general physics developments Pittsburgh, Pennsylvania	Discuss high pressure	L. Geiger P. Cohen D. Wroughton	4-17-55	4-18-55	X	
L. E. McEwen to: Knolls Atomic Power Lab. Schenectady, New York	Discuss Assistance to Hanford	R. D. Bennett	4-19-55	4-21-55	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
K. R. Merckx to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend AEC Metallurgy Information Meeting	L. K. Jetter	4-11-55	4-13-55	X	X
C. E. Michelson to: Argonne National Lab. Lemont, Illinois	Discuss operation of fluorimetric determina- tion of uranium problems	C. E. Crouthamel	4-7-55	4-7-55	X	X
W. J. Ozeroff to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Consultation on critical A. Weidenbaum mass problems	A. Weidenbaum	4-22-55	4-25-55	X	X
W. J. Ozeroff to: E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss experimental reactor physics	G. Dessauer	4-26-55	4-27-55	X	X
O. W. Rathbun to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend AEC Metallurgy Information Meeting and present paper	D. D. Cowen	4-11-55	4-13-55	X	X
P. H. Reinker to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss high pressure loops and general physics developments	L. Geiger P. Cohen D. Wroughton	4-17-55	4-18-55	X	X
P. H. Reinker to: Knolls Atomic Power Lab. Schenectady, New York	Discuss Assistance to Hanford	R. D. Bennett	4-19-55	4-21-55	X	X
J. W. Riches to: Bridge Brass Company Adrian, Michigan	Consultation on uranium metallurgy	R. M. Treco	4-19-55	4-22-55	X	X
M. J. Sanderson to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend AEC Metallurgy Information Meeting	L. K. Jetter	4-11-55	4-13-55	X	X

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
G. Sege to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Technical discussion on separations processes "	S. A. Cumpston S. A. Cumpston	4-21-55 4-25-55	4-22-55 4-26-55	X X	
G. Sege to: Knolls Atomic Power Lab. Schenectady, New York	Technical discussion on separations processes "	J. R. Wolcott R. Symon	4-18-55	4-22-55	X	
R. C. Smith to: Radiation Laboratory Berkeley, California	Technical discussions on A. S. Coffinberry plutonium metallurgy	A. S. Coffinberry	4-18-55	4-19-55	X	
R. C. Smith to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Technical discussions on R. D. Baker plutonium metallurgy	R. D. Baker	4-20-55	4-20-55	X	
W. P. Wallace to: Bureau of Mines Albany, Oregon	Discussions on zirconium E. T. Hayes and its alloys	E. T. Hayes	4-1-55	4-1-55	X	
W. P. Wallace to: U. S. Atomic Energy Comm. Oak Ridge, Tennessee	Technical activities in C. Showalter support of Hanford Fuel Element Program	C. Showalter	4-11-55	4-13-55	X	
W. P. Wallace to: Oak Ridge National Lab. Oak Ridge, Tennessee	Present paper on uni- skanning at Metallurgy Information Meeting	L. K. Jetter J. M. Warde E. J. Boyle	4-11-55	4-13-55	X	
W. P. Wallace to: National Lead Company Fernald, Ohio	Technical discussion pertaining to uranium	F. L. Cuthbert	4-14-55	4-14-55	X	
W. P. Wallace to: Bridgeport Brass Company Adrian, Michigan	Discuss zirconium tubing	R. M. Treco	4-14-55	4-15-55	X	
G. W. Watt to: National Lead Company Fernald, Ohio	Discuss Hanford Fuel Element Program	G. W. Wunder	4-5-55	4-6-55	X	

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
G. J. Wick to: Radiation Laboratory Berkeley, California	Consultation regarding Hanford assistance to Whitney Project	K. Copenhagen	4-27-55	4-29-55	X	
ENGINEERING DEPARTMENT - DESIGN SECTION						
II. Visits to Other Installations						
C. O. Clemetson to: Aircraft Nuclear Propulsion design details on Arco, Idaho	Discuss instrument Reactor Test Loops	R. W. Coyle	4-15-55	4-20-55	X	
C. O. Clemetson Material Test Reactor Arco, Idaho	Discuss instrument design details on Reactor Test Loops	F. L. McMillan	4-15-55	4-20-55	X	
J. B. Fecht to: Phillips Petroleum Co. Idaho Falls, Idaho	Consultation regarding contact maintenance of chemical separations facilities	D. G. Reid	4-18-55	4-19-55	X	
H. G. Johnson to: Phillips Petroleum Co. Idaho Falls, Idaho	Consultation regarding contact maintenance of chemical separations facilities	D. G. Reid	4-18-55	4-19-55	X	
E. R. Rudock to: Aircraft Nuclear Propulsion relative to Cincinnati, Ohio	Obtain information	D. Smith	4-25-55	4-26-55		X
MANAGEMENT						
I. Visits to other Installations						
W. E. Johnson to: AEC Nevada Test Site Yucca Flats, Nevada	Observation of weapons testing	Manager, AEC	4-5-55	4-8-55	X	
OPERATIONS RESEARCH STUDY SECTION						
I. Visits to other Installations						

OFFICE

Restricted Data
Class. Unclass. Areas

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Class.	Unclass.	Areas
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P. M. Thompson to: Rand Corporation Santa Monica, California	Use 701 computing facilities and review programming techniques	W. Orchard-Hays	4-27-55	5-10-55	X		
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FINANCIAL DEPARTMENT

I. Visitors to this Works

R. I. Beggs General Electric Company New York, New York	Discuss current contract negotiations with the Commission	D. M. Johnson	4-28-55	4-29-55	X		700-703 Bldg.
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MANUFACTURING DEPARTMENT

I. Visitors to this Works

D. S. Brereton General Electric Company Schenectady, New York	Attend staged tests on 100-K electrical system as part of Project CA-512-W	E. P. Peabody	5-2-55	5-5-55	X		100-K 105-K 105-KW 700
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R. C. Mann Aircraft Nuclear Propulsion Idaho Falls, Idaho	Recruit technical per- sonnel for work at Idaho Test Station	J. E. Kaveckis	4-14-55	4-15-55	X		700 300-L XXX
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II. Visits to other Installations

W. A. Blanton to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend Metallurgy In- formation Meeting	L. K. Jetter	4-11-55	4-13-55	X		
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W. A. Blanton to: National Lead Company Fernald, Ohio	Inspect metal produc- tion and fabrication facilities	J. H. Noyes	4-14-55	4-14-55	X		
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S. M. Gill to: E.I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss uranium quality control	T. C. Evans	4-3-55	4-5-55	X		
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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
J. E. Malder, Jr. to: U. S. Atomic Energy Comm. Committee meeting Washington, D. C.	Attend Production Planning Committee meeting	E. J. Bloch	4-28-55	4-29-55	X	
C. A. Priode to: U. S. Atomic Energy Comm. Committee Meeting Washington, D. C.	Attend Production Planning Committee Meeting	E. J. Bloch	4-28-55	4-29-55	X	
C. A. Priode to: E. I. du Pont de Nemours & Co. scheduling and Savannah River Plant operation problems for Augusta, Georgia manufacturing and produc- tion	Discuss production	J. D. Ellett	4-26-55	4-27-55	X	
H. C. Hodge University of Rochester Rochester, New York	Discuss mutual problems in Pharmacology and Toxicology	H. A. Kornberg H. M. Parker	4-21-55	4-22-55	X	100-K 105-KE, 105-KW 100-F 108-F 300-L XXX
C. M. Patterson E. I. du Pont de Nemours & Co. physics Savannah River Plant Augusta, Georgia	Consultation on health	H. M. Parker	4-19-55	4-22-55	X	100-H 105 100-K 105-KW, 105-KE 202-A 200-E 201-C 200-W 221-T, 231, Redox, 221-U 300-L XXX

CONFIDENTIAL

II. Visits to other Installations

G. E. Driver
to: U. S. Atomic Energy Comm.
Nevada Test Site
Yucca Flats, Nevada

Assignment to Program 30 R. W. Johnson

2-17-55 4-18-55 X

Name - Organization Purpose of Visit Person Contacted Arrival Departure Restricted Data Class. Unclass. Areas

W. G. Spear
to: Nevada Test Site
U. S. Atomic Energy Comm.
Yucca Flats, Nevada

Assignment to Program 30 R. W. Johnson
work on weapons testing

3-15-55 to end of spring testing

R. W. Wager

to: Los Alamos Scientific Lab.
Los Alamos, New Mexico
Effects of radioactive particles in respiratory tract of animals
W. H. Langhan
Dr. Boone
Dr. Turney

4-5-55 4-7-55

R. W. Wager

to: University of California
West Los Angeles, California
Effect of radioactive particles in respiratory tract of animals
S. L. Warren
G. V. Taplin

4-7-55 4-9-55

R. W. Wager

to: U. S. Naval Biological Lab.
Oakland, California
Aerosol studies on particle size determination and generation of aerosols from hydrosols
H. M. S. Watson

4-10-55 4-16-55

R. W. Wager

to: Radiation Laboratory
Berkeley, California
Effects of radioactive particles in respiratory tract of animals
J. G. Hamilton
K. G. Scott

4-10-55 4-16-55

D. E. Warner

to: Knolls Atomic Power Lab.
Schenectady, New York
Discuss radio-chemical waste disposal procedures
L. J. Cherubin

4-4-55 4-5-55

ENGINEERING DEPARTMENT - DESIGN SECTION (cont'd)

R. B. Gunia

United States Steel Corp.
Pittsburgh, Pennsylvania
Discuss corrosion problems at Hanford
H. E. Struck
H. Bellas

4-25-55 4-26-55

700

ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS (cont'd)

D. M. Wilsey

Knolls Atomic Power Lab.
Schenectady, New York
Regarding KAPL-120 in-pile loop modification
J. A. Berberet

5-1-55 8-1-55

100-B 105-B, 105-C
100-D XXX; 100-H 105
100-F XXX; 100-K-KW
300-L 303

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HW-36440 DEL

RADIOLOGICAL SCIENCES DEPARTMENT

APRIL 1955

SUMMARY

Forty seven informal, ten Class I and no Class II radiation incidents were recorded. The incidence of failure to wear personnel meters was high, indicating the need for a new educational program in this matter.

Iodine emission was somewhat reduced, but an area of 250 square miles outside the reservation had vegetation contamination in excess of permanently permissible limits.

Appropriate contacts have been made with state pollution officials to effect a convenient modification of the impending state regulation on waste disposal permits.

A synergistic action of radioactive particles and chemical carcinogens in inducing lesions in the lung has been observed. This may have valuable practical applications.

RADIOLOGICAL SCIENCES DEPARTMENT

APRIL 1955

The month-end force of 404 included 37 supervisors, 89 engineers and scientists, 23 clerical and 255 other personnel.

Number of Employees on Payroll

Beginning of Month	404
End of Month	404
Net Change	0

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

F. E. Adley and P. L. Eisenacher

Radioactive particle locator for Microscopy

There were 57 radiation incidents, including 10 Class I and no Class II incidents. Although none of the incidents was significant, radiation-wise, three involved failure to wear personnel meters. Evidently, the effects of the last campaign on this feature are wearing off, and a new and vigorous educational program is needed.

In addition, the investigating system revealed that positive counts for I^{131} in the thyroid had not been reported. Such counts were to be expected in view of the high emission of I^{131} in recent months. Their absence had been an inconsistent feature in a recent re-evaluation of the whole I^{131} problem.

There was no major change in the ruthenium particulate contamination picture; considerable spread of already-deposited material to the south and east was observed. Of over 1100 persons surveyed, only two showed particle contamination, and neither exposure was significant. Of nearly 1400 vehicles surveyed, 73 were found to be contaminated. This experience is similar to that of the previous month. Research on the particle problem has generally reached an intermediate stage in which all the relevant answers by "quick and dirty" methods are available. More refined solutions, where needed, will require months, or in some cases even years, of careful study.

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HW-36440

Dec

Radiological Sciences Department

The iodine emission problem continued to be of great interest. In the previous month, the record emission of 540 curies resulted in off-standard conditions over an area of 250-500 square miles contiguous with the reservation. In the current month, the emission was about 110 curies, which is some 3 or 4 times the appropriate limit. However, the deposition pattern totally changed.

