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59468

MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

FOR

MAY 1955

Compiled By
DEPARTMENT MANAGERS

June 23, 1955

RICHLAND, WASHINGTON

Operated for the Atomic Energy Commission
by the
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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

MAY 1955

GENERAL SUMMARY

PRODUCTION OPERATION

A total of 35 slug failures occurred during May. This represents the worst monthly experience to date for total ruptures and the worst since October 1954 for uranium ruptures. The total outage time required for slug removal was 463.4 hours. Four process tube leaks occurred as a result of slug failures, two at C and one each at DR and H.

The performance of the Redox plant was notable in that an operating rate of nine tons per day was sustained for the last twenty days of the month. As a result of the high rate and good operating efficiency a new record for plutonium production, which exceeded the forecast by 38 percent, was achieved along with a record uranium throughput of 256 tons.

ENGINEERING TECHNOLOGY

Studies indicate that the "free" gamma radiation from irradiated slugs being cooled before chemical processing would be worth millions of dollars per year if used for purposes such as low temperature sterilization of agricultural products. A substantial market appears to exist, and the irradiation service would be in the public interest.

The pst-irradiation examination of two uranium-magnesium specimens exposed to 10,000 MWD/T in the MTR has been completed. The cumulative mechanical property data obtained on specimens of this material show conclusively that the matrix fuel material is much more resistant to irradiation effects than other homogeneous materials.

In a series of rupture tests conducted in an out-of-pile high temperature water loop to determine relative rupture characteristics of various fuel element cores and configurations in high temperature, high purity water at 240 to 280 C, rupture of uranium or matrix slugs caused stoppage of tube flow, usually in a matter of minutes after the first indication of flow reduction.

A work stoppage by 78 operating engineers in Minor Construction began about 10:00 A.M., May 24, 1955, and continued to the end of the month. Interference with Minor Construction work has resulted in furloughing of about 30 men.

PERSONNEL AND SERVICES

Substantial progress was made on various problems relating to closer long-range delineation of Columbia River contamination. Short-term problems in the river resulting from the ruptured KE effluent discharge pipe were not serious.

Results of the 1955 Attitude Survey were reported to management and to employees during the month, within two months from the date questionnaires were administered.

Agreements have been executed with all four HAPO bargaining units incorporating the $25 deductible feature in our dependent insurance plan.

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

HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
MAY 31, 1955

DEPARTMENT	EXEMPT 5-31-55	EXEMPT 4-30-55	OTHER 5-31-55	OTHER 4-30-55	TOTAL 5-31-55	TOTAL 4-30-55
Counsel	3	3	2	2	5	5
Operations Research Study	6	6	1	1	7	7
Employee & Public Relations						
General	8	8	8	8	16	16
Salary & Wage Administration	11	11	11	11	22	22
Personnel Practices	15	15	41	39	56	54
Education & Training	6	6	31	33	37	39
Emp. Comm. & Pub. Rel.	11	10	41	42	52	52
Union Relations	5	5	1	-	6	5
Aux. Oper. & Plant Prot.	115	115	804	802	919	917
Community	82	84	339	335	421	419
Health & Safety	52	52	182	189	234	241
Engineering Department						
Engineering Administration	38	37	85	87	123	124
Advance Engineering	10	9	1	1	11	10
Design	181	179	120	122	301	301
Project	180	187	168	168	348	355
Pile Technology	230	231	143	147	373	378
Separations Techmology	166	164	94	88	260	252
Manufacturing Department						
General	21	21	8	8	29	29
Reactor	314	301	1 361	1 365	1 675	1 666
Separations	302	295	1 616	1 604	1 918	1 899
Metal Preparation	106	106	549	546	655	652
Transportation	44	44	446	448	490	492
Purchasing & Stores	60	59	215	207	275	266
Electrical Utility	16	16	75	74	91	90
Financial Department						
General	9	9	1	2	10	11
Budgets & Measurements	4	4	4	5	8	9
Contract Cost	25	23	93	92	118	115
General Accounting	9	9	60	59	69	68
Property Accounting	15	15	48	46	63	61
Auditing	12	13	2	2	14	15
SF Accountability	10	10	35	28	45	38
Personnel Accounting	9	9	55	51	64	60
Procedures & Computing	29	28	50	52	79	80
Radiological Sciences Department						
General	5	5	-	-	5	5
Records & Standards	29	27	167	163	196	190
Biophysics	53	53	68	70	121	123
Biology	31	32	39	39	70	71
Engineering	6	6	1	1	7	7
Adm. & Communications	3	3	5	5	8	8
Grand Total	2 231	2 210	6 970	6 942	9 201	9 152

AREA PERSONNEL DISTRIBUTION
MAY, 1955

	100-B Area	100-D Area	100-F Area	100-H Area	100-K Area	101 Area	200-E Area	200-W Area	300 Area	700-1100-3000 Area and Plant General	Total
Engineering Department											
Exempt	24	64	-	12	18	-	39	62	275	311	805
Other	8	24	2	77	18	-	20	32	211	219	611
Total	32	88	2	89	36	-	59	94	486	530	1 416
Manufacturing Department											
Exempt	62	57	75	68	53	-	93	225	107	123	863
Other	264	301	312	255	239	-	422	1 238	550	689	4 270
Total	326	358	387	323	292	-	515	1 463	657	812	5 133
Financial Department											
Exempt	-	-	-	2	-	-	-	5	6	109	122
Other	-	-	-	6	-	-	-	18	12	312	348
Total	-	-	-	8	-	-	-	23	18	421	470
Employee & Public Relations											
Exempt	22	6	6	6	9	-	7	12	10	227	305
Other	48	45	85	45	73	11	40	113	99	899	1 458
Total	70	51	91	51	82	11	47	125	109	1 126	1 763
Radiological Sciences											
Exempt	1	-	33	-	-	-	4	17	65	7	127
Other	3	-	43	-	-	-	20	15	179	20	280
Total	4	-	76	-	-	-	24	32	244	27	407
General											
Exempt	-	-	-	-	-	-	-	-	-	9	9
Other	-	-	-	-	-	-	-	-	-	3	3
Total	-	-	-	-	-	-	-	-	-	12	12
Total Exempt	109	127	114	88	80	-	143	321	463	786	2 231
Total Other	323	370	442	383	330	11	502	1 416	1 051	2 142	6 970
Grand Total	432	497	556	471	410	11	645	1 737	1 514	2 928	9 201

MANUFACTURING DEPARTMENT

MAY, 1955

METAL PREPARATION SECTION

A net production of 402 tons of acceptable finished slugs, including 26 tons of cored slugs, was achieved in May. This was 111 percent of the official forecast.

The canning yield for the solid and cored slugs was 82 and 79 percent respectively. The composite yield was 82 percent and represents an improvement of 3 percent over the April yield with the principal gain being made in the marred surface reject category through improvement in slug handling techniques. The controlled test of lead content on one canning line initiated in April contributed substantially to the reduction of the depression type bad weld reject category from 5 to 2 percent.

The bare slug inventory has increased to a three weeks supply while the combined 100 and 300 Area canned inventory remained at approximately 3½ weeks.

One eight-inch solid uranium autoclave failure occurred during the month.

A total of 1569 enriched uranium-aluminum alloy slugs were canned by the hot press method. The canning of thorium slugs was resumed during the month with a total of 606 pieces being canned.

REACTOR SECTION

The total and plutonium input production were 118.2 and 118.7 percent of the official forecast respectively. A record production, exceeding the March record by 20 percent, was established this month and was due principally to the contributions of the K reactors and postponement of the horizontal rod outages at B and D Areas. The reactor time operated efficiency was 79.1 percent. This is relatively low but represents a 6 percent improvement over April. Contributing to the low efficiency were the large number of slug failures, a four day extension of the outage at DR for horizontal rod replacement, and the problem at F associated with the retention basin.

Due to schedule variations to allow a buildup of material in the storage basins to compensate for an increase in cooling time, the reactor plutonium output was 118.8 percent of the forecast. Tonnages of low and high concentration metal discharged were 337 and 55 tons respectively.

Established maximum reactor power levels, excluding burnout, were increased a total of 352 megawatts: 159 at DR Reactor as the result of increased flows following venturi installation and an increase in the effluent water temperature limit; 104 at KE Reactor, and 89 at KW Reactor, in both cases as the result of reactivity gains subsequent to passing the point of minimum reactivity caused by fission product buildup.

A total of 35 slug failures occurred during May. This represents the worst monthly experience to date for total ruptures and the worst since October, 1954, for uranium ruptures. The individual reactor experience was as follows: At C Reactor there were a total of 26 ruptures including 10 regular uranium, 11 C type enrichment, 3 J type enrichment, and 2 production test slugs; H Reactor experienced 3 regular uranium and one J type enrichment failures; at D Reactor there were 2 regular uranium ruptures; B, DR and F Reactors each experienced one regular metal slug rupture. The total outage time required for slug removal was 463.4 hours.

Thirty-four reactor scrams occurred, of which 24 were caused by normal Panellit system variables with twelve of these occurring at DR Reactor subsequent to gauge replacement during the horizontal rod outage. Five Beckman scrams occurred: one at DR Reactor when an erratic Beckman was taken off by-pass to standardize other instruments; one at F Reactor due to a faulty instrument; one each at KE and KW Reactors due to by-passing a third Beckman; and one at DR Reactor due to failure to change trip setting during a cold start-up. C Reactor was scrammed once when a faulty thermocouple indicated a high tube temperature. KE Reactor was scrammed once by a faulty pressure reducing valve in the Building 1706-KE recirculation facility. KW Reactor was scrammed by the Building 165-KW under voltage relay when a fuse was blown, and by the KE Reactor emergency cross-tie valve which opened as the result of valve trip control malfunction. F Reactor was scrammed once when a venturi, which was not locked in position, slipped downstream causing a Panellit trip. The total outage time attributed to these scrams was 64.1 hours.

A 29 hour outage occurred at F Reactor when the 107-F basin overflowed as the result of blocking of the exit flume by loose baffle timbers.

Four process tube leaks occurred as a result of slug failures, two at C and one each at DR and H.

The repaired 1904-KE effluent line was returned to service during the May 18 outage following the installation of vents on both the 1904-KW and 1904-KE lines. An inspection of the 1904-KW effluent line revealed a crack in the line, however, no repairs are currently planned. Approximately 500 tons of concrete and iron ballast were placed on the lines to keep them in position.

The U-233 input production was 81.2 percent of forecast as the result of a low operating efficiency at C Reactor. At month end the balance of the enriched thorium load was 63 tubes at C and 50 at H.

The shipments of irradiated J material were resumed during the month and a total of 4480 pieces were sent offsite.

SEPARATIONS SECTION

The monthly production of all facilities, with the exception of TBP, exceeded the official forecast quotas.

The performance of the Redox plant was notable in that an operating rate of 9 tons per day was sustained for the last twenty days of the month. As a result of the high rate and good operating efficiency a new record for plutonium production, which exceeded the forecast by 38 percent, was achieved along with a record uranium throughput of 256 tons. Lower rate operation of 6 to 8 tons per day was necessary during the early part of the month because of higher than normal waste losses. On May 6, a 14-hour shutdown was taken for column flushing in order to improve the extraction performance. Following a gradual improvement in column performance the rate was increased on May 11 to 9 tons per day and the operation continued at this rate for the remainder of the month. An operating efficiency of 98.5 percent also established a new record for this facility.

The T plant production of low ngs material was 101 percent of the official forecast. Controlled dissolving to minimize the I-131 emission and equipment difficulties resulted in the average rates being lower than goal.

The UO_3 plant operation was normal throughout the month with production determined only by feed availability. A daily production rate of 18 tons established a new record for this facility.

The TBP process suffered high waste losses during most of the month. Throughout the first half of the period corrective measures in the form of column flushes and organic replacements were taken in an attempt to improve column performance. The resulting downtime and low rates were reflected in a monthly production of only 86 percent of the forecast. At month end, the process appeared to be returning to a normal operating condition with a record 8.5 tons/day rate on each cycle, and with decontamination and waste losses within limits.

The forecasted production was achieved at the Isolation Building without difficulty. Although a number of start-up difficulties were experienced with the new Purification and Reduction tanks in the Fabrication Building, the facility output in plutonium processed and cores made exceeded substantially the previous high production record of December, 1954.

The West Area evaporator continued operation during the month, using accumulated bottoms as feed, with a volume reduction of 44.6 percent.