The previously affected areas are now within limits. A new off-standard area covering 250 square miles of the Columbia River valley from below Pasco to about Hermiston, Oregon, has been created; there are small areas in the opposite direction from the stack, as at Othello with isolated patches near Walla Walla and near Ritzville, which are close to limits. It is this sporadic shifting of the affected zones with the vagaries of meteorological conditions that makes it impossible to set a realistic emission limit, other than an over-conservative one. The shifting also justifies continued plant operation under conditions that would be intolerable if persistent in one region.

Although improvement of I^{131} emission control is urgently needed, it is probable that production in the next few months can continue uninterrupted, since, in general, more favorable dilution patterns should develop as summer approaches.

In the field of river contamination, cooperation with the Washington State Pollution Control Commission is in progress on the requirements for waste disposal permits to be effective in June. The highly desirable method of reporting discharges to the Columbia River Advisory Group will probably be mutually accepted. Our long and favorable relations with this group would thus pay major dividends, since literal interpretation of the permit system would virtually make the reactors inoperable. A review of river pollution at Pasco and Kennewick for 1954 showed the gut irradiation hazard to go as high as 15% of the appropriate limit, and the bone deposition hazard up to 4%. Because of uncertainties in such calculations, the margin for future operation is not too comfortable; neither does it seem to be critical.

In waste disposal to ground, experience with scavenged wastes continued to show disappointments. Nevertheless, it must be noted that 3.4 million gallons of such wastes have been sent to ground at a savings of over \$600,000. None of this could have been done legitimately without the active studies by Earth Sciences and Radiological Engineering.

A new line of study will be needed if the proposal to refine thorium in the 321 Cold Separations Facility goes ahead. Another area of interest for thorium is being covered free of charge by cooperative measurements on thorium in air and in urine for the U. S. Bureau of Mines. Some biological work was also done on KAPL wastes which showed lethal effects on small aquatic organisms at 5% concentration.

Studies on the metabolism of ruthenium-106 are sufficiently advanced to say that kidney and bone are essentially co-equal critical organs. In either case, the permissible drinking water concentration is in the range $1-4 \times 10^{-3}$ μ c/ml. The "official" limit is 0.1 μ c/ml.

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Radiological Sciences Department

A fundamental finding, the practical significance of which is not fully explored, is that alpha-emitters in the lung act synergistically with chemical carcinogens to produce many more lesions than arise from either agent alone. One concept to be considered is that such tedious work as measurement of lung tumor induction by smoking could be greatly accelerated by simultaneous exposure to radioactive particles if this should happen to be one of the synergistic combinations.

The department held its conference on the "Development of Men" during this month. Considerable stimulation of thinking in this important field was generated. The department submitted 12 abstracts for the Geneva Conference and was requested to prepare papers on 8 of them. This unusually high acceptance ratio, although desirable as an index of the high national standing of the organization, has placed a difficult burden on some of the authors, due to the limited preparation time available.

H. M. Parker

Director
RADIOLOGICAL SCIENCES DEPARTMENT

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DECLASSIFIEDRadiological Sciences DepartmentAPPENDIX1. Condensed Exposure Records

Type	Number of Readings	Potential High Results	Confirmed High Results
Pocket chambers - gamma	286,084	15	0
Pocket chambers - slow neutron	759	0	0
Film Badges - beta-gamma	45,508	19	0
Neutron film	634	0	0
Pu bioassay	1,159	26	2
F. P. bioassay	1,277	3	0
U bioassay	317	0	0
Alpha hand counts	53,108	11	0
Beta hand counts	81,202	0	0

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Radiological Sciences Department

2. Regional Monitoring Records

<u>Sample Type and Location</u>	<u>Activity Type</u>	<u>Average Activity Density</u> <u>/uc/cc</u>	<u>Trend*</u> <u>Factor</u>
<u>Drinking Water and Related Materials</u>			
Benton City Water Company Well	alpha	1.4×10^{-8}	---
Richland, N. Richland, Benton City Wells	alpha	$(\leq 0.5 \text{ to } 1.4) \times 10^{-8}$	--
100 Areas	beta	$(\leq 0.5 \text{ to } 6.8) \times 10^{-7}$	--
200 Areas	beta	$(\leq 0.5 \text{ to } 5.2) \times 10^{-7}$	--
Pasco, Kennewick, McNary Dam	beta	$(\leq 0.5 \text{ to } 3.3) \times 10^{-7}$	--
Backwash solids - Pasco Filter Plant	beta	$2.0 \times 10^{-2} \text{ /uc/g}$	--
Backwash Liquids - Pasco Filter Plant	beta	4.1×10^{-7}	--
Sand Filter - Pasco Filter Plant	beta	$1.8 \times 10^{-4} \text{ /uc/g}$	--
Anthracite Filter - Pasco Filter Plant	beta	$1.2 \times 10^{-4} \text{ /uc/g}$	--
<u>Other Waters and Related Materials</u>			
300 Area Wells #1,2,3	alpha	No sample	--
300 Area Well #4	alpha	No sample	--
Well #4 measured as uranium	U	No sample	--
Other wells on the Reservation	beta	$(\leq 0.5 \text{ to } 5.1) \times 10^{-7}$	+4
Columbia River - Hanford Ferry	beta	1.6×10^{-5}	--
Columbia River - below reactors	beta	9.6×10^{-6}	--
Columbia River - Patterson to McNary	beta	4.0×10^{-7}	--
Columbia River - shore mud	beta	$(2.3 \text{ to } 8.8) \times 10^{-5} \text{ /uc/g}$	--
Raw Water - Operating Areas	beta	$(\leq 0.05 \text{ to } 2.3) \times 10^{-6}$	--
Reactor Effluent Retention Basins to River	beta	6,600 to 31,000 /uc/sec/reactor	--
Reactor Effluent Retention Basins to River	alpha	$(0.82 \text{ to } 7.1) \times 10^{-3}$ $< 0.03 \text{ /uc/sec/reactor}$ $< 5 \times 10^{-9}$	--
I-131 in Farm Wastes to River	I-131	26 /uc/day 6.9×10^{-7}	--
I-131 in Columbia River - Hanford	I-131	0.76×10^{-7}	-2
300 Area Pond Inlet	alpha	1.0×10^{-6}	-4

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Radiological Sciences Department

Sample Type and Location	Activity Type	Average Activity Density /uc/cc	Trend* Factor
<u>Atmospheric Pollution</u>			
Gross Alpha Emitters	alpha	$(\leq 0.4 \text{ to } 3.0) \times 10^{-14}$	+5
Gross Dose Rate - Separations Areas	beta - gamma	0.5 to 8.5 mrad/day	--
Gross Dose Rate - Residential Areas	beta - gamma	0.4 to 1.7 mrad/day	+2
Active Particles - Separations Areas	beta	$(1.7 \text{ to } 7.2) \times 10^{-13}$	--
I-131 Separations Areas	I-131	$(0.1 \text{ to } 1.1) \times 10^{-12}$	-7
I-131 Separations Stacks	I-131	3.8 curies/day	-5
Ruthenium - Separations Stacks	Ru ^{103,106}	$\leq 0.01 \text{ curie/day}$	-3
Active Particles - Wash., Idaho, Oregon, Mont.	-	0.011 to 0.11 ptle/m ³	+3
Active Particles - HAPO	-	0.003 to 0.27 ptle/m ³	--
Tritium (as oxides) - Reactor Stacks	T	0.18 curie/day	--

Vegetation

Environs of Separations Areas	I-131	$(0.03 \text{ to } 1.0) \times 10^{-4} \text{ /uc/g}$	-2
Residential Areas	I-131	$(\leq 3.0 \text{ to } 8.0) \times 10^{-6} \text{ /uc/g}$	+2
Eastern Washington and Oregon	I-131	$(\leq 3.0 \text{ to } 8.0) \times 10^{-6} \text{ /uc/g}$	-
Non-Volatile Beta Emitters - Wash. and Oregon	beta	$(0.67 \text{ to } 2.8) \times 10^{-4} \text{ /uc/g}$	+4
Alpha Emitters - Separations Areas	alpha	$(0.6 \text{ to } 5.3) \times 10^{-7} \text{ /uc/g}$	+2
Alpha Emitters - 300 Area	alpha	$\leq 5 \times 10^{-8} \text{ /uc/g}$	-2

* 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
APRIL, 1955

The budget for the fiscal year 1956 covering Production, Inventories, Net Working Capital, and Radiological Sciences Research and Development was formally transmitted to the Commission on April 25; the Plant and Equipment budgets for the fiscal years 1956 and 1957 were transmitted on April 29.

Cost reports covering Community Section activities were included in unit cost books for the first time in April. These reports provide comparative unit cost data on certain activities of the section, beginning with the fiscal year 1952. Another service inaugurated for the Community Section is the accumulation and review of bulletins and other publications which may prove helpful in developing accounting procedures for an incorporated city and for the private operation of the Kadlec Hospital.

Top Secret Document XX-1410, titled "Product Unit Cost (Current Basis) Third Quarter FY 1955," was issued. This report shows in detail the calculations made in combining production quantities, conversion factors, SF Material costs, conversion and depreciation costs to determine plutonium unit costs for the period.

A comprehensive evaluation of materials and supplies was initiated by the Property Management Unit in the 100-D, 100-H and 200-W areas in order to encourage the release of excessive accumulations of both new and used items now held in the various operating areas. Findings are being discussed with responsible superintendents.

The third annual physical inventory of coal and fuel oil was completed on March 31 and final results will be reported in the near future. The annual inventory of essential materials (exclusive of coal) was finished on April 30, the results to be reported in May.

The segregation of the value of improvements to land applicable to the Richland schools (including paved areas, walks, play areas, tennis courts, etc.) from those applicable to the remainder of the community was started during the month. It is anticipated that such costs will be transferred to the AEC after segregation is completed.

Project proposals and informal requests approved by appropriate Department Managers or the General Manager for transmission to the AEC during the month amounted to \$835,700. Twenty-five requests for appropriations, totaling \$140,428, were investigated and approved.

Charges from HAPC to the Overhead Allowance in April amounted to \$2,240, consisting of: travel and living expense variation, \$1,642; conference expense, \$346; advertisement in "Progress Edition" of the Columbia Basin News, \$189; and cost of operating the company-owned automobile, \$63.

A refund of \$1,047,528 was received from the State of Washington, representing business and occupation taxes, plus interest, paid during the period from January, 1947 to September, 1951. This amount was, in turn, transferred to the Commission.

Meetings were held on April 13 and 14 with Commission representatives by the subcommittee appointed by the Manager - Finance to negotiate changes in Appendix B to the proposed new prime contract with the AEC. Almost all of the revisions offered by General Electric, which were required largely because of modifications in Company policy, were accepted by the Commission, with some alterations agreed upon subsequent to these meetings.

In connection with SF Accountability, a review of the sampling procedure for SF Materials has disclosed three points at which either the sample or the frequency could be eliminated or reduced. These include the elimination of the Am-Cm determination for low material, a 50% reduction in sampling frequency for TBP hot wastes, and the elimination of the H-5 waste measurement at Redox. Savings in analytical time alone are indicated in the range of \$175 per month.

As a result of a decision on the part of the Hanford Operations Office of the AEC to discourage the mixing of normal uranium and depleted uranium or for the mixing of any U-235 content material with material of lower weight percentage, the recovery of canning pickle solution via TBP-UO₃ has been abandoned. In addition, the local recovery of E slugs would also appear to come under this ruling.

A custodian inventory verification program for SF Materials is to be initiated in May in the Redox, TBP and UO₃ plants. This is a service function organized by the SF Measurements Unit for increasing custodian check and verification procedures relative to these inventories. The objectives are the substantiation of inventory values, the elimination of erroneous quantities or omissions, and the elimination of after-the-fact adjustments. This program was scheduled on the basis that there would be no increase in personnel requirements. The plan has been readily accepted by custodians.

Two analysts from the Procedures and Computing Section tested programs for the 702 electronic data processing machine at the International Business Machines factory in Poughkeepsie, N. Y., during the last two weeks in April. The two major projects were the testing of the weekly payroll conversion programs, over 50% of which was accomplished, machine time being less than ten hours; and the testing of further detail lists of interpretive routines being developed for assembling program instructions for scientific and commercial problems.

At the end of April the Procedures and Computing Section had completed approximately 75% of the machine work required for a report on the results of the employee attitude survey which began March 25. In addition to key punching involving over half a million strokes, some 100,000 evaluations of a statistical formula were calculated, using the card-programmed calculator, requiring approximately 200 hours.

G. M. Myers, Auditing Section, was transferred to the Financial Section, Atomic Power Equipment Department, Atomic Products Division, Schenectady, effective May 1.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

Summary of Cash Disbursements, Receipts and Advances	I - 4
Auditing Section	I - 5
Budgets and Measurements Section	I - 6
Contract Cost Section	I - 7 through I - 10
General Accounting Section	I - 11 through I - 17
Personnel Accounting Section	I - 18 through I - 20
Procedures and Computing Section	I - 21 through I - 23
Property Accounting Section	I - 24 through I - 30
SF Accountability Section	I - 31 through I - 34
Personnel and Organization Statistics	I - 35 through I - 36

SUMMARY OF CASH DISBURSEMENTS,
RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of \$7,150,000 and \$5,900,000, respectively, by the Atomic Energy Commission) for the months of April and March, 1955, is shown below:

<u>Disbursements</u>	<u>April</u>	<u>March</u>
Payrolls (net)	\$3 529 627	\$3 024 981
Materials and Freight	1 877 999	1 717 418
Business and Occupation Tax		
Transmitted to AEC	1 047 528	-0-
Payroll Taxes	1 039 950	699 209
Payments to Subcontractors	522 490	514 009
Cost of Stock Bonus Plan for Year 1954	-0-	230 261
United States Savings Bonds	202 523	133 113
Pension Plan - Employees' Portion	97 483	99 061
Travel Advances to Employees	77 377	61 833
Group Insurance Premium	2 901	147 371
All Other	116 600	152 112
 Total	 8 514 478	 6 779 368
 <u>Receipts</u>		
Refund of Business and Occupation Tax	1 047 528	-0-
Rent	116 574	115 764
Electricity	77 613	99 063
Telephone	52 796	55 734
Hospital	51 978	64 896
Refunds from Vendors	51 374	586
Sales to AEC Cost-type Contractors	23 090	2 601
Refund of Travel Advances to Employees	14 338	7 685
Sundry Accounts Receivable	10 079	9 924
Bus Fares	8 415	9 280
Other	5 503	11 089
 Total	 1 459 288	 376 622
 Net Disbursements	 \$7 055 190	 \$5 402 746

Outstanding advances as of April 30, and March 31, 1955 were as follows:

	<u>April</u>	<u>March</u>
Cash in Bank - Contract Accounts	\$1 810 678	\$1 715 868
Cash in Bank - Salary Accounts	15 000	15 000
 Total	 \$1 825 678	 \$1 730 868

AUDITING SECTION
MONTHLY REPORT - APRIL, 1955

Reports were issued for the completed audits listed below:

- Nucleonics Employees Good Neighbor Fund
- Procurement Activities
- Stores Activities
- Minor Construction Stores
- Plant Accounting Records and Procedures

At month-end, reports were being prepared for audits of:

- Maintenance, Utilization and Safeguarding of Capital Assets
- Classified Files
- Weekly Payroll Preparation and Distribution
- Overtime Lunches

Field work was continued on the following audit:

- General Accounts

The following audits were started during the month:

- Records Operations and Forms Control
- Bank Account Reconciliations and Cash Controls
- Traffic Activities
- Accounts Payable
- General Electric Employees Purchase Plan
- Construction Work in Progress

Follow-ups were made to determine the extent of compliance with recommendations made in reports of following audits:

- Termination Clearance Procedure
- Receiving and Inspection
- Photographic Equipment and Operations
- Accounts Receivable - Sundry
- Cash Controls

Two employee information meetings were held during the month. One of the meetings included health and safety subjects and the other included security.

Two auditors were transferred from Auditing Section as of April 30, 1955; G. M. Myers to the Atomic Power Equipment Department of the Atomic Products Division, Schenectady, N. Y. and D. L. Haynie to Accountability Section.

BUDGETS AND MEASUREMENTS SECTION
MONTHLY REPORT - APRIL, 1955

General

Recruiting for additional Business Graduates was done during the month at Central College of Eastern Washington, Seattle University, College of Puget Sound and Pacific Lutheran College. Three offers were made with two acceptances to date. Of twenty offers to date, we have a total of eight acceptances, seven rejections and five not heard from. We believe a total of twenty new Business Graduates will be needed and are planning for additional recruiting during May.

Budgets

The FY 1956 budget covering Production, Inventories, Net Cash Working Capital and Radiological Sciences Research and Development was reviewed with the General Manager and was acceptable without change. Formal transmittal to the Commission was dated April 25.

Work progressed well on a control budget to supplement the regular FY 1956 budget which can be used as a measure of performance. The entire budget is expected to be complete by the latter part of May.

Bogey estimate statements were revised at the suggestion of the Manager - Finance and were released by due date in the new form.

Measurements

A second publication for HAPO Management was completed and distributed. This covered an inventory of existing measurements segregated between those applicable to all departments and those with specific applications.

A great deal of work was done on Employee Relations indicators with completion of ten charts and an additional ten in process.

Progress was made toward building up the personnel assigned to Measurements with indications that the staff should be operating at full strength by late June.

CONTRACT COST SECTION
MONTHLY REPORT - APRIL, 1955

The Budget for the Kadlec Hospital was the center of considerable discussion brought about by a sharp decrease in the average adult patient-day census which occurred early in March and which drastically effected the net costs of the hospital in FY 1955. The Commission was informed that Kadlec Hospital would overrun the 1955 budget by approximately \$37 000 and that estimates for FY 1956 should recognize this fact. As a result of these discussions, the Budget for the Kadlec Hospital was completely revised and re-submitted to the Atomic Energy Commission. It is significant to note that gross costs of this operation as budgeted for FY 1956 were reduced \$102 000, offsetting to a very large extent an expected drop of \$107 000 in expected revenues resulting from projecting the adult patient-day census at a much lower level in FY 1956 than had been contemplated in the earlier submission to the Commission. The reduction in gross operating costs was to be accomplished by force reductions primarily. The financial analyst assigned to the hospital will make periodic reports showing actual force reductions in relation to those planned.

Transfer of Stainless Steel inventory from Blaw-Knox to Minor Construction was effected early in April at the request of the Atomic Energy Commission. Acquisition value of this inventory was \$576 160 and was billed with an 80% reserve to offset losses through future excessing. Material was established in stores stocks in a special inventory account at acquisition cost and will be sold at this cost. A separate inventory reserve was established in the amount of \$460 928. Also, at Atomic Energy Commission direction, a transfer of 8600 gallons of Amercoat, primers and solvents was effected from Blaw-Knox to Minor Construction Stores. Material was established in existing inventory accounts at acquisition cost of \$52 119. This material was also transferred with an 80% reserve which was credited to inventory reserve in the amount of \$41 695.

With the assignment of responsibility for operation and maintenance of the White Bluffs Area to the Manufacturing Department, routine work orders were established to accumulate cost to be billed to the Atomic Energy Commission.

Employee and Public Relations Cost Unit

Operating budgets for the 7000 Program in FY 1956 were reviewed with AEC Community Management and Budget personnel on April 14 and 15. Some minor changes were recommended in the budget for the Community Section. Major changes, which may be necessary following decision as to ultimate disposition of Conservation of Health activities and Public Welfare, will be deferred until final disposition of these activities is known.

Plans were completed during the month to transfer budgeted funds for Mosquito Control this season from the Health and Safety Section to the Community Section.

The operating cost report form for the Plant Activities Sub-Unit was carefully analyzed during the month to determine if improvements were in order. It was decided that there would be no change in the published form; however, auxiliary schedules to facilitate elimination of within-department costs will be included in file copies retained by the unit.

A review of work loads in the Plant Activities Sub-Unit resulted in the elimination of one Cost D job and the establishment of a General Clerk A rating.

Engineering Cost Unit

Several reviews were made of the Project Section procedure for developing and standardizing project estimates. The procedure is now in final draft form and it is expected that adoption will be effective during May.

Development of operating procedure and physical inventory procedure for Minor Construction Stores was initiated during the month. Inventory procedure has been forwarded to Minor Construction Sub-Section and Audit Section for comment. It is anticipated that the operating procedure will be forwarded for comment about the middle of May.

Decisions were reached with the Atomic Energy Commission and representatives of Plant Accounts as to the projects which should be transferred to Plant and Equipment In Service from Construction-Work-In-Progress before the close of the fiscal year.

Cost reviews held with Project Section Management as of the close of the third quarter indicated that adjustments to the standard rates to more nearly equal actual costs were in order for some functions. Overliquidations result from a greater work load during this period than was planned due to the peaking of CG-558 - Pile Modifications for Increased Production, CG-603 - Re-activation of "B" and Revision of "T" Plants, CA-513 - Purex Production Plant and CA-514 - 300 Area Facilities. In the review at the close of the previous quarter, the work load of CG-603 - Re-activation of "B" and Revision of "T" Plants was too uncertain to be a basis for planning; the CA-513 - Purex Production Plant work was unknown as HOO-AEC had not indicated how much of the work would not be completed by Blaw-Knox and Project CA-514 - 300 Area Facilities was spread out over a longer schedule. Firming up of the status of these projects has increased the work load for the immediate future which tends to create large overliquidations at the present standard rate.

It was decided that redistribution of the overliquidation would better serve the purpose than a change of rate as the decline in the workload forecasted for next fall would require another rate adjustment at that time. Redistribution of approximately \$380 000 to active projects, based on costs of this fiscal year, is being effected as April business.

As a result of a review conducted during the month, a reduction in the number of journal entries issued by Design Cost is anticipated. Starting with business for the month of May, all billings to customers will be handled on one journal entry. A second journal entry for adjustments will be used as required. This change in procedure will permit a reduction of three journal entries normally issued in the past.

General and Consolidations Cost Unit

A monthly cost to date listing of expense codes is scheduled to begin in May. This report will enable the Computing Unit to summarize expense code costs weekly, thereby resulting in a savings of time at month end. The Project Engineering Weekly Work Order Cost to Date listing is scheduled from the Computing Unit beginning with the fiscal month of May.

A proposed schedule of Store Order Withdrawal Cut-off dates for FY 1956 has been completed. The new schedule is intended to relieve a month-end bottleneck within the Computing Unit by allowing a full week between Store Order and non-exempt payroll cut-off dates. It is estimated that the new cut-off dates will enable both Computing and General Books to complete this work with less confusion. At the present, sufficient time is not allowed to correct errors found in store order reports.

The month-end closing schedule for April and May was completed and distributed early in April. The fiscal year-end closing schedule is now in preparation but will not be completed until after the Fiscal Year 1955 closing meeting has been held.

Twenty pages of the uniform cost code guide were revised, printed, and distributed during April.

Assistance was given to Radiological Sciences personnel in preparing visual aids for presentation by the department manager.

A meeting was held with representatives of the Biology Section and the AEC to discuss justification of the proposed increase of Research and Development funds for the Biology Section. Based on this meeting, a letter was sent to the Commission outlining these justifications.

Manufacturing Cost Unit

A new form tentatively titled "Capital Work Order" is being designed with the thought of providing Plant Accounting most of the necessary information required in unitizing equipment items. A procedure is also being written covering the use of this form by cost units in an attempt to have a uniform method of reporting and transferring cost to Plant Accounts. This form and procedure is being designed jointly by the Manufacturing Cost Unit and Plant Accounting personnel.

In order to eliminate much of the typing and reduce the proofing required on the Equipment Work In Progress report a new duplimat master was designed and forwarded to Printing. This will eliminate approximately fifty pages of heading typing on this report and should save considerable typing time.

Landlord Expense Codes were established for 100-KE Area Buildings. Rental rates were set at the same figure established for comparable buildings in other areas. Billing to tenants is being made for the month of April. This completes setting up the expense code structure for both KE and KW Areas.

Revisions to Reactor Section standard costs were made for coal consumption and gas consumption for purges during startups. Revision of the coal standard incorporates the recent change in the operating procedures requiring the operation of turbines in the 190-buildings during Reactor outages and provides for the drop in water flow to Reactors during an extended outage. Gas standards were reduced to reflect the recent changes in volume of gas used for purges during startups. Inclusion of a standard cost for process tube replacement was made to provide for large scale replacement of process tubes because of general weakness of the tubes.