At mid-month, waste metal removal from tanks containing 1.2 year old material was started. Removal of metal waste from the East Area storage is practically completed with sluicing operations being confined to one tank at month end. During May two of the remaining three tanks with metal waste were officially declared empty - 104 and 106-BX.

GENERAL

Personnel

On Roll May 1, 1955	5094
Net Increase	39
Total on Roll May 31, 1955	5133

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY
FOR
MONTH OF MAY, 1955

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

INVENTOR	TITLE
C. E. Frantz, Metal Preparation Section	A Pneumatic Program Timer (5/31/55)
D. C. Wheeler, Reactor Section	Annunciator Circuit

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

MONTHLY OPERATING REPORT - MAY 1955

DECLASSIFIED
WITH DELETIONS

June 3, 1955

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
May, 1955

I. RESPONSIBILITY

There was no change in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

	May	April	Year to date
Total Acceptable Slugs Canned (Tons	402	364	1989
Composite Canning Yield (%)	82	79	79
Efficiency (%) (Canning Throughput)	95	94	94
Forecast Achievement (Current commitment)	111	100	107
Net Acceptable Solid Slugs (Tons)	376	347	1892
Slugs Returned from Reactor (Tons)	6.05*	2.67	22.54
Canning Yield (%)	82	79	79
Net Acceptable Cored Slugs (Tons)	26	17	97
Slugs Returned from Reactor (Tons)	.35**	.14	.49
Canning Yield (%)	79	71	72
Autoclave Failure - Solid (No./M)	.001	.001	.001
Autoclave Failure - Cored (No./M)	.00	.00	.00
Acceptable C-4 Slugs Canned (Pieces)	728	2308	5034
Acceptable Pb-Cd Slugs Canned (Pieces)	808	0	8432
Acceptable 10-66 Slugs Canned (Pieces)	351	0	397
Average Steam Generated (M lbs/hr)	33.6	42.7	
Maximum Steam Generated (M lbs/hr)	52.0	60.0	
Total Steam Generated (M lbs)	25,021	30,725	
Coal Consumed (Tons)	1,626	1,947	
Sanitary Water from 3000 Area(Million Gals)	55.8	51.0	
Average Rate (GPM)	1,250	1,183	

*Includes adjustment for 4.98 tons returned during April.
**Includes adjustment for .35 tons returned during April.

[redacted]

2. Activities

A net production of 402 tons of acceptable finished slugs was attained in May, essentially 111 percent of forecast. Twenty-six tons of this total were cored slugs. Three canning lines were operated on a two-shift basis; three line-shifts on a full relief basis and three line-shifts on a minimum relief basis.

The composite yield of 82% was an improvement of 3% over the April yield. The major causes for rejection remained bad welds, marred surfaces and poor bonds. Significant improvement was achieved in both the bad weld and marred surface reject categories over the April experience.

The controlled test of lead content on one canning line initiated in April contributed substantially to the reduction of the depression-type bad weld reject category from five percent to approximately two percent. The dimple defect experience for slugs canned on the test canning line was less than one percent during May. However, the uncontrolled canning lines also experienced a reduction in dimple-type rejects, indicating that other factors may be contributors. Continued study of this problem will be necessary before definite controls can be established.

At month-end the bare slug inventory had increased to about a three weeks' supply and the combined canned inventory of the Metal Preparation and Reactor Sections remained at a three-and one-half week's supply.

One eight-inch solid uranium autoclave failure occurred during the month. The failure occurred near the upper end of the slug and appeared to be due to a defect in the can wall.

The material and outline for a Cost Training Program has been completed. The first meetings of this program will be presented to exempt members of the Section in June and subsequent meetings will be scheduled monthly for the remainder of the calendar year.

The Physical Constants Test Reactor installation in 305-B Building is nearing completion. All of the equipment has been assembled and the electrical work is over 80% complete. Work has begun on the assembly of the Thermal Test Reactor in this same building.

An unusual amount of overtime has been necessary throughout the month for the completion of shop work required by project work orders.

3. Special Operations

A total of 1,569 Tru-line enriched uranium-aluminum alloy slugs were canned by the hot press process with a canning yield of 90%. The improvement in the yield over previous months is attributed to the elimination of carbon scale deposited on the surface of the slug.

The canning of thorium slugs continued with 606 slugs being canned by the "C" process with a yield of 60%. The low yield was caused by difficulties in obtaining a sound weld closure.

3. Special Operations - continued

The continuous calciner in the 321 Building was started up for a 96-hour run to test an extension of operating variables and the off-gas filter. Shift coverage was provided for this run. The off-gas filter was fabricated in the 328 Building shops and installed by plant forces. In spite of the high temperatures involved (bed temperature 850°F), the mechanical operation of the calciner was satisfactory. The filter performance was good and no serious difficulties were encountered.

4. Schedule Variance

Acceptable canned slug production was essentially 111% of forecast. Manpower was diverted from special canning and utilized to relieve three canning line-shifts during the month and build up canned slug inventories in anticipation of the early discharges of K reactors.

B. Equipment Experience

1. Operating Continuity

The canning line efficiency was 95 percent during May, an increase of one percent over April.

2. Inspection, Maintenance and Replacement

The radiograph and dark room facilities, started up last month, were operated intermittently during May. Additional alterations will be necessary before these facilities can be operated on a production basis.

Since the start-up of the penetration etch machine in March, four etch tank heating element failures have occurred. Replacement elements have been removed from the second penetration etch machine to maintain continuity of operation and an emergency order has been placed to obtain additional elements.

Investigation of the acid leaks occurring in the Boltaron pipelines of the nitric acid tank farm indicated that this pipe is unsatisfactory. The Boltaron pipelines will be replaced with stainless steel at an early date.

C. Improvement Experience

1. Production Tests

PT-313-47MT "Cored Slugs From Extruded Blanks and Rolled Rods" HW-33189

A total of 26 tons of finished eight-inch cored slugs was produced with a 79 percent yield. This represents a yield improvement of 8 percent over last period and it resulted primarily from a reduction in bad weld and poor bond rejects.

Three thousand cored slugs were processed to evaluate the use of pressed aluminum plugs as a substitute for welded uranium end plugs. The finished yield was 78.1% and no canning bath metal was found in the cores either by destructive or non-destructive testing using the cobalt tester.

C. Improvement Experience - continued

1. Production Tests - continued

During this period eight tons of finished slugs processed with pressed aluminum plugs were shipped to D pile and eleven tons of regular cored slugs were shipped to F pile for lot charging.

2. Process Tests and Revisions

Eleven thousand bare slug cores, finished to a diameter three mils greater than the nominal specification, were canned and evaluated during the month. No canning difficulties were encountered and reject rates did not differ significantly from those of normal slug cores. This evaluation was made as part of a proposal to increase pile reactivity with a larger uranium and smaller aluminum-silicon volume.

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 except the following:

C. E. Frantz — A Pneumatic Program Timer

D. Events Influencing Costs

1. Labor Variance

Labor costs will decrease .005 per unit as a result of a 3% increase in yields. A further reduction of .003 will result from the utilization of manpower for the Purex start-up production.

2. Material Variance

Material costs are expected to decrease about .005 per unit as a result of a 3% increase in yields. A further reduction in material costs based on the increased yield was offset by an increase in the consumption of new steel sleeves.

3. Other Costs

Other costs decreased .025 primarily as a result of a 10% increase in slug production and the Purex start-up requirements.

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 $4,259,977 as of May 22, 1955. Construction is estimated to be essentially complete as of June 15, 1955. Minor exceptions will remain for completion on a work order basis.

1. Project Status - continued

Demolition work is approximately 95% complete. The old slug pickle area has been released for removal. All acid bricks have been installed in the slug recovery area. The lighting in the old portion of the building is near completion. The two slug pickle machines are in operation; however, one is being tested and adjusted.

The sleeve cleaning machines are complete except for a portion of the exhaust duct work. Production tests are expected to start on this equipment within a few days. The cap and can cleaning equipment has been installed and is complete except for a small amount of piping and electrical work. The slug recovery equipment has been positioned and electrical, piping, and ductwork are being installed.

The canning area conveyor system is complete except for the control and safety circuits. Testing is in progress. A temporary unload table has been placed in the component parts preparation area to facilitate the use of the system prior to the delivery of the regular unload table.

A portion of the ventilation equipment for the canning area has been installed and tested. This equipment is being installed on all canning lines as it becomes available.

A third automatic quench machine has been modified and is in operation. Alteration of the fourth quench machine is near completion. The slug stamping machines have been received. Installation of these machines is expected to start within a few days.

The Acme-Gridley cut-off machines #1 and #3 are performing satisfactorily; however, experimental work is continuing relative to the collet liners. Collet liners fabricated with a phenolic material have given satisfactory results. Development work relative to the high noise level of the cut-off machines is continuing.

Installation of the newly designed ventilation system for the weld booths has been started. The system provides adequate capacity for additional welding booths.

Fabrication work has been started on the newly designed ductwork for the penetration etch machine in the east finishing line.

An improved condensate disposal system has been designed for use in the autoclave area. Installation will start when the necessary materials arrive.

The general and supporting facilities are essentially complete.

Modification of the 3706 Building is complete. Final acceptance of the building was made on May 2, 1955. Project work relative to the Manufacturing offices is complete except for some paving around the 3706 and 3703 Buildings and the installation of another entrance to 3703 Building.

Project CG-610 - "Replacement of Existing 313 Building Roof"
Project authorized funds total $55,000. Detailed design is 98% complete. Construction is expected to start about June 15 and be completed by August 15, 1955.

Project CG-614 - "Hanford 4X Program - 300 Area Production Increase"
Project authorized funds total $130,000. Scoping is complete and design is 96% complete. The present estimated cost is $340,000. The proposal has been forwarded to Washington, D.C. for final approval.

Project CA-590 - "Fly Ash Collection Equipment-384 Building"
Estimated cost - $38,000. Scoping and preliminary design are complete. The proposal was revised to specify that tie-in work would be done by Minor Construction rather than plant forces. The revised proposal was submitted to the A.E.C. on May 3 and rejected on May 19. Negotiations for re-submission of the project are under way.

Project ER-A-3118 - "300 Area Fence Replacement"
- Cost estimated as $26,000. The proposal was approved by the A.E.C. Work Review Board on May 19; however, the directive has not yet been received.

IR-194 - "Centralized Quality Reporting System" ($15,000)
This proposal was approved by the Department Manager and has been transmitted to the A.E.C. Board for review.

F. Significant Reports Issued

1. Routine

Number	Title	Author	Date
HW-36501	Monthly Report,Process Sub-section,Metal Preparation Section, April 1955	EW O'Rorke	5-2-55
HW-36518	Monthly Report, New Fuel Element Production Program, April 1955	WA Blanton	5-3-55
HW-36574	Operation Sub-section Monthly Report, April,1955	WW Windsheimer	5-5-55
HW-36772	General Analytical Control Program I,Uranium Metal, March 1,1955 to March 31,1955, MCW	PR Anderson	5-18-55
HW-36773	General Analytical Control Program I, Uranium Metal, March 1,1955 to March 31,1955, NLCO.	PR Anderson	5-18-55
HW-36833	Statistical Quality Report, January-March,1955	GX Beard	5-25-55
None	Project Status Report	FK Peck	5-18-55

2. Non-Routine

HW-36011	Preliminary Report on a Surface Hydrogen Analytical Technique	HR Gardner RI Miller	3-31-55
HW-36564	Dimensions of Canned and Bare Fuel Elements	RE Olson	5-18-55
HW-36552	Uranium Quality Control Analytical Results	WG Hudson	4-29-55
HW-36715	Report of Acme Lathe Production Test	J Roslund	5-2-55
HW-36738	Evaluation of FMPC and MCW Ingot Chemical Composition:Recommended Specification Limits	SM Gill	5-17-55
HW-36811	Minimum Residual Can Wall Thickness for 8-Inch Uranium Slugs, May,1954 to March, 1955	DE Christensen	5-23-55
HW-36896	Report of Trip to the Ninth Western Metal Congress and Exposition	RC Aungst	5-27-55

2. Non-Routine Reports - continued

Number	Title	Author	Date
HW-36939	Mfg. Dept. Radiation Incident Investigation, Class I, Incident No. 460	LP Henderson	5-23-55
None	Supervisory Selection Program	FK Peck	5-9-55
None	Ten Years of Progress in Portable Radiation Instrumentation	LM Palmer	5-23-55
None	Noise Control - 1171 Building	TW Gore	5-25-55

III. PERSONNEL

A. Organization

No change.

B. Force Summary

	Start of Month			End of Month			Net Change	
	Exempt	Non-Exempt		Exempt	Non-Exempt		E.	N.E.
Section General	1	1		1	1		0	0
Operations	24	170		25	169		+1	-1
Power & Maintenance	36	304		36	309		0	+5
Process	35	67		34	67		-1	0
Projects & Personnel Dev.	11	4		11	3		0	-1
Section Total	107	546	(653)	107	549	(656)	0	+3

C. Safety Experience

There were no major or sub-major injuries during May.

A near-serious incident occurred when a grinding wheel disintegrated and a piece of the wheel struck the machinist on the shoulder. The wheel was being operated greatly in excess of its rated speed.

A second near-serious incident resulted when a flange located near the etch machine in the nitric acid in-put line dissolved in approximately two hours following the initial charge of nitric acid. Although the flange appeared to be stainless steel, it proved to be of Monel. This is the second such incident since January. Although a considerable quantity of acid was discharged at the rupture, no injuries to personnel resulted.

A near-serious injury occurred in the 305 Building when an electrician was checking a limit switch on a control rod and, due to a misinterpretation of signals, the rod was operated. The electrician's hand was caught between a horizontal rod and its stop. Procedures for the testing of energized circuits are being prepared.

D. Radiation Experience

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

Potential contamination of the 3717-B Building was narrowly averted when a 1/10 mg. radium source was accidentally dropped. The lucite capsule fractured but fortunately the platinum-encased needle remained intact. The needle was placed in a lead cave and sealed, building ventilation turned off and the building evacuated. The follow-up survey revealed that no contamination spread had occurred. New cobalt sources, not subject to breakage, will replace the sources in use for ten years.

E. Personnel Activities

1. Visits and Visitors

K.V. Stave and W.W. Windsheimer attended the National Convention of the American Society for Quality Control in New York City and visited the Savannah River Plant to discuss fuel element fabrication problems.

E.W. O'Rorke and S.M. Gill visited the National Lead Company of Ohio for discussion of uranium specifications.

W.K. Wright visited the Freuhauf Trailer Company in Seattle to inspect two 30-ton semi-trailers prior to acceptance.

Messrs. F. Brandel and A. Church, National Lead Company of Ohio, visited Hanford May 18, 19 and 20.

Messrs. K.B. Baker, N.L. Olsen, and J.C. Finley of the Aluminum Company of America visited Hanford this month to discuss component parts.

2. Meetings

Forty-eight safety and security meetings and 56 round table and information meetings were held for members of the Section.

Sixty-three exempt members attended Training Courses at W-10. A course on "Customer Relations" was presented to 37 non-exempt members of the Section.

A Leadership and Self-Development Conference was held May 7, 1955 at W-10 Building and attended by 104 exempt members of Metal Preparation Section.

Richland, Washington
June 7, 1955

MANUFACTURING DEPARTMENT
REACTOR SECTION
MONTHLY REPORT
MAY, 1955

I. RESPONSIBILITY

There were no changes in the responsibilities of the Reactor Section during May.

II. ACHIEVEMENT

A. Operating Experience

Reactor time operated efficiency was 79.1 per cent, a six per cent improvement compared to April, but still relatively low as the result of a record number of slug failures, continuation of the DR Reactor horizontal rod outage for approximately four days of May, 107-F Basin overflow problems, and routine reactor operating problems, all discussed in greater detail later in this report.

Total and plutonium input productions were 118.2 and 118.7 per cent of forecast, respectively, and exceeded previous records established in March, 1955, by approximately 20 per cent. Forecast was exceeded as the result of postponing two-week horizontal rod replacement outages at B and D Reactors.

Thorium input production was 81.2 per cent of forecast as the result of a low, 63.7 per cent, operating efficiency at C Reactor. Production charged to thorium irradiation at C and H Reactors was 4.3 and 3.1 per cent, respectively.

A. Operating Experience (Continued)

Plutonium megawatt day output production was 118.8 per cent of forecast as the result of schedule variations, and a continued build-up of material in the storage basins to compensate for an increase in cooling time.

Production, low, and the D Reactor pilot program concentrations remained unchanged, with 337 and 55 tons of low and production concentration material having been discharged. The latter figure includes 14 tons at D Reactor at base goal plus 400 megawatt days per ton.

Established maximum reactor power levels, excluding burnout, were increased a total of 352 megawatts, 159 at DR Reactor as the result of increased flows following venturi installation and an increase in the effluent water temperature limit, 104 at KE Reactor, and 89 at KW Reactor, in both cases as the result of reactivity gains subsequent to passing the point of minimum reactivity caused by fission product build-up.

Thirty-five slug failures occurred as detailed below. This represents the worst monthly experience to date for total ruptures, and the worst since October, 1954, for uranium ruptures. Effective May 23, the effluent water temperature limit at C Reactor was reduced from 105C to 100C in an effort to minimize slug failures.

	B	C	D	DR	F	H	KE	KW	Total
Eight-Inch Regular	1	10	2	1	1	3			18**
Production Test		2*							2
"C" Material		11**							11
"J" Material		3				1			4
	1	26	2	1	1	4	0	0	35

* One each from:
PT-105-552-E "Corrosion Test of Zirconium Canned Slugs"
PT-105-588-A "Irradiation of Extruded Cored Slugs"

** Eight failures were removed from one tube, all can failures apparently resulting from cocked slugs.

*** Of the 18 regular uranium failures, 14 occurred at concentrations of less than 250 megawatt days per ton. Possible causes for this phenomenon are being investigated.

The total time required for rupture removal was 463.4 hours.

A. Operating Experience (Continued)

1. Statistics

Operating statistics are summarized in the table on Page 4.

2. Activities

DR Reactor resumed operation on May 4, after a 17-day horizontal rod replacement outage. Work accomplished during this outage was reported in detail in the April report.

In mid-May, the process water pH was reduced from 7.5 - 7.8, to 7.2 - 7.4 at all water plants except 100-F Area, which is operating under a Production Test, in compliance with revised process standards. It is expected that the lower pH will result in a significant reduction in weight loss corrosion of aluminum process tubes and slug jackets. In place of incomplete acid feed facilities, pH control is being secured by addition of excess alum. To accomplish this, an average of 13 ppm alum is necessary as compared to a previous average feed of 7.5 ppm for coagulation purposes only.

3. Charge-discharge activities associated with major irradiation programs included discharge of 48 tubes of J-Q material at C Reactor. These tubes were recharged with uranium. The month-end balance of J-Q tubes at C and H Reactors under the major J-Q program was 63 and 50, respectively.

4. The shipment of "J" material from DR Reactor to Arco, Idaho, was resumed, with 32 casks containing 4480 pieces shipped.

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

	Tubes Charged	Tubes Discharged	Casks Shipped
Production Tests	24	17	1
Mint (flattening)	7	6	0
Chemical 10-66	9	7	3
Total	40	30	4

1. Statistics (Continued)

HW-36928

	B	C	D	DR	F	H	KE	KW	Total or Average
Reactor Time Operated Efficiency (%)	89.5	63.7	78.3	77.8	67.7	77.8	89.7	88.3	79.1
Reactor Outage Time (Hrs)									
Plutonium Production	78.3	250.7	161.7	164.8	238.5	159.3	74.7	86.9	1214.9
Special Irradiations and Tests	-	19.2	-	-	2.0	5.6	1.6	-	28.4
Total	78.3	269.9	161.7	164.8	240.5	164.9	76.3	86.9	1243.3
Reactor Unscheduled Outage Time (Hrs)	78.3	269.9	79.9	55.4	205.4	164.9	34.9	44.9	933.6
Metal Discharged (Tons)	57.4	55.7	76.2	22.9	69.2	108.5	0.4	1.4	392
Water Quality (ppm Turbidity)									
Raw Water - Average	13	13	14	13	11	10	11	9	
Raw Water - Maximum	22	21	25	23	16	17	21	17	
Process Water - Average	.005	.004	.006	.005	.006	.006	.003	.004	
Process Water - Maximum	.015	.007	.008	.008	.008	.010	.005	.006	
Water Pumped (MM Gals)									
Bldg. 190 to Reactor	2018	2790	2031	1978	1567	2000	5424	5299	23107
Bldg. 182 to 200 Areas			462						462
Bldg. 181	5496		5186		1882	2342	5714	5544	26164
Steam Generated (MM Lbs)	163		228		115	107	25	23	661
Coal Consumed (Tons)	10231		14801		7666	6169			38867
Oil Consumed (Gals)							247900	228040	475940

Ec-4

B. Equipment Experience

Thirty-four reactor scrams occurred, of which 24 were caused by normal Panellit system variables. (Twelve of the scrams occurred at DR Reactor subsequent to gage replacement during the horizontal rod outage.) Five Beckman scrams occurred: one at DR Reactor when an erratic Beckman was taken off by-pass to standardize other instruments; one at F Reactor due to a faulty instrument; one each at KE and KW Reactors due to by-passing a third Beckman, and one at DR Reactor due to failure to change trip setting during a cold start-up. C Reactor was scrammed once when a faulty thermocouple indicated a high tube temperature. KE Reactor was scrammed once by a faulty pressure reducing valve in the Building 1706-KE recirculation facility. KW Reactor was scrammed by the Building 165-KW under voltage relay when a fuse was blown, and by the KE Reactor emergency cross-tie valve which opened as the result of valve trip control malfunction. F Reactor was scrammed once when a venturi, which was not locked in position, slipped downstream causing a Panellit trip. The total outage time attributed to these scrams was 64.1 hours.

A 29-hour outage occurred at F Reactor when the 107-F Basin overflowed as the result of blocking of the exit flume by loose baffle timbers.

Four process tube leaks occurred as the result of slug failures, two at C Reactor and one each at DR and H Reactors. At month end, the water collection rates were returning to normal at DR and H Reactors, but remained high at C Reactor. Water collection rates remained high at F Reactor, but indicated a general downward trend. Approximately six hours were involved in leak testing programs.

The 1904-KE effluent line was returned to service during the May 18 outage following repairs which included installation of vents (installed in the 1904-KW line also). An inspection of the 1904-KW effluent line revealed a crack in the line. However, no repairs are currently planned. Approximately 500 tons of concrete and iron ballast were placed on the lines to keep them in position.

Thermobulb failures at KE and KW Reactors were three and 15, respectively, making totals of 114 and 78 bulbs that have failed since start-up. One central row of bulbs at KE Reactor, and 108 bulbs at KW Reactor were replaced with interim bulbs for evaluation.

Considerable difficulty at the K Reactors has been experienced in preventing separation of the Panellit gage switch

B. Equipment Experience (Continued)

mercury contact into several balls. Cause of the separation is thought to be the "flipping" action of the switch vane during outage pressure changes, together with dirty mercury which prevents recombining of the separate particles. Currently, all gages are checked and corrected after each outage. Study of the problem is continuing.

At KE Reactor, three front face pigtails were replaced as the result of evidence of slight extrusion. At KW Reactor, process water flow was cycled between 120,000 and 160,000 gpm for 30 minutes following each shutdown with no evidence of extrusion noted.

Horizontal rod work and experience included:

a. At DR Reactor, excessive scratching of the new rods as the result of sharp edges on crushed bushings which were unable to support the weight of the rods. This problem is under active study.

b. At D Reactor, continued unsuccessful attempts to remove a portion of the No. 2 thimble which is stuck.

c. At H Reactor, removal of No. 15 rod and thimble, and replacement with a new type thimbleless rod.

Panellit gage reliability checks at five reactors revealed 35 faulty trips:

Reactor	High Trips	Low Trips	Misc.	Total
B	1	0	0	1
C	4	0	0	4
D	0	1	0	1
F	5	1	7	13
H	9	7	0	16
Totals	19	9	7	35

The average of seven trips per reactor represents an increase over the average of approximately four per reactor in April.

At F Reactor, 11 process tubes were replaced as part of the tube replacement program. Approximately 140 outage hours were involved.

No unusual equipment experience in water treatment and steam generating facilities was noted.

[redacted] DECLASSIFIED

EC-8

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)
One of the original test tubes was discharged at 94 per cent of goal as the result of a "J" slug rupture. The tube was recharged with uranium. Irradiation of the remaining 11 tubes continued without incident.