It does not represent the cost of replacing tubes which have been damaged as a result of a stuck tube charge or a fuel element failure.

Recuplex and Task I additions to the 234-5 Building have made a revision in the method of unit cost calculation necessary. A proposed revised method of calculation was issued in Document HW-36420 "Unit Cost Calculation - Metal Fabrication".

The Separations Section Financial Representative has been working with the Industrial Engineers of the Separation Section on a "cost of the month program", recently inaugurated. This program is designed to bring pertinent cost items to the attention of all Separations Section personnel in an attempt to reduce the expenditures for the various items to be covered in a six month period.

A large number of changes received in the Work Authorization listing since the March 15, 1955 revision, made an April 25, 1955 revision necessary. It was originally planned to have Computing issue a revision periodically. We have been informed that Computing will be unable to do this work due to lack of operating time and, therefore, Manufacturing Cost Unit will make future revisions manually.

As a result of a routine review of all open work orders with no recent activity, twenty Reactor Section work orders which had shown no activity in the preceding six months were closed via letter from the Reactor Section Financial Representative to the Unit Superintendents holding the work orders. Manufacturing Cost Unit will continue to make complete reviews of all orders showing no activity for the preceding three months to ensure the prompt closing of all jobs as they are completed.

A quarterly review of unit prices for essential material consumption was made. Significant changes due to new contracts were a decrease in ANN price from \$4.10 per hundred pounds to \$3.75 and a Nitric Acid decrease from \$3.50 per hundred pounds to \$3.10 effective with April consumption.

GENERAL ACCOUNTING SECTION
MONTHLY REPORT--APRIL, 1955

ADMINISTRATIVE PLANNING

A total of 16 new or revised organization and policy guides were distributed during April. One of these was an instruction guide, the balance were organization guides.

The sole instruction guide was 13.1, Vacation Plan. This guide was revised due to the revision in HAPO vacation policy to conform with the Company plan which was effective January 1, 1955.

One complete OPG book was compiled and 374 extra copies of OPGs distributed.

In addition to the OPGs mentioned above, 86 are in Duplicating awaiting production and distribution.

Establishment of standard delegation of authority lists progressed during the month with the classification of authorities within each subject group into three categories according to importance. Various servicing components are currently reviewing these break-downs.

Approximately 25 organization and policy guides are now in process of review and necessary revisions will be made as required.

In addition, OPGs 13.7, Company Benefits for Employees Entering the Armed Forces, and 18.14.7, Policy on Employment of Individuals Relieved from the Armed Forces, U. S. Public Health Service and State of Washington National Guard, are being reviewed for possible consolidation into one guide. Also two new guides are being prepared: 04.2 on Engineering Standards and 04.13, Research and Development Equipment Accountability and Control.

A report was issued summarizing AEC transmittals received within HAPO for the month of March, 1955.

ACCOUNTS PAYABLE UNIT

Number of vouchers booked in Accounts Payable during the month was 4,507 amounting to \$4,760,620, as compared with 4,852 amounting to \$3,785,781 in March. The dollar increase in April results from one voucher issued to transfer to the Commission the Business and Occupation Tax refund received from the State in the amount of \$1,047,528.

Preliminary plans and arrangements are being made in connection with the proposed move of Accounts Payable from the 101 Building to Dorm W-21. Tentative date for this move is June 25.

Cash discount earned in April totaled \$10,371, as compared with \$8,471. Total cash discount earned this fiscal year to date is \$59,375.

ACCOUNTS PAYABLE UNIT (Continued)

Active contracts handled by Accounts Payable, excluding requirements numbered 22, and contract commitments at the end of April amounted to \$484,582. Payments on these contracts in April totaled \$78,229.

Requirements contract orders placed during April numbered 14 in the amount of \$470,068 and commitments at the end of April amounted to \$704,280. Payments under requirements contracts for the month were \$442,434.

During the month of April a check in the amount of \$47,605 was received from the National Carbon Company covering final settlement of Special Agreements No. G-5 and G-12. Final release forwarded to the supplier on March 31, 1955 for execution has not as yet been returned.

Accounts Payable:

	<u>April</u>	<u>March</u>
Balance at beginning of month	\$ 774 248	\$ 584,044
Vouchers entered	4 760 620	3 785 781
Accrual for inventories	112 754	45 841
Cash receipts	<u>51 373</u>	<u>586</u>
	<u>5 698 995</u>	<u>4 416 252</u>
Less:		
Vouchers paid	4 782 342	3 621 278
Reversal of accruals	<u>45 841</u>	<u>20 726</u>
	<u>4 828 183</u>	<u>3 642 004</u>
Balance at end of month	<u>\$ 870 812</u>	<u>\$ 774 248</u>

Other Statistics:

Number of vouchers recorded	4 507	4 852
Number of checks issued	2 706	3 072
Number of freight bills paid	1 572	1 635
Amount of freight bills paid	\$332 000	\$302 315
Number of purchase orders received	2 593	2 613
Amount of purchase orders received	\$2 175 228	\$2 516 588
Amount of cash discount earned	\$10 371	\$8 471

ACCOUNTS RECEIVABLE UNIT

We were advised by Commonwealth, Inc., operators of the North Richland Construction Camp, that all living facilities other than for U. S. Army personnel would be closed effective June 15, 1955. As of April 30, 1955, 106 General Electric employees were occupying trailer or barracks space in North Richland, and payroll deductions were being made from salary checks for rentals due. As requested by Commonwealth, Inc., deduction authorizations will be cancelled as of June 1, 1955, and final deductions will be made from June salaries covering rentals due through May 31, 1955. Employees who continue to occupy space

ACCOUNTS RECEIVABLE UNIT (Continued)

after June 1 will make cash payments directly to Commonwealth, Inc., however they will be required to vacate on or before June 15, 1955.

Disconnect notices were mailed to 146 telephone subscribers during the month, and the service of 9 subscribers was suspended due to non-payment of bills. During the month, 334 delinquent notices and 69 final notices were mailed to electricity customers. The service of 13 electricity customers was suspended due to non-payment of bills.

One accounts receivable employee of Kadlec Hospital was transferred to the Contract Cost Section on April 25, 1955. Due to decreased hospital sales, and the expectation that sales will continue at a lower level than in previous years, the work load of this employee was distributed with other employees, and a replacement will not be required.

Other statistics pertaining to accounts receivable are summarized below:

<u>Account</u>	<u>Balance</u> <u>3-31-55</u>	<u>Net</u> <u>Charges</u>	<u>Collec-</u> <u>tions</u>	<u>Balance</u> <u>4-30-55</u>	<u>Bills</u> <u>Issued</u> <u>in April</u>
Kadlec Hospital:					
Active	\$ 96 850	\$ 56 607	\$ 58 332	\$ 95 125	1 352
Collection Agencies					
(90 Accounts)	9 321		80	9 241	
Electricity	42 818	94 295	80 833	56 280	4 016
Telephone	35 201	50 164	53 925	31 440	6 891
Sundry:					
Active	27 391	19 558	13 285	33 664	373
Collection Agencies					
(134 Accounts)*	7 482	663	282	7 863	
AEC Cost-type Contractors	33 080	16 890	23 090	26 880	32
Rents	27 507	391 632	386 056	33 083	6 831
Equipment sales to					
Facilities (1 Account)	22 336		349	21 987	
Safety Shoes	1 818	1 876	2 290	1 404	314
Loans to Employees					
(2 Accounts)	516		154	362	
Sub-total	304 320	\$631 685	\$618 676	317 329	19 809
Reserve for Bad Debts	26 164	cr.		24 526	cr.
General Ledger Balance	\$278 156			\$292 803	

*Includes all utility and rental accounts.

CONTRACT REIMBURSEMENTS

Ten letters, written in accordance with O.P.G. 05.4 ("Work or Expenditures Which Require AEC Reimbursement Authorization or Letter Approval"), were approved by the Commission in April. The subject of three of these was memberships in associations and societies, two were related to travel expense, and others to a telephone installation rate schedule for the community, the interpretation of an AEC issuance covering extended work schedules, the use of classified material in the Graduate School of Nuclear Engineering, the attendance of an employee at a radioactive contamination conference in England, and a workmen's compensation case.

Charges from HAPO to the Overhead Allowance in April amounted to \$2240, consisting of: travel and living expense variation, \$1642; conference expense, \$346; advertisement in "Progress Edition" of the Columbia Basin News, \$189; and cost of operating the company-owned automobile, \$63.

A report on various types of meetings held by the Financial Department for the first quarter of 1955 showed a grand total of 351, including 178 staff meetings, 11 held by the department manager, 83 by section managers, and 84 by unit heads; 105 "round table" meetings; 24 information meetings; and 44 safety, health and security meetings.

A survey was made to determine how many telephones should be provided only in-plant service after the separation of the plant system from the community about June 15, and a list of 36 such numbers in the Financial Department was furnished the Auxiliary Operations and Plant Protection Section. This is about one-third of the department's telephones, since there are approximately 90 numbers assigned to Financial Department personnel in addition to the PBX system for the Procedures and Computing Section and the Financial Department telephones at the hospital, which are also reached through a PBX board.

Other staff assignments included the completion of the quarterly organization chart for the department as of March 31.

A schedule for safety-health-security meetings for General Accounting Section employees (except for Accounts Payable personnel, for whom separate meetings are held because of their location) for the remainder of 1955 was worked out. The various groups in the section will rotate in preparing for and conducting the meetings.

The Contract Reimbursements group handled 12 inquiries on reimbursement problems during the month, a third of which originated outside of the Financial Department.

The March "Summary of Disbursements," which was transmitted to the Commission through the Chief of its Finance Division, covered disbursements of \$6,402,745, which are detailed on the following page.

CONTRACT REIMBURSEMENTS (Continued)

Payrolls and Payroll Deductions Disbursed	\$3 981 701
Material (including payments on requirements contracts) and Freight	2 143 967
Subcontracts and agreements	87 117
Advances for Traveling and Living Expenses	61 833
Miscellaneous Payments	<u>504 749</u>
Gross disbursements	6 779 367
Less: Receipts	<u>376 622</u>
Net disbursements	<u>\$6 402 745</u>

In preparing this report, a review was made of each of 277 items which comprised "Miscellaneous" to establish their propriety, while all other expenditures were analyzed, classified and summarized to disclose the nature of all the disbursements made by HAPO during the month.

GENERAL BOOKS UNIT

A check in the amount of \$1,047,527.97 was received in April from the State of Washington, representing refund to General Electric of Business and Occupation Tax paid for the period January, 1947 through August, 1951 and interest at the rate of 3% per annum on those payments from March, 1949 until August, 1951. The amount refunded was immediately transferred by check to the Atomic Energy Commission. Settlement of approximately \$1,500 covering court costs and additional interest is still outstanding.

Interest income in the amount of \$2,760 was received on invested funds of the Washington State Pension Awards Deposit account. This amount represents interest earned for the period November 1, 1954, through April 30, 1955 on U. S. Government Series K Bonds totaling \$200,000. Since the purchase date, May 1, 1953, interest earned on these bonds totals \$11,040. The balance of the Washington State Pension Awards Reserve consists of the following:

Invested Funds

U. S. Government Series K Bonds, 12-year maturity date May 1, 1965, purchased May 1, 1953. Interest rate of 2.76% compounded annually or semi-annually.

Face value	\$200 000
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U. S. Treasury Savings Notes Series B issued September 15, 1953, maturity date September 15, 1955. Interest rate 2.1% payable at maturity. (Optional retirement 4 months from issue date.)

Face value	150 000
	<u>82 122</u>

Current Funds (cash on hand)

\$432 122-a)

(a-Consists of award reserves of \$421,082 and earned interest received of \$11,040.

GENERAL BOOKS UNIT (Continued)

Two cash receipting machines for use in the Works Cashier's Office were received during April. A standard customer's receipt form, similar to bank deposit receipts, was designed for use in the cash receipting machine as the customer's receipt. The machine prints the date of payment, serial number of the receipt, symbol designating item paid, i.e., rent, telephone, electricity, etc., and amount of payment. A written procedure covering procedures to be followed in connection with the use of the cash receipting machines has been completed and will be incorporated in the Cash Control Procedures Manual. Other forms to be used in connection with the new procedure have also been designed. The changeover to the new procedure is expected to take place on May 9, 1955 at the time necessary renovations to the Cashier's Office will be completed.

Effective with May 1, 1955, the Washington State Business and Occupation Tax rate applicable to HAPO was increased from .3% of gross disbursements adjusted by allowable deductions to .4%, and state sales tax rate was increased from 3% to 3-1/3%. This represents an increase of approximately \$72,000 per year in state taxes to be paid by HAPO based on current disbursements. A letter has been forwarded to those having responsibility for collection of sales tax, informing them of the change in rate and requesting that they take the necessary steps to collect proper amounts.

General ledger account 0505 - Travel and Living Expense Variation was discontinued at the end of March and was replaced by account 0507 - Non-Reimbursable Expenditures, effective as of April 1, 1955. This new account is to be used to record all non-reimbursable cost under our present contract, including travel and living expense variation, conference expenses, company owned cars and other non-reimbursable expense. The account is to be cleared prior to close of business at the end of each month by billing to Schenectady for reimbursement from the Overhead Allowance, therefore will reflect a zero balance at month end.

Final editing of the Cash Control Procedures Manual is complete and duplimate masters are now being typed for printing of the manual. It is expected that the manual will be forwarded for printing by May 13 and will be issued before May 31. Work on FY-1956 budgets for travel and living expense variation and attendance at meetings of technical and professional societies continued during April. The proposed budgets will be completed in May and submitted for approval.

Through further consolidation of certain work and re-allocation of work a reduction in work force of one employee was effected during the month. This represents a total reduction of two employees within the last three months.

The statistical information on the following page relates to General Books activities.

GENERAL BOOKS UNIT (Continued)

	<u>April</u>	<u>March</u>
Advances from A.E.C.		
Balance at beginning of month	\$1 730 868	\$2 233 614
Advances received from A.E.C.	7 150 000	5 900 000
Other cash receipts	<u>1 459 288</u>	<u>376 622</u>
	10 340 156	8 510 236
Less disbursements	<u>8 514 478</u>	<u>6 779 368</u>
Balance at end of month	<u>\$1 825 678</u>	<u>\$1 730 868</u>
Advances requested for subsequent month	<u>\$6 500 000</u>	<u>\$7 150 000</u>
Travel and Living Expenses		
Travel Advances to employees		
Balance at beginning of month	\$ 54 063	\$ 38 651
Advanced to employees	<u>77 377</u>	<u>61 910</u>
	<u>131 440</u>	<u>100 561</u>
Less:		
Travel, living, and conference expenses reported by employees	50 273	38 813
Cash refunded by employees	<u>14 338</u>	<u>7 685</u>
	<u>64 611</u>	<u>46 498</u>
Balance at end of month	<u>\$ 66 829</u>	<u>\$ 54 063</u>
Outstanding Travel Advances to Employees		
Current	\$ 60 380	\$ 47 966
Outstanding over 30 days	<u>6 449</u>	<u>6 097</u>
Total	<u>\$ 66 829</u>	<u>\$ 54 063</u>
Number of expense reports submitted by employees	221	215
Works Cashier's Office		
Receipts Issued	<u>April</u>	<u>March</u>
Rent	1 248	1 246
Telephone	5 728	5 905
Electricity	3 483	4 023
All other	<u>722</u>	<u>723</u>
	<u>11 181</u>	<u>11 897</u>
Bus System Operations		
Cash collections: Village	\$ 689	\$ 820
Area	\$ 7 326	\$ 7 860
Tickets: Value of tickets sold	\$ 400	\$ 600
Number of tickets sold	8 000	12 000
Number of tickets collected	9 450	10 515
Cash Overages and (Shortages)		
Number	6	9
Amount	\$ (.62)	\$ (8.89)

PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT - APRIL, 1955

One time clock was installed in the 713 Building for use by personnel of the Procedures and Computing Section. There are now 44 time clocks in use throughout 300, 700, and 1100 Areas.

Vacation Notice cards for weekly-paid employees who are qualified or will qualify for a vacation in 1955 were delivered to supervisors with weekly payroll checks on Friday, April 22, 1955. These cards will be used by supervisors to notify Weekly Payroll of the weeks that their employees will be on vacation and to request that vacation payments be included in the employees' payroll checks on the payday prior to start of the vacation.

At the end of April, 332 weekly-paid employees and 111 monthly-paid employees had authorized payroll deductions for shares in the HAPO and GESA Federal Credit Unions, respectively. This represents an increase of 73 weekly-paid employees and 31 monthly-paid employees over the number who had authorized deductions up to the end of March 1955.

Three hundred fifty-five Special Absence Frequency Reports for the first quarter of 1955 were forwarded to Section Managers in April. A report was issued for each non-exempt employee who had an absence frequency of four during the quarter. These reports indicate frequency of absenteeism during the current year segregated by quarters and frequency of absenteeism during the two prior years, as well as number of days absent during all of these periods. The absences are segregated by reasons.

The Monthly Attendance Report form used by exempt employees to report time worked will be printed on an IBM card form instead of an 8-1/2" x 11" sheet effective with the month of May. Use of the new form will facilitate the work of Monthly Payroll in preparing and distributing the form and in summarizing the information shown on the form after it is returned to Monthly Payroll. It is estimated that a saving of approximately 60 man-hours per month will result from use of the new form.

The Procedures Unit conducted a guided tour of the IBM machine room for the benefit of Weekly Payroll personnel. The purpose of the tour was to acquaint Payroll employees with the various types of machines used to prepare the payroll and to broaden their concept of the machine processing of the weekly payroll.

As of the end of April, 114 annuity certificates had been issued to employees who transferred to General Electric from the Du Pont Company at Hanford on September 1, 1946. Three such certificates were issued during the month of April.

Among the topics discussed in the Round Table meetings of non-exempt employees were the proposed \$25 deductible feature applicable to the dependent insurance coverage under the General Electric Insurance Plan and the criteria for selecting employees to fill vacancies in non-exempt classifications.

STATISTICS

Personnel Accounting Section

<u>Number of HAPO Employees</u>	<u>Total</u>	<u>Monthly Payroll</u>	<u>Weekly Payroll</u>
<u>Changes during month</u>			
Employees on payroll at beginning of month	9 101	2 257	6 844
Additions and transfers in	163	8	155
Removals and transfers out	(112)	(23)	(89)
Transfers from weekly to monthly payroll	-	14	(14)
Transfers from monthly to weekly payroll	-	(4)	4
Employees on Payroll at end of month	<u>9 152</u>	<u>2 252</u>	<u>6 900</u>

	<u>April</u>			<u>March</u>	
<u>Overtime Payments During Month</u>	<u>Number</u>	<u>Amount</u>		<u>Number</u>	<u>Amount</u>
Weekly Paid Employees	7 796	\$135 870 -a)		6 736	\$147 594 -b)
Monthly Paid Employees	451	36 718		461	41 064
Total	<u>8 247</u>	<u>\$172 588</u>		<u>7 197</u>	<u>\$188 658</u>

<u>Number of Changes in Salary Rates and Job Classifications</u>	<u>April</u>		<u>March</u>	
Temporary Changes	75		23	
Retroactive Changes	31		79	
Normal Changes	754		1 086	
Total	<u>860</u>		<u>1 188</u>	

<u>Gross Payroll Paid During Month</u>	<u>April</u>		<u>March</u>	
Engineering	\$ 827 866		\$ 782 972	
Manufacturing	2 863 617		2 426 553	
Other	1 300 207		1 130 636	
Total	<u>\$4 991 690 -a)</u>		<u>\$4 340 161 -b)</u>	

(a- Payments to weekly paid employees are for five week periods.

(b- Payments to weekly paid employees are for four week periods.

<u>Employee Benefit Plans</u>	<u>Number Participating</u>		<u>Percent Participation</u>	
<u>Participation in Benefit Plans at Month End</u>	<u>April</u>	<u>March</u>	<u>April</u>	<u>March</u>
Pension Plan	7 972	8 000	98.4%	98.3%
Insurance Plan				
Personal coverage	9 094	9 043	99.4	99.4
Dependent coverage	6 427	6 392	-	-
U. S. Savings Bonds				
Stock Bonus Plan	4 674	4 584	51.0	50.4
Savings Plan	1 189	1 191	13.0	13.1
Both Plans	5 284	5 202	57.7	57.2

<u>Pension Plan</u>	<u>April</u>	<u>March</u>
Number retired	4	6
Number who became eligible for participation	50	56
Number who applied for participation	49	52
Number who elected not to participate	1	3
Replies not received	0	1
 <u>Insurance Plan - Number of Claim Payments</u>		
Employee Life Insurance	2	2
Employee accident and health insurance	457	557
Dependent accident and health insurance	487	614
Total	<u>946</u>	<u>1 173</u>
 <u>Good Neighbor Fund</u>		
Number participating	6 506	6 425
Percent of participation	71.1%	70.6%
 <u>Suggestion Awards</u>		
Number of awards	85	75
Total amount of awards	\$1 880	\$1 245
 <u>Preferential Rates</u>		
Number (eliminated) or added	(3)	(3)
Number currently in effect	554	557
 <u>Number of Military Allowance Payments</u>	5	4

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - APRIL 1955

GENERAL

Two Analysts tested programs for the 702 Electronic Data Processing Machine at the IBM factory in Poughkeepsie, New York during the last two weeks in April. Over 50% of the weekly payroll conversion programs were tested, using less than ten machine hours. The basic logic and approximately 3000 detail program steps were proven.

Further testing on the modified SCRIPT assembly routine was carried out at Poughkeepsie. All floating-decimal subroutines available at the time, including the tracing routine, were thoroughly tested. These tests included a number of sample problems, among which was one requiring the inverting of 25th order matrices. Using floating-decimal arithmetic, the time required to invert one of these matrices was approximately 11 minutes. Work on the development of subroutines is being continued. Subroutines for the functions logarithm and arctangent, in both fixed and floating-decimal, are presently being written, and should be completed in time for the final testing session at Poughkeepsie.

New commercial subroutines developed during April and tested at Poughkeepsie were:

1. Punching and printing routines for preparing report formats automatically.
2. The use of "Move-To" type subroutine was tested and found to reach expectations for ease in programming and accuracy.

Systems and logic work is underway for conversion of the following:

Weekly Salary Distribution

Work Order Distribution

Vehicle Reporting

Classified Files

Manpower Survey Report

Quarterly Weighted Average Report

Personal Accident Report

Machine processing of attitude survey questionnaires was initiated on March 25. A total of 8,081 questionnaires was returned to the Procedures and Computing Section for keypunching. Since each questionnaire contained an average of 60 responses, there were some half million keypunch strokes required. In order to furnish management with reports on the attitude survey, test scores for each organizational component (department, section, sub-section, and unit) and for each personnel class (nonexempt, exempt non-supervisor, and exempt supervisor) were calculated. This required some 100,000 evaluations of a statistical formula. The calculations were performed on the card-programmed calculator and required approximately 100 hours. Machine processing is approximately 75% complete.

PROCEDURAL ANALYSIS

PROCEDURES AND COMPUTING SECTION

Forms Control reviewed 417 orders during April covering 1,267,000 forms; 15 orders, amounting to 12,500 forms, were rejected; 103 new forms were designed.

Employee & Public Relations Department

A request from Salary Administration for selective statistics on college graduates was received and completed during April.

The study of clerical procedures at Kadlec Hospital was completed and released to management. The principal recommendations were to consolidate or eliminate clerical functions and to more clearly define responsibilities.

Engineering Department

Two meetings were held with Classified Files personnel to discuss proposed systems changes necessary to facilitate conversion of Classified Files work to EDPM processing.

Financial Department

Requests completed in April for monthly payroll included the production and transcription of a mark sense file for assembling exempt data requested by Schenectady. The Quarterly Tax Report (941-A) was completed. Exempt Salary Distribution procedures were revised to accommodate a changed policy for handling overtime payments.