PT-105-579-A (Quantity Irradiation of J-Q Columns)
Forty-eight tubes were discharged at C Reactor. All were recharged uranium. The month-end balance of J-Q tubes under this test was 63 at C Reactor and 50 at H Reactor.

PT-105-7-MR (Irradiation of High Quality Production Uranium Slugs)
At H Reactor, all 10 "run to rupture" tubes passed the 1000 megawatt days per ton concentration without incident. Copper tubing has been installed on six of the 10 tubes to permit individual tube effluent water sampling for rupture detection.

PT-105-8-MR Suppl. A (Uranium Charging During Reactor Operation)
At C Reactor, two tubes were successfully charged and discharged during operation.

PT-105-354-H (KAPL-120 Recirculation Loop)
Installation of the new loop at H Reactor was started, with work limited to out-of-pile phases.

PT-105-546-H (Effect of Helium on D Pile Distortion)
This test, which was scheduled to be concluded on May 1, will be continued pending consideration of an additional test program.

PT-105-550-H (Operation of the In-Pile Facilities of the 1706 Semi-Works)
At KE Reactor, four tubes originally charged with solid aluminum dummies were discharged and recharged with weighed regular metal. Water is now supplied from Building 1706-KE to the eight-tube facility.

C. Improvement Experience (Continued)

No new revised Process Standards - Reactor were issued. One Standard, titled "Process Tube Water Temperature Rise Limits," was deleted from the manual. Completion of Panellit gage replacement at DR Reactor placed this reactor on trip-before-instability limits with the remainder of the reactors, and excess header pressure limits are no longer required.

One revised Process Standard - Reactor Cooling Water, titled "pH Control," was issued. Details of this Standard are described under "Activities."

Delivery of liquid alum by truck from Hedges, Washington, to 100-K Area was started May 2. Delivery by truck has substantially decreased the amount of work associated with unloading as compared to shipment in railroad tank cars.

The report of invention indicated below was submitted in May.

Inventor	Invention Report Title
D. C. Wheeler	"Annunciator Circuit"

D. Events Influencing Costs

May Reactor Section costs were favorably affected by a record high production, and the absence of major maintenance programs during the month as the result of rescheduling the rod replacement outages at B and D Reactors. Adversely affecting Reactor Section cost were the maintenance work associated with F Reactor tube replacement and rupture removal, and increases in coal and chemical costs.

Operation of DR Reactor for a full month, as compared to two weeks in April, accounted for increased steam generation and coal costs in May. Decreased raw water quality, together with use of excess alum to control pH were instrumental in increasing chemical costs.

Preliminary estimates indicate that both plutonium irradiation and total irradiation unit costs will be approximately 10 per cent below April costs as the net result of the above factors.

E. Plant Development and Expansion

1. Project Status

The most significant Reactor Section project activity is reported below. Further details concerning projects

E. Plant Development and Expansion

1. Project Status (Continued)

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 5/20/55.

CA-431 (100-C Area)
Western Gear Company is experiencing difficulty in attaining specified packing density of powder in horizontal rods. Delay beyond the promised shipment date of June 10, is expected.

CA-512 (100-K Plant)
Experience with 100-K Area equipment is covered under "Equipment Experience." A test of the interim effluent trench type crib indicated that the percolation rate was satisfactory. Consideration continues to be given by the Manufacturing and Radiological Sciences Departments to the possibility of using this crib as the permanent crib.

CG-558 (Reactor Plant Modification for Increased Production)
Scratching of replacement rods at DR Reactor, as described under "Equipment Experience," has resulted in postponement of rod replacement outages at B, D and H Reactors until a satisfactory solution can be achieved. Thirty ball valves for the poison column facility are expected to arrive during the first week of June. Brass elbows on all pressure monitor gages for this project will be replaced with steel elbows by the vendor, with the first shipment of modified gages expected in July. Excavation for the Building 190-B annex began May 4, and was approximately 90 per cent complete at month end.

CA-595 (Installation of Car Pullers for Coal Movement - 100-B, D, F, and H Areas)
A final inspection and acceptance of the car puller equipment was made in all areas on May 5. Operation difficulties encountered during the tests indicated need for additional equipment which will be provided by the Engineering Department and installed by plant forces.

E. Plant Development and Expansion (Continued)

2. Plant Engineering

A number of engineering and development studies were active in the Section during May. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in document HW-37101. Several items of interest are reported below.

Samples of tubular and perforated aluminum dummies formed by a unique shaping method from flat plate stock (solid or perforated) by Smithway Machine Company have been tested and found to be satisfactory from stress relaxation (unrolling when exposed to heat) and compressive strength aspects. Additional tests are planned on these dummies which can be manufactured at a considerable saving as compared with the current extruded and machined dummies.

Preparations are being made for installation at F Reactor of approximately 100 sets of a new type nozzle which is designed to allow process tube replacement without nozzle removal. The tube seal is provided by nozzle "O" rings rather than a Van Stone flange.

Various synthetic materials are being tested at 220C temperatures provided by high pressure steam to determine the effect of high temperatures on their mechanical properties. Increased operating temperatures have indicated a need for heat resistant materials to be used as "O" rings, ball valve seats, and wire insulation.

F. Significant Reports

1. Routine

Monthly operating reports issued for April were:

HW-36440-A	Reactor Section	W. K. MacCready	5/6/55
HW-36663	Operations Sub-Section	J. H. Warren	5/1/55
HW-36575	Process Sub-Section	O. C. Schroeder	5/1/55
HW-36525	Projects and Personnel Development	F.A.R. Stainken	5/2/55
HW-36546	Radiation Monitoring Sub-Section	P. C. Jerman	5/4/55
-	Maintenance Sub-Section	E. E. Weyerts	5/4/55
HW-36548	Power Sub-Section	J. C. McLaughlin	5/4/55

F. Significant Reports

1. Routine (Continued)

Other routine reports issued during May included:

HW-36832	"Monthly Progress Report, Reactor Section Expansion, May, 1955"	J. P. Langan	5/23/55
-	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	F.A.R. Stainken	5/20/55
HW-36515	"Reactivity Balance and Associated Data - Period April, 1955"	A. P. Vinther	5/2/55

2. Non-Routine

HW-36662	"Operational Aspects of KE Reactor Activation"	H. T. Wells	5/24/55
HW-36468	"History of the KW Reactor Panellit Board and Orifice Pattern"	K. W. Hess	4/5/55
HW-34867 Rev.	"Reactor Operational Engineering Problems"	C. W. Botsford R. B. Hamilton	4/11/55
HW-36861	"Anticipated Reactor Section Irradiation Costs"	J. R. Young	5/12/55
HW-36445	"Summary Analysis of Operational Charge-Discharge Safety Circuit Protection"	R. D. Schilling	4/29/55
HW-36298	"Slug Rupture Detection Utilizing Ion Exchange Resins"	R. R. Bloomstrand	4/4/55
HW-36211	"Analysis of Tube Deflections"	R. H. Gay	4/20/55
HW-36451	"Examination of Decanned Irradiated Uranium Slugs"	R. R. Bloomstrand	4/3/55
Conf.Undoc.	"J and C Slug Shipping"	J. W. Sowards	5/9/55
	"Reactor Section Cost Analysis - Third Quarter FY 1955"	J. R. Young	5/12/55

III. PERSONNEL

A. Organization

There were no appointments in the Reactor Section during May.

Effective May 23, R. O. Mehann assumed the duties related to an approximate one month special assignment consulting with the Atomic Energy Commission on SF accountability problems for commercial reactors.

B. Force Summary

	Beginning of Month	End of Month	Net Change
Section General	2	2	0
Operations	371	372	/ 1
Maintenance	614	619	/ 5
Projects & Personnel			
Development	44	44	0
Power	485	484	/ 1
Process	69	73	/ 4
Radiation Monitoring	82	83	/ 1
Section Total	1665	1677	/ 12

Changes during May included 20 transfers into the Section, five transfers out of the Section, four new hires, six terminations, one reactivation, and two deactivations.

C. Safety Experience

There were no Major or Sub-Major Injuries in the Reactor Section in May. A decreased number of minor injuries in May as compared to March and April indicated progress in reducing minor injury experience. In May, the Section adopted a program of asking each supervisor to do something "extra"in the way of direct safety effort.

D. Radiation Experience

There was one possible Class II Radiation Incident in addition to five Class I Radiation Incidents in May. The possible Class II Incident involved a radiation monitor at DR Reactor whose film badge on May 25 showed a high reading which could not be substantiated by his activities during the shift. This investigation was still in progress at month end.

The Class I Incidents were as follows: No. 453 at F Reactor on May 8 and 9 involved several employees subjected to exposure from radioactive waste on a rear face catwalk stub; No. 454 at F Reactor on May 8 involved possible internal deposition and contamination of two employees during transfer of dummies; No. 455 at F Reactor on May 8 involved a foreman who received an estimated exposure in excess of the weekly permissible limit; No. 459 at C Reactor on May 13 involved several employees subjected to exposure from contaminated gloves in a rear face labyrinth; and No. 463 at 100-H Area on May 4 involved contamination of ground area by particles exhausted from the H Reactor exhaust stack. Complete

D. Radiation Experience (Continued)

details on these incidents can be found in Documents HW-36878, HW-36879, HW-36880, HW-36886, and HW-37122, respectively.

F. Personnel Activities

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

H. G. Harder, M. P. Johnson, C. E. Harkins and N. H. Skarshaug, Power Sub-Section, attended the Pacific Northwest Conference of the American Water Works Association at Yakima, Washington on May 19 and 20.

R. A. Rohrbacher, Process Sub-Section, attended the Pacific Northwest Instrument Exposition at Portland, Oregon on May 25.

R. B. Campbell, Process Sub-Section, visited the General Chemical Company at Hedges, Washington on May 19, to discuss the analysis of liquid alum samples.

Two information meetings for non-exempt Reactor Section employees were held at 100-H Area on May 27, by J. H. Warren and E. E. Weyerts. Subjects discussed were the K Reactors and Maintenance Sub-Section organization and functions.

Non-exempt personnel of the Power Sub-Section participated in the recording of a 12 minute commentary on 100 Area Water Plant activities. The commentary was prepared for future presentation on the radio program "Inside Hanford."

The 100 Area Master Evacuation Plan was revised, based on a revised over-all HAPO plan. At month end, the plan was essentially ready for publication.

The first presentation of Job Methods Improvement was completed for seven Reactor Section supervisors on May 10.

Richland, Washington
June 7, 1955

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
MAY 1955

I RESPONSIBILITY

Responsibilities of the Separations Section were unchanged during the month of May, 1955.

II ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	May		April	
	Normal	Acid Wash	Normal	Acid Wash
Charges started in Canyon Bldgs.	102	1	44	0
Charges completed in Conc. Bldgs.	97	1	44	0
Special charges - Conc. Bldgs.	2		9	
Charges completed-Isolation Bldg.	84		87	
Average Waste Losses, %	3.9		3.2	
Special charges-Isolation Bldg.	7		21	
Material balance, %	99.0		101.5	
Yield through Process, %	95.1		98.3	
Average cooling time (days)	99		90	
Minimum cooling time (days)	92		75	

b. Redox Operations

	May	April
Equivalent charges started	492.2	265.7
Charges completed	469.0	229.0
Tons Uranium delivered to storage	256.2	187.5
Average Production Rate per operating day, Tons	8.4	7.8
Average Daily operating rate for the month, Tons	8.3	6.3
Average yield, %		
Uranium	99.3	97.9
Plutonium	96.9	100.8
Total Waste Loss, %		
Uranium	0.43	0.90
Plutonium	0.87	1.31
Average cooling time, days	123	147
Minimum cooling time, days	106	82
Percent down time	2.0	19.7

c. 231

	May	April
Batches started	102	107
Batches completed	91	108
Batches awaiting processing	7	3

d. 234-5 Operations

	May	April
Batches completed through Task I	290 (997.2)	-
Batches completed through Task II	288 (989.7)	111 (353.8)
Runs completed through Task III	150	44
Waste Disposal (Units)	10.4	7.9

e. UO_3 Operations

	May	April	To Date
Uranium drummed, Tons	394.36	342.49	9729.72
Uranium shipped, Tons	339.92	349.35	9633.67
Average cooling time, Days (Redox)	129	147	
Minimum cooling time, Days (Redox)	112	82	
Waste loss, %	0.02	0.02	

f. TBP Operations

	May	April	To Date
Tons received from Metal Removal	154.19	151.12	5416.98
Tons shipped to UO_3 Plant	141.07	146.14	5230.06
Average Production Rate per operating day, Tons	5.40	5.17	
Average Daily Operating Rate for the month, Tons	4.55	4.87	
Average yield, %	96.01	95.79	
Total Waste Loss, %	4.85	2.14	
Actual Waste Volume returned to Theoritical Volume	0.56	0.59	
Percent Down Time	15.81	5.83	

g. Power

	200 East	200 West
Raw water pumped, gpm	2 937	7 411
Filtered water pumped, gpm	543	1 020
Steam generated, lbs/hr	39 871	178 265
Maximum steam generated, lbs/hr	76 000	232 000
Total steam generated, M lbs.	29 663	132 629
Coal consumed, tons (est.)	1 898	8 082

h. Waste Storage

	Equivalent Tons U	
	May	April
Metal Waste reserve storage capacity-T Plant	203	219
1st Cycle reserve storage capacity-T Plant	468	609
Metal Waste reserve storage capacity-B Plant	685	685
1st Cycle reserve storage capacity-B Plant	74	74
Redox Waste reserve storage capacity	679	939

2. Activities

a. Redox Processing

A total of 256.2 tons of uranium were produced this month exceeding the production forecast by 38%, and setting a new record for the Redox plant.