Weekly meetings were held with Plant Accounting personnel to discuss various phases of the proposed conversion to EDPM. The new Plant Record Unit history forms and IBM 884 Typewriter Punch, to be utilized in the conversion, are scheduled to arrive soon.

A new report covering Project Engineering cost-to-date is being drafted after consultation with management of Project Engineering.

Pension Plan reports to be mailed to employees during May were prepared for the Payroll Section. Partially printed forms were furnished by Schenectady. Results were very satisfactory and it is now planned to address the Benefit Plan packet in a similar manner.

Radiological Sciences Department

Studies were continued on a machine application for Radiological Measurement evaluation.

The systems work for converting calibrations data of Radiological Sciences Department from kardex records to punched cards was completed during April. New card forms have been designed and printed. The systems change will be made early in May.

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Employee and Public Relations Department	26	Standard	Storage	Cartons
Engineering Department	68	"	"	"
Financial Department	188	"	"	"
Manufacturing Department	119	"	"	"
Radiological Sciences Department	4	"	"	"
	<u>405</u>			

Seven hundred and eighty-four cartons of records were destroyed.

RECORDS OPERATIONS (continued)PROCEDURES AND COMPUTING SECTION

Records Retention and Disposal Schedules Number 210, "Community Electrical Distribution Records", consisting of seventeen individual records and Number 211, "Community Recreation Records", consisting of six individual records were developed and submitted to the Employee and Public Relations Department for internal approval. Records Retention and Disposal Schedules Number 209, "Community Water and Sewage Utilities Records", consisting of twenty-three individual records and Number 211, "Community Recreation Records" consisting of six individual records were submitted to the Atomic Energy Commission for approval.

The Atomic Energy Commission approved establishing an off-site file of "As built" reproducibles of 100-K Area and Purex Process. The Project Section has been authorized to prepare the "as built" reproducibles.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-36440-W.

COMPUTING OPERATIONS

During the month of April the following non-routine assignments were completed for customers:

Employee and Public Relations	14
Engineering	17
Financial	16
Manufacturing	2
Operations Research	1
Radiological Sciences	2
	<u>52</u>

Service charges for the month amounted to \$42 486.96. Services, by customer, were as follows:

Atomic Energy Commission	\$ 863.94	2%
Employee & Public Relations	4 222.90	10
Engineering	8 018.69	19
Financial	26 126.25	61
Manufacturing	1 589.07	4
Operations Research	934.96	2
Radiological Sciences	731.15	2
	<u>\$42 486.96</u>	<u>100%</u>

PROPERTY ACCOUNTING SECTION
MONTHLY REPORT - APRIL 1955

PLANT ACCOUNTING UNIT

A recent inventory of hospital and clinical equipment (inventory completed by Medical personnel) is 75 percent completed. Discrepancies resulting from the reconciliation have been forwarded to Health and Safety Section for clarification.

The reconciliation of telephone inventories and segregation of records between Community and Operations will be completed in May.

Representatives of AEC, GE, GAO and the Army conducted inventories of North Richland Cafeteria No. 2 and a tavern prior to turnover of the facilities to the Army. Listings of equipment are being completed and will be transferred to AEC in May and they in turn will transfer costs to the Army. Items will be transferred at first cost less accrued reserve.

An inventory of Photographic equipment was completed except for 100-K Area and the T and U Plants in 200 West Area. Reconciliation is 70 percent completed.

A complete listing of machine tools was forwarded to AEC for submission to the office of Defense Mobilization. In addition to an itemized listing, the first cost of all items was shown.

An inventory of Electric Time Card Clocks was reconciled to Plant records and adjustments affected as necessary. Office Equipment Unit was established as the property custodian. The adjustment consisted of a transfer of these items from uncataloged to cataloged accounts.

Unitization of 100-K Area is still scheduled for completion May 15, 1955. However, some delays may be expected since a few Kaiser personnel active on unitization were utilized in the recent Kaiser sale.

Project Unitization Reports completed during the month total \$2,115,791 and include:

CA-187-D-III	Redox Production - Part III	\$ 272,979
CA-441	Solvent Building	51,185
CA-561	713 Building Alterations	50,362
CA-577	Improvements to George Washington Way	63,742
CG-605	Additional Generating Capacity - 189D	21,835
AEC-107	Geological & Hydrological Investigations	228,084
AEC-115	Additional Richland Water Supply	1,344,317
AEC-125	Catskill and Rainier Ave. Improvements	15,015
AEC-162	Fire Protection - 272W	15,051
	All Other (6 Projects)	<u>53,221</u>
	Total	<u>\$2,115,791</u>

Segregation of improvements to land applicable to Richland Schools was started during the month. It is anticipated that such costs will be transferred to AEC after segregation is completed. Included are paved areas,

PLANT ACCOUNTING UNIT (Continued)

walks, play areas, tennis courts and improvements to land which are operated and maintained by School District 400.

Accounts were established during the month as sub-accounts of Plant and Equipment in Service to record value of equipment capitalized, previously constructed with research funds. At fiscal year closings account "Equipment Obtained from Research Projects" will be closed to the applicable plant and equipment account and account "Prior Years Costs - Non Fund" will be transferred to AEC.

Plant and Equipment values at April 30, 1955 were:

	(In Thousands)		
	<u>ASSET</u>	<u>RESERVE</u>	<u>NET</u>
Completed Plant and Equipment	\$ 747,467	\$ 310,746	\$ 436,721
Construction Work in Progress	43,121		43,121
Total Cost Recorded (G.E. Books)	790,588	310,746	479,842
AEC and Other Contractor Costs			
Land and Land Rights	5,476		5,476
Construction Work in Progress-1	202,333		202,333
Total Plant	\$ 998,397	\$ 310,746	\$ 687,651

	(In Dollars)	
	<u>THIS MONTH</u>	<u>LAST MONTH</u>
1) Kaiser	\$120,367,170	\$119,982,237
Blaw-Knox	60,092,159	61,437,413
AEC	21,873,921	19,555,570
Total	\$202,333,250	\$200,975,220

INVENTORY ACCOUNTING UNIT

The third annual physical inventory of coal and fuel oil under the custody of Manufacturing and Employee and Public Relations Departments was completed on March 31, 1955. Tentative results of this inventory reflect net shortages of \$18,398 in coal and \$45 in fuel oil under the custody of Manufacturing Department, and a net overage of \$2,116 in coal under the custody of Employee and Public Relations Department. Final results of the inventory will be issued shortly.

The annual physical inventory of essential materials (exclusive of coal) was completed on April 30, 1955. Reconciliation of the physical value with the book value is progressing and the results of the physical inventory are expected to be reported in May.

The next physical inventory which is scheduled to be taken on May 16, 1955, is telephone supplies under the custody of Auxiliary Operations and Plant Protection Section. On May 23, 1955, the annual physical inventory of electrical materials in the custody of Electrical Utility Section is also scheduled to be taken. Detailed procedures have been prepared, issued and will be discussed with the respective custodial personnel.

INVENTORY ACCOUNTING UNIT (Continued)

The procedure "Accounting for Excess Materials and Equipment" was revised this month and issued. The major revisions were that all excess property would be reserved at ninety percent of acquisition value, and the established reserve for general supplies would be charged for all excessing losses (prior to this change the department responsible for the procurement of the material was charged this loss).

Considerable time was spent this month in preparing the various quarterly reports for the Atomic Energy Commission.

A study was made by Inventory Accounting to assist Transportation in determining where certain corrective measures could be taken to strengthen the procedures on service station reports.

Considerable work was done this month toward closing out open documents affecting the General Supplies and Spare Parts inventory accounts.

Following is a summary showing inventory account balances for the months of March and April, 1955, together with amount of change.

	<u>Book Balance</u>		<u>Increase</u>
	<u>3/31/55</u>	<u>4/30/55</u>	<u>(Decrease)</u>
Current Inventories			
General Supplies	\$ 1 799	2 166	367
Fuel and Lubricants	80	79	(1)
Essential Materials	<u>4 042</u>	<u>4 062</u>	<u>20</u>
	5 921	6 307	386
Special Materials	1 351	1 360	9
Spare Parts	3 189	3 390	201
Standby	48	48	0
Excess Materials	<u>358</u>	<u>263</u>	<u>(95)</u>
Total Inventories - Gross	10 867	11 368	501
Less: Essential Materials Inventory Reserve	113	118	5
General Supplies Inventory Reserve	92	84	(8)
Spare Parts Inventory Reserve	717	740	23
Standby Inventory Reserve	12	12	0
Excess Inventory Reserve	<u>52</u>	<u>(21)</u>	<u>(73)</u>
Total Inventories - Net	<u>\$ 9 881</u>	<u>\$10 435</u>	<u>\$ 554</u>
As a Memo: Excess Equipment	\$ 529	\$ 518	(11)
Excess Equipment Reserve	(271)	(215)	(56)

PROPERTY MANAGEMENT UNIT

A comprehensive evaluation of the field holdings of material and supplies was initiated with initial surveys covering the 100D and H Areas and three of the sub-sections in the 200-W Area. In addition to encouraging the immediate release of excessive accumulations of both new and used materials and supplies now held in various operating areas, the survey will provide data which will serve as a bench mark by which the findings of future surveys may be evaluated. Recommendations for the improvement of unsatisfactory conditions found are being discussed with responsible superintendents. To date the results have been very encouraging. Results of these surveys of the individual sub-sections are being recorded and these will be combined into one report covering each operating section.

Seventy-seven requests for the disposal of property were investigated and disposal instructions issued during the current month.

At the request of the Transportation Section, disposal instructions were given on a sizable accumulation of materials and equipment stored at the new Transportation facility. The items being disposed of consisted of a residue of materials and parts moved to the new facility at the time of occupancy and which were sorted from more desirable and useful materials. Included were chain falls, miscellaneous crane and caterpillar tracks, fire fighting equipment, truck bodies, etc.. The total accumulation required ten (10) trucks for disposal.

Special attention was given to the disposal procedures used in connection with equipment and materials removed from existing buildings by Minor Construction and operating forces. As a result of a study of the various factors influencing the disposal decisions a tentative procedure was developed. Under the now existing procedure, the operating management in the plant where equipment is removed is responsible for issuing property disposal reports, which in addition to providing disposal instruction, will facilitate subsequent removal of the material or equipment from the plant accounting records.

Through discussion with responsible property control custodians continued emphasis is being placed upon the elimination of accumulations of worn out and/or damaged operating equipment now stored in unused operating cells or in the storage basins in the areas.

The laboratory furniture from three additional laboratories in Building 3706 was disposed of by burial so that these rooms could be converted to more useful purposes.

Machine tools having a new acquisition cost of \$8,000 were acquired at no cost from AEC surplus to fill plant needs for certain equipment.

Requests for a multipoint recorder, an oscilloscope and a 24 point temperature indicating device were filled without need for additional purchase when these items were located within the plant for Pile Technology personnel. The new acquisition cost of these items would have approximated \$4,000.

Twenty-five Requests for Appropriation, totalling \$140,428, were investigated and approved during the month.

PROPERTY MANAGEMENT UNIT (Continued)

The question of the control of zirconium has been under study with interested HAPO activities and AEC. Due to the increasing use of this material, several problems have arisen in connection with its control as a special material. A decision has been reached that all shipments will be received by and all inventory stocks held by the Stores sub-section. Inventory stocks will not be maintained by field activities. All withdrawals will be charged off at the time of issue. Store orders will carry the notation, "This material will be consumed in use, contaminated or changed in grade, purity or form to the extent that it will be rendered unfit for normal use". OPG 04.10 (Control of Reactor and Other Special Materials) is being revised accordingly.

A study is being made of the suitability of our present work order form to cover work involving Capital Assets. More information is required in order to properly account for the Capital Assets involved. A new form and procedure is being worked up with the assistance of the Manufacturing Department Work Order Control Sub-Unit and the Plant Accounting Unit.

Plans are underway to transfer the custody of the graphite line and associated equipment from the Separations Section to the Stores Sub-Section. This will place the custody and warehousing of all of the equipment being held at the request of the AEC under the Stores Sub-Section.