The high plutonium waste loss problem continued from last month and necessitated operating at lower than normal production rates (varying from 6 to 8.5 tons uranium/day) during the first part of the month. On May 6 a shutdown of fourteen hours was taken in order to flush the second plutonium cycle extraction column (2A) in an effort to improve the extraction

a. Redox Processing (Continued)

performance in this cycle. Subsequent to startup, waste losses remained high but began tapering off as a result of other improvements effected in the flow sheet. By May 11 it was possible to raise the extraction battery rates to 9 tons uranium per day. At this rate, the first extraction cycle column (1A) began to exhibit flooding tendencies finally forcing a rate reduction to 8.5 tons per day on May 13. This rate continued until May 16 at which time the 1S column was placed in parallel operation with the 1A column. With each column operating at a greatly reduced rate of 4.5 tons uranium per day, a combined rate of 9 tons uranium per day was achieved and maintained throughout the remainder of the month.

b. Metal Recovery

1) TBP Processing

Waste losses began increasing late in April and on May 3 a shutdown and chemical flush of all extraction batteries was performed. Continued high losses occurred after startup. A second shutdown was made on May 12 for a caustic flush of first cycle equipment. The entire organic system was replaced with fresh solvent and the backcycling of RDW as RAIS scrub was discontinued. After startup, waste losses were somewhat improved but were not reduced to normal until sanitary water was substituted for demineralized water. The underlying reason for this was being explored at month end; the ion exchange resin being suspected.

Failure on the RA pulser on May 23 accounted for 32 hours lost time on first cycle operation. A new concentrator was mounted in Section 10 and this section became operable during the month.

Production for May of 141.07 tons was 23.93 tons under the May commitment.

2) UO_3 Processing

The UO_3 Plant operated normally all month. Production of 394.36 tons exceeded the May commitment by 44.36 tons.

3) Waste Metal Removal

Production in Metal Removal in May was 173 tons which exceeded the TBP Plant needs.

Sluicing of 101-U was started this period and continued all month. This minimum age (1.2 year) material was delivered to TBP at a low rate and later deliveries were increased to one

3) Waste Metal Removal (Continued)

blend per two blends of TX farm material. Under these conditions, there was no apparent increase in total gamma activity of the feed after concentration and no appreciable changes in decontamination factors in first and second cycle products.

c. T Plant Processing

T Plant production was curtailed during the first half of the month, by efforts to control the I^{131} emission from the ventilation stack to a maximum of 1.0 curies per day. During the latter part of the month all dissolvers have been operated at full capacity, and in spite of numerous equipment failures, which resulted in approximately 40 hours of lost production time, production equaled approximately 97% of the schedule and 101% of the commitment.

d. Isolation and Metal Fabrication

The Isolation Building was scheduled to process only low MWD material from "T" Plant for shipment off-site as plutonium nitrate. Production schedules were met without difficulty.

During the month plutonium was fabricated into 130 Model and 190 Model assemblies. The production commitments for the month were satisfied for both models, with the achievement of a new high in production for a given month. The schedule for delivery for unfabricated metal was also completed, and this also represented the establishment of a new production record.

Routine production operations were conducted in the new Task I (Wet Chemistry) equipment during the month, and good results were generally obtained. Some difficulties with plugged lines, faulty operating valves, and poor venting were experienced, and it was necessary to make equipment modifications to permit the addition of chemicals into the top of the reactors instead of the previously used dip tube introduction at the bottom.

3. Special Operations

a. Waste Evaporators

Failure of the 118-TX feed pump shutdown 242-T during which time a caustic flush of the evaporator was made. Evaporation of accumulated evaporator bottoms resulted in an overall volume reduction of 44.6 percent for the month on 263,312 gallons of feed.

b. Plutonium Recovery, Metal Fabrication

The recovery of skulls was accelerated during the month; Hood 41 (used formerly for powder recovery only) was adapted

b. Plutonium Recovery, Metal Fabrication (Continued)

to metal recovery and capacity more than doubled. This was done in order to recover the maximum amount of high MWD/T plutonium prior to the time when the fabrication facilities converted to low MWD/T plutonium processing. Powder recovery in Hood 41 will be resumed when metal recovery is on a current basis.

4. Schedule Variance

Redox production exceeded forecast by 28 percent, establishing a new production record for the plant.

Although the production commitment was exceeded by approximately 8% in T Plant, problems associated primarily with the high I^{131} emission curtailed plant production to 97% of the production forecast.

In the Metal Recovery Sub-Section the UO_3 Plant production forecast was exceeded but the TBP Plant failed to meet its forecast. Nine carloads of UO_3 were shipped this month.

In addition to meeting production schedules and forecasts for both Isolation and Metal Fabrication production, two new production records were established. The number of assemblies exceeded previous building records by 50% and the delivery of unfabricated metal exceeded past production records by 25%.

B. Equipment Experience

1. Operating Continuity

Redox downtime amounted to 14.6 hours (98% mechanical efficiency) for purpose of flushing columns.

In Metal Recovery significant downtime of 117.5 hours on 2nd cycle TBP operation was experienced due to flushing column equipment as the result of high waste losses.

Continuity of operations in T Plant was affected by 40 hours of lost production time caused by failures of the 7-2 centrifuge, A-1 tank jacket, Canyon railroad tunnel door, 75 Ton crane electrical units, 19-1 agitator, and E-1 to E-2 transfer line. Dissolver operation was curtailed in an effort to control I^{131} emission.

Although some down time of individual units resulted from maintenance failures there was no serious interference with operating continuity in Z Plant.

2. Inspection, Maintenance and Replacement

a. Cell Equipment Replacement - Redox

One silver reactor heater unit became plugged during the month and was reclaimed by steaming out the off-gas line.

b. Centrifuges - T Plant

Faulty electrical wiring of the 7-2 and 13-2 centrifuges resulted in damage which necessitated replacement of these units.

c. Silver Reactors - T Plant

Three silver reactor columns were replaced during the month. In order to evaluate the efficiency of different packing, the 3-5L now has interlock ceramic packing and the 3-5R is packed with berl saddles.

d. Section 10 - Metal Recovery

Section 10 was reactivated to provide additional feed concentrator capacity. Operation has been satisfactory.

C. Improvement Experience

1. Process Tests and Revisions

a. Iodine Emission

Redox

Iodine control was excellent during the report period largely due to the age of the metal being processed. The average I^{131} emission was 0.24 curies per day.

Activity is continuing along several lines to isolate the mechanism of iodine emission and to gain better control over it. These activities include:

1) Improved temporary sampling devices on individual Redox dissolver off-gas lines which will provide more reliable samples.

2) An expanded sampling program aimed at pin pointing the time and place of the emission.

3) A small backup silver reactor is being installed in the "T" Plant pipe gallery to determine the feasibility of a backup reactor.

4) Detail drawings for permanent iodine monitoring stations for each dissolver off-gas line are being prepared.

Silver reactors were regenerated on a preventive routine basis in the Redox Plant during the month.

a. Iodine Emission (Continued)

T Plant

The dissolver coating removal procedure has continued to give erratic iodine emissions even with close operating control and reduced boiling temperatures. Iodine emission has been observed on all three dissolvers during the coating removal step and indicates a possibility that some reaction during coating removal either evolves iodine or removes iodine already deposited on the silver reactor. Samples taken across the silver reactor and the filter of the 3-5R dissolver, although not conclusive, have shown that iodine going to the silver reactor is approximately one third the amount of iodine leaving the silver reactor during coating removal, and that about one half of the iodine leaving the silver reactor is retained by the filter. It is planned to take additional samples to define this problem further.

On May 13 and 14 Iodine^{131} emissions of 6.9 and 5.4 curies respectively occurred. Evaluation of direct off-gas line monitors and analyses of off-gas scrubber solutions indicated failures of the 3-5L and 3-5R silver reactors. These units were both replaced, the 3-5L silver reactor being packed with interlocks and the 3-5R silver reactor being packed with berl saddles. Installation of the berl saddles in the 3-5R dissolver should further evaluate this problem and provide the basis for the type of packing used on future reactors at T Plant and other Separations plants.

b. Waste Scavenging - Metal Recovery

TBP in-process waste scavenging was continued with indications of improvement. The latest storage tank filled (108-BY) has been sampled and the supernatant analyzed for Sr^{90}. The activity is approximately a factor of three less than the Sr^{90} activity in the Tank which was filled prior to tank 108-BY. Soil column tests are being performed with this material.

c. Pot Caking - Metal Recovery

About 12 days of moderately severe pot caking took place this month. The causes are generally unknown although the last two days are thought to be attributed to higher sodium content of the feed due to the use of sanitary water for demineralized water in process at the TBP Plant.

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.

[redacted] DECLASSIFIED

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D. Events Influencing Costs

The Separations Section expenditures, for May, are expected to be approximately seven percent above the April level. This increase in cost will be the result of (1) the increased essential material consumption associated with the record Redox production and increased over April level of production achieved by T Plant (2) and increased labor cost due to the longer working month and the addition of nineteen employees to the Section roll.

E. Plant Development and Expansion

1. Project Status

a. CA-513-A Purex

Construction status is 99.6 percent complete. Transfer of administrative responsibility from the Commission to the General Electric Company (Engineering Department, Project Section) was approved on May 2, 1955.

Minor Construction has completed 24 of 75 design changes scheduled. Of the remaining, 17 affect canyon equipment. Crane modification, the major item, is scheduled during the period of canyon ventilation balancing.

b. CB-598-- Purex

The General Electric portion of the project was 71 percent complete on May 17. Architectural piping and instrument drawings were received and comments were resolved. The design phase of the project is on schedule.

c. CB-613 - UO_3 Expansion

Revised total project costs indicate an expenditure of $3,600,000 and construction is expected to be done in three phases, namely, 1) site preparation by Minor Construction starting June 6, 1955, 2) building construction by a lump sum contractor between August 15, 1955 and November 15, 1955 and 3) equipment to be installed by Minor Construction and ready by March 1, 1956.

Design is two to three weeks behind but Engineering indicates that this will be corrected.

d. CB-535 - Redox

Minor Construction was not able to complete its work on the silica gel facility due to labor difficulties. Construction work to be done after settlement of the dispute includes setting of the jumpers on the neutralization tank, setting

d. CG-535 - Redox (Continued)

cover blocks on the process cell and diversion box, and area cleanup.

e. CG-496 - Recuplex

Plant forces have reduced the list of startup items by approximately 80% during the month. The fluorethene coating in the column plates failed necessitating the substitution of nozzle plates without any coating. The three columns were regasketed with polyethylene because of failure of the original neoprene-backed teflon gaskets. Early in the month, there was concern about the acceptability of pumps, but a large portion of the trouble was later traced to plugged strainers in the lines. Startup with uranium has been tentatively set for early in June.

f. CG-603 - 4X Program

AEC Directive HW-338, Modification No. 2, dated May 13, 1955, was received during the month. This Directive authorizes the expenditure of Part I funds for specifically designated portions of Part II work.

Project Proposal, Revision 1, Hanford 4X Program - Bismuth Phosphate Plants was approved by G.E. and submitted to the AEC on May 5, 1955. This revision includes all work for Part I and Part II of Project CG-603.

Rehabilitation of B Plant by Minor Construction forces progressed satisfactorily. July 1, 1955 has been established as the target date for performing functional tests of the equipment located in the 221, 224 and 271 Buildings. It is estimated that the B Plant work included in the Part I portion of Project CG-603 is approximately 64% complete.

2. Plant Engineering

a. Standards

The analytical service standards for 221-U and 224-U Buildings were revised and the steam standard for the 221-U Building is being revised to include the evaporation of wastes. The revised labor standard for the 234-5 laboratory has been completed.

b. Work Simplification

The third series of the Work Simplification Program is 90% complete with improvements on 16 jobs already accepted out of the 46 different jobs under study.

c. Engineering Assistance

1) Bail Block Repairs

Tests conducted on a socket type anchor have proven the feasibility of this method to reinforce faulty tank farm block bails at a minimum cost. Estimates for conducting this work have been requested of Minor Construction forces.

2) Noise Control

Investigation of work areas with high noise levels were continued during the month. Corrective measures were scoped for installation in several locations on an experimental basis. Evaluation of these installations will determine the extent of work to be carried out in other locations.

3) Design and Drafting

Progress continued on the overall as-built drafting program, items completed during the month included 224 centrifuge bowl spray, thermowells and adapter flanges for U Plant, and agitator general assemblies for U and S Plants.

Scoping layouts were continued on the proposed T Plant off-gas treatment systems.

F. Reports Issued

1. Routine

Number	Subject	Author
HW-37025	Separations Section Redox Plant Sub-Section Monthly Report - May 1955	R.T. Jessen
HW-36969	Separations Section Metal Recovery Sub-Section Monthly Report - May 1955	T. Prudich
HW-37146	Separations Section T Plant Sub-Section Monthly Report - May 1955	C.T. Groswith
HW-36937	Separations Section Z Plant Sub-Section Monthly Report - May 1955	W.N. Mobley
HW-36975	Separations Section Analytical Control Sub-Section Monthly Report - May 1955	L.M. Knights
HW-37028	Separations Section Radiation Monitoring Sub-Section Monthly Report - May 1955	A.R. Keene
Official Use Only	Separations Section Projects and Personnel Development Sub-Section Monthly Report - May, 1955	O.V. Smiset
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - May 1955	C.P. Cabell

1. Routine (Continued)

Number	Subject	Author
HW-36944	Separations Section Purex Plant Sub-Section Monthly Report - May 1955	V.R. Chapman
HW-36588	Essential Materials Consumption for T Plant April 1955	M.A. Thress
HW-36584	Essential Materials Consumption for TBP Plant April 1955	M.A. Thress
HW-36583	Essential Materials Consumption for Redox Plant - April 1955	M.A. Thress
HW-36643	Essential Materials ordered May 1 - May 31	D.E. Peterson
HW-36644	Essential Materials Area Report to Cost and Purchasing, April 1 - April 30, 1955	M.A. Thress
HW-36553	Separations Section Waste Status Summary, April 1955	D.E. Peterson
None	Status of Projects, Informal Requests, and Budget Items, May 1955	R.M. Shervem
HW-36442	Separations Section Contact Engineering - 4X Program Monthly Report - April 1955	S.G. Smolen
HW-36881	Separations Section Process Council Minutes	E.G. Pierick
HW-36645	Analytical Control Quality Report - May 5, 1955	L.M. Knights by D.T. Crawley, Jr.

2. Non-Routine

HW-36767	Radiation Incident, Class I, Number 457-C	J.P. Corley
HW-37021	Radiation Incident, Class I, Number 465-R	F.E. Owen
HW-36971	Radiation Incident, Class I, Number 462-C	G.C. Loud
HW-37022	Radiation Incident, Class I, Number 466-C	W.G. Westover
HW-36709	Radiation Incident, Class I, Number 451-R	G.E. Backman
HW-36660	TBP Plant Feed Schedule, May 1955 through July 1956	B.F. Campbell
None	Work Simplification Proposal No. 10 "Gummed Tape - An Economic Substitute for Masking Tape"	M. Pociluyko
None	Industrial Engineering Report No. 31 "T Plant Dispatching Center Study"	M. Pociluyko
None	Labor Standard for the Metal Removal Unit	G.R. Ruzicka
None	Analytical Service Standard for the 221-U Building	R.H. Silletto
HW-36589	Concentration of Redox H-4 Solutions	A. Brunstad
HW-36859	Trip Report: Discussion of Analytical Methods and Problems at Savannah River Project	R.E. Roberts
HW-35944	Measurement of UNH Receipts	L.W. Finch by O.T. Roth
HW-36783	TBP "Hot Waste" Analysis	T. Prudich
None	Concentration Building Essential Material Consumption, April 1955	R.H. Steach

[redacted]

2. Non-Routine (Continued)

Number	Subject	Author
None	Canyon Building Essential Material Consumption - April 1955	R.H. Steach
None	Procedure for Checking Waste Analyses $BiPO_4$	G.L. Hanson

III PERSONNEL

A. Force Summary

	Start of Month	End of Month	Net Change
Section General	2	2	0
Redox Plant Sub-Section	232	216	-16
Metal Recovery Plant Sub-Section	291	270	-21
Z Plant Sub-Section	173	180	+7
T Plant Sub-Section	233	218	-15
Purex Sub-Section	203	282	+79
Power & Maintenance Sub-Section	326	312	-14
Projects & Personnel Development	62	59	-3
Analytical Control Sub-Section	203	205	+2
Radiation Monitoring Sub-Section	174	174	0
Section Total	1899	1918	+19

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 580 days without a lost time injury, an outstanding achievement since it involves approximately 7,500,000 exposure man-hours.

C. Radiation Experience

Five Class I radiation incidents occurred and included: (1) uncontrolled contamination spread (up to 8 rads/hr) from a leaking wall connector flange in the 221-U pipe gallery with no significant personnel exposure experienced (No. 457-C); (2) abnormally high dose rates (up to 100 r/hr) occurred when process liquid backed up into a chemical addition line in the pipe gallery in the 202-S Building with no significant personnel exposures experienced (No. 465-R); (3) possible inhalation of airborne plutonium contamination when two employees in the 234-5 Building RMA line failed to perform a personal survey following a hood glove rupture (No. 462-C); (4) a contaminated puncture wound occurred to a maintenance mechanic while rodding out a jet in a hood in the 234-5 Building RMA line (No. 466-C); and (5) uncontrolled exposure (up to 5 r/hr) to three samplers occurred while they were working without adequate

C. Radiation Experience (Continued)

monitoring near jumpers lying on the canyon deck at Section 7 in the 221-T Building (No. 451-R).

Daily emission of I^{131} from the T and S Plant stacks averaged 1.5 and 0.4 curies, respectively. The A-3 reactor in the 202-S Building was regenerated on a scheduled basis. In the 221-T Building, a reactor in the 3-5R position containing porcelain interlocks was replaced by a reactor containing porous berl saddles. The effectiveness of the replacement is being evaluated.

D. Personnel Activities

1. Personnel Programs and Training

During the month the training program activities were as follows:

Program	Attendance
For Exempt Roll:	
Supv. Safety Training	17
For Non-Exempt Roll:	
Process Training Meetings	40
Orientation	16
G.E. Selection Evaluation	6 (P&M)
Nine-week Instrument Training	11
Radiation Monitoring	6

2. Procurement

At month's end there are thirty active requisitions on file with Employment for non-exempt personnel.

3. Visitations

R. W. Harvey attended a conference on time standards at Schenectady and visited the Dow Chemical Plant at Midland, Michigan and the A. E. Staley Plant at Decatur, Illinois.

F. A. Hollenbach spent May 24 and 25 at the Savannah River Plant reviewing problems encountered there in the operation of a Purex type solvent extraction process.

June 3, 1955

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

May, 1955

ACHIEVEMENT

Operating Experience

Power Statistics (See last page for details)

Plant Contract

Probable time of May Peak . . .	2:30 - 3:00 p.m., May 25
Telemetered Peak demand for May	176,000 KW
Probable energy consumption for May	111,978 MWH
Billing demand for May.	201,000 KW
Actual BPA Metered Peak demand for April.	176,671 KW
Actual BPA Metered energy consumption for April .	96,200 MWH
Average Monthly energy consumption this FY through April.	77,016 MWH

* * * * *

Volume of energy over the transmission system reached another new high as approximately 112 million kilowatt-hours were delivered to the Plant, 17% greater than last month and approximately 30% above the fiscal year average.

Two transmission incidents, which had no effect on Plant operations, occurred when system frequency dropped a half cycle for one minute on May 18 and 30 due to generator trouble at McNary.

On the distribution system, a nine minute interruption of normal power to the "U" Area occurred on May 24, due to an electrical maintenance incident. An electrician, using a blower to dust out a control box, directed the air on an open type relay which closed and tripped the transformer breaker. The relay, which was not known to be connected, had been installed by Construction forces as a future transformer overload limiting control, staged to operate in the event cooling fans could not control rising oil temperature. The transformer loading has been

such that the installation of cooling fans has not been necessary, nor had connection of the limit relay been considered. The tripping circuit has been disconnected and the one other similar device on the Plant system, located at the 300 Area, has a protective cover.

* * * * *

The annual count and audit of our inventory accounts was made on May 23 in cooperation with the Property Accounting Section. The physical operation was well-organized and completed in four hours with no disruption to electrical maintenance crew work schedules. Indications are that the total variance on all accounts will be under five per cent.

Equipment Experience

During recent heavy rains, water was found to be entering the 165-KW basement via the conduit which carries high voltage cable from adjacent power transformers to inside switchgear. Investigation disclosed that run-off from the roof was concentrated at a spot near the conduit. A gutter will be installed along the roof to divert this. Upon excavating to determine how the water entered the conduit, it was discovered that Construction had merely butted the concrete envelope to the building entrance hole, leaving an eighth inch space. This will be built up and sealed with tar.

Improvement Experience

Items pertinent to the Critical power procedures were discussed in a meeting attended by representatives of the Reactor, Plant Engineering, and Electrical Utility Sections. Some of the subject matter concerned re-evaluation of allowable system frequency limits, by-passing problems at 100-D-DR and 100-F, routine test operation of 230 KV circuit breakers, and applicability of the precepts of Critical power procedures at 100-K Areas. Revisions will be issued following final agreement between the Reactor and Electrical Utility Sections.

* * * * *

On May 2, staged fault tests on the 13.8 KV system at 100-KE Area were conducted to verify installed relaying and to test the 100-KE generators' stability upon system separation. The analysis of test data is underway and the summary report is scheduled for issue in June.

Preliminary investigation of causes for the retarded and malfunction of relaying has disclosed the following:

a. One of the pilot wire relays was found to have a spring which had apparently been overheated. Following repairs, exhaustive tests

were made under simulated conditions. Time measurements taken by oscillograph indicated proper timing. The spring was probably damaged during the third test of the series when polarity had been inadvertently reversed for a short time on one of the test circuits. Subject to further developments, it can only be conjectured that the cause of the slow action in the first three tests was also corrected when the spring repairs were made.

b. Investigation of the cause or causes of malfunction of the differential relaying has disclosed reversed factory-wired current transformer leads to the connection block in the grounding transformer. (GE) It appears that this transposition can well be the total source of the trouble. Further analysis and such simulated tests that can be made are under way, however, the actual proof can only be made under fault conditions.

Equipment at 100-KW will be checked for similar errors.

* * * * *

Events Influencing Costs

Overtime hours expended were approximately 2.9% of the total regular hours worked. Attendance for the month was 98.2%.

Approximately $21,000 value in insulators, crossarms, and timbers; materials for the five miles of 230 KV line held at AEC request, was transferred from our control and custody to Stores Spare Parts on May 19. The transaction was planned and accomplished ahead of the annual audit inventory in order to facilitate accounting and avoid further costs.

In compliance with the fixed objective of reducing Section controlled inventories to an operating minimum, current spare parts and general materials inventories totaling $37,300 will be cut through transfer and excessing to approximately $5,000 by August, 1955.

Plant Development and Expansion

Critical "W" Power Conditions were established on the 230 KV loop in order that BPA forces at Midway substation could perform several phases of work necessary toward creation of a third 230 KV bus at Midway. Potential transformers on the line side of Hanford No. 1 and 2 lines were also relocated on the bus side. The accomplishment of this and other work scheduled during the coming months will potentially improve the quality of service from Midway.