APPROPRIATIONS UNIT

The following Plant and Equipment projects were processed through the Appropriations Unit during April. GE and AEC approval action was as indicated below:

Project Number	Title	Amount of This Request	Total*	Date to AEC	Disposition
CA-514 Rev. 3	1952 Hanford Expansion - 300 Area Production Facilities	\$ 815,000	\$ 5,900,000 GE 5,188,000	3-18-55	AEC-21, Mod. 5, dated 4-6-55, Auth. AEC \$5,900,000. Wk. Auth. dated 4-11-55 auth. GE \$5,188,000
CA-555 Rev. 2	Graphite Hot Shop & Storage Facility - Building 3730	- - -	83,500 GE 29,500	4-13-55	Approved by AEC Board 4-28-55
CG-558 Rev. 4	Reactor Plant Modifications for Increased Production	- - -	26,800,000	3-3-55	Approved by AEC Board 3-31-55. Forwarded Washington for approval of schedules. Schedules approved 4-1-55.
CA-590 Rev. 1	Fly Ash Collection Equipment - 384 Building	38,000	38,000 GE 6,500	- - -	Received by Supervisor - Appropriations 4-28-55
CG-598 Rev. 1	Purex Acid Fractionator	- - -	- - -	4-4-55	HW-339, Mod. 1, dated 4-19-55, auth. requested changes
CA-601 Rev. 1	General Grounds Improvements - 300 Area	96,000	96,000 GE 22,500	2-7-55	Forwarded AEC, Washington, for approval 3-31-55
CG-608 Rev. 1	Redox Crane Viewing Room	- - -	- - -	3-22-55	HW-344, Mod. 1, dated 4-5-55, auth. extension of completion date
CG-613 Rev. 1 Rev. 2	Hanford 4X Program - Metal Con- version Plant	2,660,000	3,000,000	3-31-55)	HW-347, Mod. 2, dated 4-21-55, auth. \$1,100,000
CG-614 Rev. 1	Hanford 4X Program - 300 Area	210,000	- - - 340,000	4-14-55) 4-25-55	

APPROPRIATIONS UNIT (Continued)

<u>Project Number</u>	<u>Title</u>	<u>Amount of This Request</u>	<u>Total*</u>	<u>Date to AEC</u>	<u>Disposition</u>
CA-619	Alterations to 186-D Building	\$ 32,000	\$ 32,000	3-10-55	AEC Board deferred proposal 3-31-55 for further study
CG-621 Rev. 1	Redox Contamination Control Facilities	502,000	550,000	4-15-55	HW-351, Mod. 1, dated 4-26-55, auth. \$98,000
CG-624	Redox Railroad Tunnel Ventilation Barrier	57,000	57,000	3-21-55	Forwarded Washington for approval 4-5-55
CG-626	Alterations to Redox Inert-Gas Vent System	115,000	115,000	4-12-55	Approved by AEC Board 4-21-55. Forwarded AEC, Washington, 4-25-55
IR	Development of Riverside Park - North of Newton Street	8,700	8,700	4-13-55	To be returned by AEC with request only water system to be installed at this time

*Total previous authorizations plus this request.

SF ACCOUNTABILITY SECTION
MONTHLY REPORT - APRIL, 1955

The USAEC-Hanford Operations Office has provided verbal notice of the decision to discourage the mixing of Normal Uranium with Depleted Uranium or for the mixing of any U-235 content material with material of lower weight percent. As the result of this policy decision, the recovery of Canning Pickle Solution via TBP- UO_3 has been abandoned. In addition, the local recovery of E Slugs would also appear to come under this ruling.

While the complete review of the A.E.C. investigation is not available, losses at other sites, which develop during final processing, appear to reduce the economic advantages of a local nature.

The SF Accountability Manual for Normal Uranium has been revised to date and is now in the process of final editing. In addition to subject coverage required by A.E.C. regulations, the presentation has attempted to anticipate obsolescence. Basic procedures rather than specific details have been used.

Preparations have been completed for the transfer of Separations Technology plutonium records from their present location in 234-5 Bldg., to the Metal Preparation Area-SF Accountability Unit. This reassignment will be consummated in May and will complete the reorganization of Technical accounts. This change is consistent with the Custodians organization.

Activities directed towards the reduction of Inactive Status Material have progressed to the point of preparation for shipment. A.E.C. "Approval To Ship" has been received for a number of items. Materials to be shipped in May include: Cold Depleted Uranium Scrap, Enriched Uranium "J" Metal Slugs and Scrap and will also include "E" Slugs and Scrap. The liquidation of irradiated "J" slug inventory continues on the scheduled frequency of two shipments per week.

The preparation of the SF-101 forms and attachments which constitute the SF Accountability Transfer Papers are an item of expense. Currently a ditto machine is used and is located in the 300 Area SF Accountability office. We are replacing this machine with the ozalid process on the recommendation of Procedures and Computing. The change is directed towards economy in costs and in improved copy coverage.

Reactor Areas-SF Accountability Unit

Basic development of the Reactor Area accounts in the form of a double entry bookkeeping system has been completed. We have scheduled these accounts for parallel operation until personnel training demonstrates the Unit is capable of assuming full responsibility for the records. This training period may extend to June 30, 1955 but must be completed on or before that date.

One of the difficult problems associated with Reactor Area accounts is that of the bias introduced by the use of an average MWD value. Correction of this bias involves considerable detail and is a combined manual and machine accounting calculation. Procedures have been devised for the routine processing of this data which appears to be adequate for correction. The elimination of this bias will tend to materially reduce the adjustment from calculated Pu content to measured Pu at the time of separation. This error has been particularly objectionable due to its magnitude and has also adversely effected the basin accounts.

All personnel requisitions have been filled and the Unit is now completely staffed.

MONTHLY REPORT-SF ACCOUNTABILITY SECTION
APRIL, 1955

D. L. Haynie was transferred in as of May 1, 1955 and will succeed F. W. Richardson as Supervisor-Reactor Area Unit.

Separations Area-SF Accountability Unit

The Redox plant was flushed for removal of all "low" MWD material during April and has since introduced "high" material to process. As the result of this change in operating procedure we will be able to convert standard dissolver heels to measured quantities. This is the only time that such measurements are available and while reported in the month of occurrence apply to the throughput since the last dissolver clean out. In this connection it should be noted that the use of a standard dissolver heel determined by prior measurement experience has proved fully adequate in the Bismuth Phosphate Process, has been only moderately successful in Redox and may not be applicable to Purex. Differences in visibility account for these variations with the result control of volume of the standard heel has been unsatisfactory. The results of the adjustment in converting from standard value to measurement are not as yet available and will require review for proper evaluation. Completion of review is scheduled for May 15, 1955.

Isolation Bldg., activity continued on "low" material for final processing as nitrate. The new Task I installation is processing all Redox material and the only feed to 231 Bldg., is provided by the Bismuth Phosphate Process. Work load for SF Accounting continued on a limited basis due to the curtailed operation. Similar reduction in work load is expected at the Metal Reduction step in the new Task III installation where larger batch size processing is to be inaugurated.

The test of the adequacy of standard forms devised in the prior month provided excellent results. These forms will be prepared in advance as a means of better work load distribution and were directed towards alleviation of the large volume of work concentrated in the first seven working days of the new month. The need for revision was minor. These and other similar moves are directed towards the reduction of overtime to the Section limit of 1.5% of available manpower.

SF Measurement yardsticks have been devised for Redox, TBP and UO_3 . Their values lie in the fact that the accounts provide "Material Over or Under Accounted For" which require explanation. The yardsticks provide a valid basis of comparison by which assignable reasons can be applied.

The Plutonium Material Balance at Redox covering "low" material showed excellent agreement between Reactor Area predicted and recovered material based on measurements.

Analytical difficulties in the measurement of Depleted Uranium in Redox waste losses indicate continued bias. Based on the results as compared to standards a correction will continue to be required.

Automation studies directed towards TBP- UO_3 SF Accountability control have progressed through the programming stage. More than 95% of the source data is a form suitable for input to machine accounting with the balance now being subjected to standardization.

A comprehensive schedule of physical inventories to be taken in conjunction with A.E.C. Survey #12 was prepared. It was accepted by the A.E.C. without revision.

MONTHLY REPORT-SF ACCOUNTABILITY SECTION
APRIL, 1955

Further progress on the submission of the Monthly Material Balance Report by the 11th working day of the new month was evidenced by the improvement in the date of submission of area reports for consolidation and in the reduction of items requiring recheck. Both of these improvements were achieved in spite of the fact reports provided additional coverage.

SF Measurements Unit

Numerous measurement evaluation projects were completed as follows:

1. The effect of cored and solid slug discharges on the accuracy of Reactor Area Basin inventories was determined and reported in Document HW-36321. In general, the maximum potential error lacks magnitude. The use of one standard factor weight for either cored or solid slugs now appears feasible, thereby eliminating the problem of slug identification.
2. A control system for Normal Uranium Process Solution account Material Under or Over Accounted For was devised and reported in Document HW-36126.
3. Tests were devised and applied for determination of the accuracy of the acid flowmeter monitoring the flow from UO_3 to 241 WR. This stream carries Depleted Uranium from the UO_3 Plant. The magnitude of previous errors warranted extensive review of this problem. Preliminary results indicate a marked improvement over previous test results.
4. Economic feasibility review has ruled out the installation of separate measurement facilities at UO_3 covering receipts of Depleted Uranium from Redox. Due to manometer difficulties at Redox 204-1 series tanks and to the distance of over one mile, inventory and transfers have been a source of inaccuracy in the SF Accountability records. The proposal for consideration of Receiver measurement facilities was directed towards the correction of these problems but has been ruled out.
5. Sample frequency review produced three points at which either the sample or the frequency could be eliminated or reduced. These include the elimination of the Am-Cm determination for low material, a 50% reduction in sampling frequency for TBP lot wastes and for the elimination of the H-5 waste measurement at Redox. Savings in analytical time alone are indicated in the range of \$175 per month.

Preliminary investigations were directed towards the review of coating waste losses for which Depleted Uranium content is subject to question. The program calls for routine uranium assay and will probably be followed by a bench scale test. The over-all program is directed towards the reconciliation of 300 and 200 Area experience where data currently presents certain contradictions.

Shipper-Receiver Variance controls were extended so as to include the sample retention period until receipt of Receiver's commitments. In addition, the precision statement for nitrate shipments was revised to $\pm 2\%$ in conformity with current data.

MONTHLY REPORT - SF ACCOUNTABILITY SECTION
APRIL, 1955

Physical Inventory Inspection procedures disclosed a departure from standard practice in that book values has been mislabeled as physical inventory. It developed that manometer reading difficulties at the 203-1 series tanks resulted in operations selecting the book value in preference to a questioned physical inventory. However, the error was compounded by failure to specify the correct basis of inventory. Recommendations for correction was incorporated in Document HW-36369.

The Uranium Recovery Manual HW-35000 was published and distributed during April. This manual provides a systematic presentation of the source data requirements for SF Accountability control and organizes the physical inventory in such a manner as to enable it to be taken in an orderly manner with the minimum of personnel. Similar work on the Bismuth Phosphate Manual is now in progress and is currently on schedule.

The custodian inventory verification program is to be initiated in May covering Redox, TBP and UO_3 . This program is a service function organized by the SF Measurements Unit for increasing custodian check and verification procedures relative to their inventory. The objectives are the substantiation of inventory values, the elimination of erroneous quantities or omissions and the elimination of after the fact adjustments. The program has been scheduled on a no increase in personnel requirements basis and has been readily accepted by the custodians.