* * * * *

On May 19 in a meeting attended by representatives of AEC, BPA, GE Engineering, and the Electrical Utility Section, the following major topics of common interest were discussed:

1. Supply of Reactive Power

From the discussion, it developed that BPA's prime interest in the reactive power situation at Hanford is to determine what our future plans and schedules are. They were not anticipating that HAPO would supply reactive power in excess of local needs as we had been led to believe in previous correspondence on the subject. BPA is presently making long range studies to determine the potential need and the proper location for equipment for supplying corrective reactive power to their system. Our future power situation is obviously a factor for consideration in their study.

It was finally concluded that analyzer board studies would be mutually beneficial. The results of the tests should particularly indicate to us the local operational problems and limits during various HAPO System load levels and conditions after completion of CG-558.

In view of additional generation sources, BPA has scheduled during the next five or six years which will influence the values of fault current available to our loop, it is also quite desirable that studies of this subject be made.

It is planned to set up both of these studies in July or August concurrently with BPA operational studies. Personnel from GE Engineering and this Section will participate.

2. Priest Rapids

The BPA people were asked what, if any, planning they had done toward tie-in of the Priest Rapids generation to their system. They stated that about all they had done was think about it, but they are quite sure that if Priest Rapids is built in 1960, as planned, a tie-in to Midway will be made. We stated the subject was brought up particularly because of our interest in the future fault current which would be available at Midway; that we are presently studying the capabilities of the HAPO System circuit breakers.

3. 230 KV Fault Tests

It was pointed out that fault tests on the 230 KV loop are still a probability. The time setting of the backup relays was discussed and BPA stated they had not reached final conclusions on what they would want but will advise us in the near future.

[redacted]

Significant Reports

Non-Unit Non-Exempt Force Reduction Procedure: a plan to insure proper consideration of employee seniority and company value in the event of a necessary reduction of forces.

ORGANIZATION AND PERSONNEL

Force Summary

	May
Exempt Personnel	17
Dispatchers	5
Electricians	12
Linemen	22
Substation Operators	31
Secretary	1
Stenographer	1
Clerk	1
Storekeeper	1
Draftsman	1
	92

During the month, there was one lineman reactivated from an illness leave.

Safety Experience

No minor injuries were reported during the month. While it is hoped that this reflects the true performance, the employee's responsibility for First Aid will be re-emphasized during June safety meetings.

* * * * *

A systematic procedure and schedule is being formulated for the periodic review of all Section job hazard breakdowns and safety rules, and for cyclic coverage of these in safety meetings. The initial step in this program is the publication of an employee safe practices handbook specifically edited for the Electrical Utility Section. This edition is now scheduled for final review and printing with distribution planned for August 1, 1955. A major improvement will be the incorporation of a section containing all job hazard breakdowns of line and substation work. A desirable objective will also be realized in that future revisions can be accomplished more readily than in the past when the safety handbook also covered the inside electrical and telephone crafts.

[redacted]

L. H. Holden, Electrical Utility representative, was elected chairman of the Health Activities Committee for the 1955-56 term.

Radiation Experience

There were no radiation incidents reported during the month.

* * * * *

An R.M.U. conducted meeting was held for Section personnel wherein 200 Areas contamination types and control methods were reviewed and discussed. The 100 Areas radiation will likewise be reviewed in June.

Personnel Activities

The movie "It's Everybody's Business", a cartoon interpreting basic business economics, was attentively received at the monthly Section information meeting.

* * * * *

Line and substation maintenance craftsmen attended the first four of five scheduled refresher courses, staged by the System Planning Unit, reviewing the electrical and mechanical features of all transformer types as well as the methods of connection.

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A supervisory training program was formulated and begun with the aim of training and aiding first-line supervisors to better represent the Company to their workmen.

ELECTRICAL UTILITY SECTION

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

	ENERGY - MW HRS.		MAXIMUM DEMAND-KW		LOAD FACTOR-%	
	Last Month	This Month	Last Month	This Month	Last Month	This Month
230 KV System						
A-2 Out (100-B)	25470	26050	46000	44800	76.9	78.2
A-4 Out (100-D)	14150	17560	26600	28100	73.9	84.0
A-5 Out (100-H)	9710	9220	15000	14700	89.9	84.3
A-6 Out (100-F)	7180	7420	14100	15000	70.7	66.5
A-7 Out (100-KW)	18096	20544	38500	36500	65.3	75.6
A-8 Out (200 Area)	5720	6170	10050	9900	79.0	83.8
A-9 Out (100-KE)	11280	20488	47500	32000	33.0	86.1
TOTAL OUT	91606	107452	197750*	181000*	--	--
MIDWAY IN	92502	109371	172000	170400	74.7	86.3
115 KV System (300 Area)						
BB3-S4 Out	2320	2312	4336	4069	74.3	76.4
115-66 KV System						
B9-S11 Out (100-K)	90	60	240	200	52.1	40.3
B7-S10 Out (W. Bluffs)	261	216	810	675	44.7	43.0
Hanford Out (7200 V.)	49	38	---	---	----	----
Hanford In	411	295	1300	1100	43.9	36.1
Project Total In	95233	111978	177636*	175569*	----	----

* Denotes Non-Coincidental Demand

Average Power Factor - 230 KV System 86.2

[redacted]

MANUFACTURING DEPARTMENT
PURCHASING AND STORES SECTION
MONTHLY REPORT MAY, 1955

I Responsibility

An agreement has been reached during the month with AEC to transfer from their books to General Electric amounts representing deposits on returnable containers for which related material costs have been or will be transferred to General Electric. As a result of this change of booking deposits, Stores assumed the responsibility for accountability and control of these returnable containers.

II Achievements

As will be noted from the following statistics total Section activity remained at a high level during the month. Worthy of special note are the abnormally high number of emergency requisitions being received, especially from Minor Construction.

	FY 1955			
Purchasing Sub-Section	March	April	May	FY to Date Average
Emergency requisitions received*				
Employee & Public Relations	6	1	1	2
Engineering	38	23	22	22
Manufacturing	80	61	56	55
Medical	7	1	10	6
Minor Construction	168	185	247	151
Radiological Sciences	3	2	7	3
Stores	145	123	86	106
Total	447	396	429	345
Average per day	19.4	18.9	20.4	16.4
*Data available for 5 months only				
Total requisitions**				
On hand start of month	914	1,047	956	889
Received	3,315	2,786	3,020	2,539
Placed	3,182	2,877	2,938	2,542
On hand end of month	1,047	956	1,038	886
**Do not include those assigned to AEC, VIZ:	612	472	531	483
Number of purchase orders placed				
General Supplies Unit	1,832	2,255	1,932	Breakdown
Process Equipment Unit	591	725	530	Not
Essential Material Unit	34	34	27	Available
Local Purchase	55	62	64	
Total	2,512	3,076	2,553	2,265

II Achievement - (Cont.)

	FY 1955			
	March	April	May	FY to Date Average
Purchasing Sub-Section (Cont.)				
Value of purchase orders placed				
General Supplies Unit	$608,554	$722,227	$559,146	Breakdown
Process Equipment Unit	951,663	856,873	892,954	Not
Essential Material Unit	1,059,440	644,981	648,358	Available
Local Purchase	392	439	501	
Total	$2,620,049	$2,224,520	$2,100,959	$2,004,470
Purchase Order Alterations				
Number	209	220	254	181
Gross value	$ 70,768	$158,839	$ 82,508	$ 98,583
Expediting*				
Orders on hand start of month	2,455	2,585	2,562	2,356
Orders received	2,817	2,530	2,234	2,225
Orders completed	2,687	2,553	2,249	2,195
Orders on hand end of month	2,585	2,562	2,547	2,396
Stores Sub-Section				
General Supplies				
Store orders processed	33,996	30,280	29,430	28,644
Value of issues	$347,534	$336,184	$305,611	$ 312,074
Line items in account	29,283	28,698	29,826	28,591
Back orders on hand	330	415	383	334
Out of stock items	203	203	223	203
Percent of line items out of stock	.7	.7	.7	.7
Spare Parts				
Store orders processed	1,865	1,707	1,603	1,413
Value of issues	$114,245	$108,561	$104,398	$ 96,714
Line items in account	27,265	27,855	28,362	25,670
Back orders on hand	394	341	345	294
Out of stock items	280	254	298	253
Percent of line items out of stock	1.0	.9	1.0	1.0
Receiving				
Shipments received	8,447	7,194	6,889	6,622
Receiving reports issued	7,604	6,549	5,967	5,778

*Data available for 7 months only.

II Achievement -(Cont.)

	FY 1955			
	March	April	May	FY to Date Average
Stores Sub-Section				
Excess Material & Equipment				
Received	$192,736	$153,259	$ 49,064	$152,180
Issued to Project	7,292	7,082	6,959	39,152
Shipped off-Project	263,096	305,396	76,751	370,008
Revenue from scrap and surplus sales	$ 19,544	$ 20,505	$ 5,290	$ 19,531
Requisitions screened	3,436	2,988	2,875	2,813
Items screened	11,631	8,550	8,089	8,594
Items furnished	643	758	841	378
Traffic				
Savings				
Rate reductions	$ 5,882	$ 2,975	$ 2,092	$ 3,202
Freight bill audit	1,885	1,182	1,769	1,622
Savings - September 1, 1946 to date $1,945,000.				
Money recovered - Claims				
Loss, damage & overcharge	$ 63	$ 549	$ 33	$ 524
Ticket refunds	1,306	204	617	639
Money recovered - September 1, 1946 to date $208,975.				
Work Volume				
Travel requests	207	159	152	143
Reservations made	660	478	500	440
Expense accounts checked	157	216	210	198
Shipments traced	122	105	103	63
Quotations furnished rates and routes	629	562	637	520
Freight bills approved	1,649	1,577	1,644	1,504
Amount	$298,074	$326,470	$337,941	$313,097
Carload shipments received	885	1,011	1,089	937

The strike which was called by the Teamster's Union on May 18, against two of the major motor carriers operating in the Western states has resulted in practically full curtailment of motor transportation in the eleven Western states. Quick action in providing alternate routes and close attention to those shipments enroute via motor carriers has kept to a minimum the number of shipments which have not been delivered due to the strike. All effort is being made to effect delivery of materials via other modes of transportation with as little delay and increase in costs as possible.

Our claim against Udylite is delayed by that firm; meanwhile we are withholding sufficient funds to cover work being done by plant forces to modify the equipment to meet specifications.

II Achievement - (Cont.)

Trouble is being experienced on the water pumps for Project CG-558 due to casting delays. We are following this closely, using our Liaison Representative's reports from the vendor's plantsite, A.E.C. directive, and performance bond as levers to obtain satisfactory delivery.

Our program to utilize off-site excess resulted in net savings to the plant of $133,474.56 during May; total since March, 1954, is $326,879.87. This was a significant figure for the month.

The rail carriers reduced their rates approximately 15¢ per cwt., on May 16 on Sodium Bichromate and Ferrous Ammonium Sulphate from West Coast ports to the Project. This reduction came at an opportune time as over 200,000 lbs. of this material had to be shipped by rail due to the motor carrier strike.

Distribution of all Spare Parts catalogs except one covering capital items has been completed. Completion of the Capital item catalog is being held up temporarily pending establishment of a new identification system. Expected completion date is June 15, 1955.

The results of a recent survey made by Stores personnel of warehouses and tool cribs in the outer areas did not reveal any large amount of surplus stocks on hand and only the normal flow of excess from these areas can be anticipated.

On May 2, 1955 Stores closed the stock rooms located in Buildings 325 and 3717, 300 Area. The present delivery service throughout the 300 Area will be utilized in these locations. This change in method of service permitted the transfer of 2 employees to assignments in other Sections.

An improvement in Stores method of applying identification marks on incoming stainless steel has been accomplished with the purchase of a Mathews portable printer. Continuous, non-corrosive, water-proof markings are applied to materials in indelible ink providing complete identification. The use of this machine will eliminate delays previously experienced in securing the services of painters to perform this work.

The preparation of "Repeat Requisitions" on all classes of General Supplies is progressing satisfactorily with approximately 50% of all items now on this form. The goal for completion by October, 1955 will be met. The use of this form will result in a reduction of one employee, decrease our reordering analysis time by approximately 25% and will eliminate the possibility of errors in ordering incorrect materials.