As a service function to Manufacturing, the format of the Production Report was reviewed and ultimate revision and acceptance by the A.E.C. obtained. In addition, the basic source data for this report was also revised.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION

APRIL, 1955

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Changes During Month</u>		
Employees at beginning of month	460	466
Additions and transfers in	14	10
Removals and transfers out	(17)	(16)
Employees at end of month	<u>457</u>	<u>460</u>
 <u>Personnel by Components at Month-End</u>		
<u>General</u>	<u>10</u>	<u>11</u>
<u>Auditing Section</u>	<u>15</u>	<u>16</u>
<u>Budgets and Measurements Section</u>	<u>9</u>	<u>8</u>
<u>Contract Cost Section</u>		
General and Consolidations Cost Unit	10	12
Engineering Cost Unit		
General	5	5
Design Cost	7	7
Project Cost	14	17
Technical Cost	11	11
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	8	10
Community Cost	5	5
Medical Cost	3	3
Manufacturing Cost Unit		
General	2	2
Financial Representatives	11	10
Budgets and Control	17	17
Reports and Records	16	16
Product Costs	<u>4</u>	<u>4</u>
	<u>115</u>	<u>121</u>
 <u>General Accounting Section</u>		
Accounts Payable Unit	23	25
Accounts Receivable Unit	21	22
General Books Unit	16	17
Administrative Planning	3	3
Contract Reimbursements	<u>5</u>	<u>5</u>
	<u>68</u>	<u>72</u>

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Accounting Section</u>		
Payroll Planning and Analysis Unit	7	7
Weekly Payroll Unit	16	15
Monthly Payroll Unit	10	11
Benefit Plans Accounting Unit	12	11
Payroll Reports Unit	7	7
Weekly Payroll Records Unit	8	7
	<u>60</u>	<u>58</u>
<u>Procedures and Computing Section</u>		
Computing Operations Unit	20	19
Numerical Analysis Unit	8	9
Procedural Analysis Unit	20	20
Scheduling Unit	24	22
Records Operations Unit	8	8
	<u>80</u>	<u>78</u>
<u>Property Accounting Section</u>		
Appropriations Unit	4	4
Inventory Accounting Unit	10	10
Plant Accounting Unit	43	40
Property Management	4	4
	<u>61</u>	<u>58</u>
<u>SF Accountability Section</u>		
Reactor Area - SF Accountability Unit	3	2
Separations Area - SF Accountability Unit	12	12
Metal Preparation Area - SF Accountability Unit	8	8
SF Accounting Unit	6	6
SF Measurements Unit	9	9
	<u>38</u>	<u>37</u>
<u>Rotational Trainees</u>	<u>1</u>	<u>1</u>
	<u>457</u>	<u>460</u>

PROCEDURES & COMPUTING SECTION
MONTHLY REPORT - APRIL 1955

GENERAL

Two Analysts tested programs for the 702 Electronic Data Processing Machine at the IBM factory in Poughkeepsie, New York during the last two weeks in April. Over 50% of the weekly payroll conversion programs were tested, using less than ten machine hours. The basic logic and approximately 3000 detail program steps were proven.

Further testing on the modified SCRIPT assembly routine was carried out at Poughkeepsie. All floating-decimal subroutines available at the time, including the tracing routine, were thoroughly tested. These tests included a number of sample problems, among which was one requiring the inverting of 25th order matrices. Using floating-decimal arithmetic, the time required to invert one of these matrices was approximately 11 minutes. Work on the development of subroutines is being continued. Subroutines for the functions logarithm and arctangent, in both fixed and floating-decimal, are presently being written, and should be completed in time for the final testing session at Poughkeepsie.

New commercial subroutines developed during April and tested at Poughkeepsie were:

1. Punching and printing routines for preparing report formats automatically.
2. The use of "Move-To" type subroutine was tested and found to reach expectations for ease in programming and accuracy.

Systems and logic work is underway for conversion of the following:

Weekly Salary Distribution

Work Order Distribution

Vehicle Reporting

Classified Files

Manpower Survey Report

Quarterly Weighted Average Report

Personal Accident Report

Machine processing of attitude survey questionnaires was initiated on March 25. A total of 8,081 questionnaires was returned to the Procedures and Computing Section for keypunching. Since each questionnaire contained an average of 60 responses, there were some half million keypunch strokes required. In order to furnish management with reports on the attitude survey, test scores for each organizational component (department, section, sub-section, and unit) and for each personnel class (nonexempt, exempt non-supervisor, and exempt supervisor) were calculated. This required some 100,000 evaluations of a statistical formula. The calculations were performed on the card-programmed calculator and required approximately 100 hours. Machine processing is approximately 75% complete.

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PROCEDURES & COMPUTING SECTION

PROCEDURAL ANALYSIS

Forms Control reviewed 417 orders during April covering 1,267,000 forms; 15 orders, amounting to 12,500 forms, were rejected; 103 new forms were designed.

Employee & Public Relations Department

A request from Salary Administration for selective statistics on college graduates was received and completed during April.

The study of clerical procedures at Kadlec Hospital was completed and released to management. The principal recommendations were to consolidate or eliminate clerical functions and to more clearly define responsibilities.

Engineering Department

Two meetings were held with Classified Files personnel to discuss proposed systems changes necessary to facilitate conversion of Classified Files work to EDPM processing.

Financial Department

Requests completed in April for monthly payroll included the production and transcription of a mark sense file for assembling exempt data requested by Schenectady. The Quarterly Tax Report (941-A) was completed. Exempt Salary Distribution procedures were revised to accommodate a changed policy for handling overtime payments.

Weekly meetings were held with Plant Accounting personnel to discuss various phases of the proposed conversion to EDPM. The new Plant Record Unit history forms and IBM 884 Typewriter Punch, to be utilized in the conversion, are scheduled to arrive soon.

A new report covering Project Engineering cost-to-date is being drafted after consultation with management of Project Engineering.

Pension Plan reports to be mailed to employees during May were prepared for the Payroll Section. Partially printed forms were furnished by Schenectady. Results were very satisfactory and it is now planned to address the Benefit Plan packet in a similar manner.

Radiological Sciences Department

Studies were continued on a machine application for Radiological Measurement evaluation.

The systems work for converting calibrations data of Radiological Sciences Department from kardex records to punched cards was completed during April. New card forms have been designed and printed. The systems change will be made early in May.

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Employee and Public Relations Department	26	Standard Storage Cartons
Engineering Department	68	" " "
Financial Department	188	" " "
Manufacturing Department	119	" " "
Radiological Sciences Department	4	
	<u>405</u>	

PROCEDURES & COMPUTING SECTION

HW-36440-W DEL

RECORDS OPERATIONS (continued)

Seven hundred and eighty-four cartons of records were destroyed.

Records Retention and Disposal Schedules Number 210, "Community Electrical Distribution Records", consisting of seventeen individual records and Number 211, "Community Recreation Records", consisting of six individual records were developed and submitted to the Employee and Public Relations Department for internal approval. Records Retention and Disposal Schedules Number 209, "Community Water and Sewage Utilities Records", consisting of twenty-three individual records and Number 211, "Community Recreation Records", consisting of six individual records were submitted to the Atomic Energy Commission for approval.

The Atomic Energy Commission approved establishing an off-site file of "as built" reproducibles of 100-K Area and Purex Process. The Project Section has been authorized to prepare the "as built" reproducibles.

NUMERICAL ANALYSIS

In order to achieve more accurate in-pile accounting of plutonium and uranium, arrangements have been made with the Production Planning and Scheduling Unit to process certain data accumulated by that group at the machine facility in the Procedures and Computing Section. Calculations will be made monthly to yield individual tube exposures for all plutonium-producing tubes in all reactors. Reports showing summations, by reactor, will be available at the first of each month. At the same time, tube factors and disadvantage factors will be computed for the benefit of reactor physicists in determining flattening and enrichment patterns. Miscellaneous calculations for the Production Planning and Scheduling Unit this month consisted of the calculation of tube factors for KW and F reactors.

The first set of panellit data from KW reactor was processed this month. Reports are issued weekly and are similar to those being prepared for the other reactors. Work is in progress to incorporate data from KE reactor in this system.

A keypunch and keypunch operator were moved to the 300 Area for a two day period in order to keypunch data from potentially contaminated data sheets. The data, taken from the operation of some new type chemical equipment, are presently being processed.

Computations have been resumed on the determination of lattice parameters in connection with exponential pile measurements. The problem formulation remains essentially the same: given a theoretical expression for lattice buckling containing three or four unknown parameters, to determine these parameters so that the theoretical expression fits the experimentally observed data in some best sense. In the present calculations, 11 different lattices are to be considered. Results obtained to date indicate reasonable agreement with the experimental data.

A double numerical integral was programmed and evaluated on the card-programmed calculator. The integration involves sines, cosines, and Bessel functions of orders up to four, and was carried out over an essentially square region, with the locus of two sides given by the solution of a transcendental equation. The answer obtained appeared to differ from the expected answer by as much as 5%. A close investigation of the computational methods employed revealed that over a portion of the range of integration considerable significance was being inadvertently lost. The problem was transformed slightly for purposes of computation, and in so doing it was demonstrated that the integration could be done

PROCEDURES AND COMPUTING SECTION

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HW-36440-W DEL

NUMERICAL ANALYSIS (continued)

analytically. Therefore, no further numerical work is anticipated.

Work is continuing on the calculation of the average eta of a Hanford cell. Requests were received to calculate the average thermal utilization, the average diffusion length, and the average capture cross sections of U-235, U-238, and Pu. With this information it will be possible to determine the temperature coefficient of uranium. All calculations are to be made for four different exposure levels. Upon completion of this phase the calculations will be repeated taking into account the buildup of Pu-240 and various fission products.

Approximately 600 sets of three simultaneous equations were submitted for solution. Since the matrix of coefficients in these equations was the same for all sets, the unknowns were solved for by multiplying a variable column matrix by the universe of the fixed coefficient matrix. In addition to the solutions, sums and sums of squares and frequency distributions were required over certain classes of data. The work was done in connection with a statistical study.

Work continues on the calculation of thermal utilization and resonance escape probability of an internally cooled slug. Some 180 cases, representing variations in cell wetness and dimensions, have been completed and an additional 40 are now projected. Advantage is being taken of card-programmed calculator programs written in the past for problems of similar nature. An attempt will be made to evaluate the effect of the stainless steel liner on the quantities computed. This will be done by replacing the present model by one in which the liners are of the same substance, either steel or zirconium.

Additional listings of corrosion data were prepared for purposes of publication. Another transcendental equation relating the variables pertinent to the corrosion of aluminum has been received and solutions will be carried out by iterative methods.

COMPUTING OPERATIONS

During the month of April the following non-routine assignments were completed for customers:

Employee and Public Relations	14
Engineering	17
Financial	16
Manufacturing	2
Operations Research	1
Radiological Sciences	2
	<u>52</u>

Service charges for the month amounted to \$42 486.96. Services, by customer, were as follows:

Atomic Energy Commission	\$ 863.94	2%
Employee & Public Relations	4 222.90	10
Engineering	8 018.69	19
Financial	26 126.25	61
Manufacturing	1 589.07	4
Operations Research	934.96	2
Radiological Sciences	731.15	2
	<u>\$42 486.96</u>	<u>100%</u>

OPERATIONS RESEARCH STUDY

MONTHLY REPORT

APRIL, 1955

The following is the month end summary of personnel:

	<u>As of 3-31-55</u>			<u>As of 4-30-55</u>			<u>Net Change</u>		
	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>
General	1	1	2	1	1	2	0	0	0
Operations Research Analysts	5	0	5	5	0	5	0	0	0
TOTAL	6	1	7	6	1	7	0	0	0

Mr. P. M. Thompson visited the RAND Corporation of Santa Monica, California on the use of the RAND Corporation computing equipment and to discuss the mathematical formulations on the production scheduling operations research program, during the latter part of the month. Prior to Mr. Thompson's visit at RAND he attended the Institute on Operations Research for Business and Industry held at the University of California, Los Angeles on April 28 and 29.

Production Planning

Two reports on the Production Planning Operations Research Program were issued. Production Planning - Scope and Mathematical Formulation (HW-34226) and Production Planning - Summary of Scope and Formulation (HW-36079). These reports present a comprehensive review of all but the most recent developments in this research. In order to provide a rigorous basis for production planning at Hanford, salient features of the operation have been described in a mathematical model. This model represents the relations between reactors and separations plants that make possible the simultaneous planning for, and scheduling of, these two parts of the operation. These relations are contained in a set of equations, the solution of which under specified constraints gives a production plan. This plan indicates how the operation can best be made to achieve desired production goals while optimizing some measure of its effectiveness. This approach to production planning should make a significant contribution to the efficient operation of the Hanford Atomic Products Operation by allowing management to prepare rapidly a great variety of production plans under varying sets of assumptions and appropriate measures of effectiveness.

Several minor modifications have been made in the mathematical formulation of this problem after extensive conferences with Manufacturing Department personnel. These are now being tested on the RAND Corporation 701 computer. In the meantime, detailed programming for the solution of linear programming problems on the Hanford 702 computer is progressing on schedule.

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