To assist area employees in the selection and purchase of safety shoes, display cases containing samples of shoes available from Stores have been installed in the following locations:

Area	Building	Area	Building	Area	Building
100-B	1717	100-K	1717	200-W	221-T
100-D	1717	200-W	202-S	200-W	272-W
100-F	1717	200-W	221-U	200-E	272-E
100-H	1717	200-W	234-5	200-E	202-A

The necessary forms for ordering shoes from Stores are available at each of the locations shown above.

II Achievement - (Cont.)

We were successful in negotiating several changes to the HOO Commodity classifications with the AEC. These changes are necessary in order to permit segregation and classification of spare parts in accordance with this system and will bring about uniformity in inventory classification and reporting.

Spare Parts warehousing activity remained at a high level. In addition to routine work extensive consolidation of existing stock has been accomplished to clear 3,000 square feet of warehouse space to meet requirements for the installation of additional bins and pallet racks.

Spare parts pertaining to the 100-200 Area operations were moved from Central Stores to the 2101 Building, 200-E Area, on May 27, 1955. This move is a further step in the centralization of spares.

A purchase requisition was issued on May 3, 1955 for new bins and pallet racks for the 2101 Building. Quotations were received but no order was placed because it was questionable whether the equipment offered by the lowest bidder would meet our specifications. Additional information concerning the product offered is being obtained from the low bidder prior to purchase.

A pre-inventory meeting was conducted during the month with both Financial and Stores personnel to lay the ground work for taking the third annual physical inventory of excess materials and equipment.

The following five value analysis studies are being conducted by the Inventory Standardization Unit:

1. Telephone and communications material carried in spare parts.

2. Analysis and columnar pads carried in the stationery and office supplies caption.

3. Community spare parts.

4. Welding supplies carried in spare parts.

5. Bearings carried in both spare parts and general supplies.

The first four of the above items are awaiting final action or decision by the responsible organization or principal end-user. The study of bearings which was just started will require considerable time and effort to complete because of the variety, type, kind, size and manufacturer of bearings.

A change in the method of documenting expenditures from the Stores petty cash fund reduced clerical time to prepare reimbursement requests by 50%.

Surplus Sale Number SS-102, covering the old Transportation Facility, 1131 Area, was awarded by the AEC and removal of the property is in progress.

Stores costs in handling stainless steel in the 200-W Area through the use of riggers and rigging equipment is rather high at this time. To reduce the cost of handling and render better service arrangements are being made to install a conveyor and a power hack saw in the 200-W Area.

II Achievement - (Cont.)

Status of Essential Material Contracts

Sodium Dichromate - the contract with Irving M. Sobin Company, Inc. is completed and in force.

Carbon Dioxide -inquiries for Carbon Dioxide for the period from October 1, 1955 through September 30, 1956, with alternate bids for the period through 1958, have been mailed and the bids are received. No analysis or recommendation has been made.

Nitric Acid - our contract for 10,000 tons of Nitric Acid from Du Pont has been prepared, but is being held up temporarily while a corrected forecast of consumption is obtained from the Separations Section. This is necessary in order to determine that this contract is actually necessary for protection for our source of supply.

Tributyl Phosphate - contract RO-19 for Tributyl Phosphate for the period July 1, 1955 through June 30, 1956 has been prepared and is ready to present to Westvaco Mineral Products Division of Food Machinery Corporation for signature.

Sulfamic Acid - contract RO-18 for Sulfamic Acid requirements from October 1, 1955 through September 30, 1956 has been signed by Van Waters and Rogers, Inc., and sent to Separations Section for further approval.

Ferrous Ammonium Sulphate - bids received on our requirements for Ferrous Ammonium Sulphate for the period October 1, 1955 through September 30, 1956 show a possible saving if we can lower our specifications. This matter is being investigated now; if the lower grade material can be used new bids on the lower specification will be solicited.

Caustic Soda - suppmement No. 1 to contract RO-10 for Caustic Soda is now with Pennsylvania Salt Manufacturing Company of Washington for signature. This supplement is to establish an additional delivery point.

Liquid Aluminum Sulphate - supplement No. 1 to RO-11, Liquid Aluminum Sulphate, is now with General Chemical Division for signature. This supplement is to extend the term, establish an additional delivery point, and add security and indemnity provisions.

III Organization and Personnel

Organization

The position of Engineering Specialist - Purchasing was established May 16, 1955. Mr. J. R. Kelly was appointed to this position and will report directly to the Section Manager.

III Organization and Personnel - (Cont.)

Force Summary

Component	4-31-55 Ex.	N.Ex.	T	5-31-55 Ex.	N.Ex.	T	Change Ex.	N.Ex.	T
General	2	3	5	3	3	6	1	-	1
Traffic	3	6	9	3	6	9	-	-	-
Purchasing Sub-Sect.	42	45	87	42	49	91	-	4	4
Stores Sub-Section	12	153	165	12	157	169	-	4	4
Total	59	207	266	60	215	275	1	8	9

Safety Experience

The expansion joints in the floor of Central Stores are becoming somewhat of a serious problem. The joints are exceptionally wide and contain a soft tar substance which was used by the construction contractor when the building was constructed. We are not only experiencing a maintenance problem of preventing the concrete at these joints from cracking and chipping from the use of the warehouse equipment, but are facing a serious safety hazard. Because of the current condition an employee fell while working in the warehouse. Fortunately the accident was not serious. Upon notification of the accident, steps have been taken with maintenance forces to provide a better filler in the joints. From all indications this will be very costly to rectify.

Employees in the Excess and Shipping Unit have compiled 8890 safety exposure hours, without a single accident from the first of January thru May 20, 1955. This is the longest period of time this Unit has gone without a minor accident and is especially significant in that the major portion of the work performed by this unit consists of loading and unloading of various types of material and equipment which can be very hazardous.

Three minor injuries were reported for the month.

Eight safety and security meetings were held with a total of 255 employees attending.

Personnel Activities

Mr. W. M. Hunt attended the North West Purchasing Agents conference in Portland, Oregon on April 22 and 23, 1955. This was omitted from the April report.

Mr. B. W. Call representing the General Electric ANP Department, Arco, Idaho visited Stores May 23 and 24. The purpose of his visit was to review methods and procedures and secure information to assist in the establishment of similar activities at Arco.

Mr. John Moffett, Stores, attended the sixth National Materials Handling Exposition and Conference in Chicago, Illinois which is produced by the American Materials Handling Society. While there, he also visited the Hotpoint Plant.

TRANSPORTATION SECTION
MONTHLY REPORT
MAY 1955

Transportation Section personnel forces decreased from 492 to 488 by four new hires, one transfer in, one reactivation - personal illness, three terminations, three transfers out, and four deactivations - personal illness. These changes included the transfer of E. W. Powell - Foreman, Garage - to the Minor Construction Sub-Section. Mr. Powell was replaced by the upgrade of C. A. Thompson - Automotive Mechanic Journeyman.

Fiscal year to date costs through April are under the budgetary provisions by $117,094 or 3.367% (salaries -$89,803, materials -$56,093, other costs +$28,802). FY 1955 expenditures are $16,663 or 0.493% less than those for the same period in FY 1954. The following indicates comparative costs by major service functions:

Function	FY 1955 1st 10 mos.	FY 1954 1st 10 mos.	% of change from FY 1954
Railroad	$ 618,732	$ 617,989	+ 0.12 %
Plant Bus	1,123,945	1,140,126	- 1.42 %
Heavy Equipment Maintenance	477,947	480,656	- 0.56 %
Light Equipment Maintenance	553,381	636,019	- 12.99 %
Road Maintenance	92,975	112,006	- 16.99 %

Special attention was given to the preparation of appropriation requests, purchase requisitions, and specifications for the remaining items of budgeted equipment for FY 1955, to comply with the Commission's revised policy with respect to the commitment of funds.

Three hundred and seventy-five units of equipment have been received in the newly established HOO Reserve Pool. This includes 42 buses temporarily assigned by the Commission. General agreements on procedure for the major overhaul of construction equipment have been reached with representatives of the Minor Construction Sub-Section and the Financial Department. The work will be performed by the Transportation Section and the cost will be borne by the major overhaul reserve.

Received a 1953 model, 1500 horsepower, diesel electric locomotive from another A.E.C. installation to replace a 1942 model, 500 horsepower unit that would have required major repairs later in the year. The newly acquired unit appears to be in excellent condition following inspections and test runs. Actual out-of-pocket expense to the Plant will be less than $10,000 whereas a new unit of this class would cost approximately $160,000. This upgrade will enable a greater volume of tonnage to be handled with existing manpower. Completed the assignment of the 30 new Ford sedans to replace a like number of 1948 Buicks and 1952 Fords.

Reduced the IME rate of the Track Maintenance Unit from 75% to 65% and credited railroad costs with the year to date over-liquidation of $23,906.

Revised the unit cost financial statement on railroad operations to provide a segregated breakdown of expenditures and statistical information between process and commercial service. This will enhance the comparative value and facilitate equitable liquidation rates.

Transportation Section

Furnished statistical data to the Manufacturing Cost Unit on the properties and activities of the Transportation Section. This information is to be used in the possible development of a policy with the Travelers Insurance Company.

Compiled financial data and volume statistics for FY 1955 on the Plant and Richland Bus Systems for a special report to the Commission.

Completed the acquisition of several items of specialized shop equipment from Kaiser Engineers. The Commission sanctioned these transfers which were at net book value on capital equipment and 30% on cost items.

Devised a proposed system for recording, reporting, and liquidating landlord expenditures at Riverland and the Unassigned Service Area. General agreements have been reached on the treatment of charges for maintaining bus lanes and parking facilities; method of computing floor space and reporting expenditures by type of service and space categories; and the inclusion of a summary of road maintenance costs by areas by the Transportation Section.

Devoted considerable effort on inventory matters. Principal items included a continuing check of fuel disbursements particularly at the 1172 Service Station; the establishment of tentative dates for physical inventories during 1955; method of reporting the stock of parts recently acquired from Construction for the major overhaul of heavy equipment; and a prepared statement for Inventory Accounting on the stock level and turnover of railroad track materials.

Established an information and training program on financial matters with the initial meeting being held on May 24. Monthly meetings are planned for the review of performance with respect to costs, budgets, inventories, etc. A portion of each discussion will be devoted to a study of some particular aspect of the financial plan. The objective of this undertaking is to increase knowledge and stimulate thinking in cost control and allied interests.

Civil Defense received a great deal of attention throughout the month. Several meetings were held and procedures revised to maintain assigned responsibilities. A limited but actual evacuation of the Richland and North Richland schools was conducted on Friday May 20 by the Transportation Section in cooperation with school officials. Buses were dispatched to each school for transporting children to the edge of town and return. Each phase of the evacuation was analyzed to determine the efficiency of the operation. It now appears that the schools could be completely evacuated within a thirty minute period. A full scale test of this nature is planned during the Fall Term. The initial test was quite successful and received favorable publicity.

The Commission has been requested to retain ten additional buses, or a total of thirty, in the HOO Reserve Pool to insure adequate equipment for school evacuation. This additional equipment is primarily required whenever the regular bus fleet is enroute to or from the Plant areas. Arrangements are being made to obtain emergency equipment for the 300 Area since this area has not been provided with regular evacuation buses.

[redacted]

Transportation Section

Commercial rail traffic during May increased by 16.2% over April due to higher receipts of coal and essential materials. The following recapitulation indicates the distribution of commercial cars handled:

Carload Movements -	Loads In	Empties In	Loads Out	Empties Out
General Electric Company	1119	17	12	1110
A.E.C. c/o Kaiser (cement)	5	0	0	5
Blaw-Knox	25	0	0	25
J. P. Head Co.	2	0	0	2
Kaiser Engineers	33	0	0	30
Sound Construction Co.	2	0	0	2
Thorne & Marble	2	0	0	2
U. S. Army	12	0	0	15
	1200	17	12	1191

Railroad process service during May increased by 34.3% over April which was below normal because of production difficulties.

Railroad car movements including process service totaled 2,843 in May compared to 2,463 in April, 2,106 in March, 2,354 in February, and 2,288 in January.

Locomotive 39-3731 was returned to service on May 6 following the reconditioning of traction motors and wheels. This unit burned out a journal while under load at the 300 Area on May 12 and was out of service for the remainder of the month for repairs.

Routine maintenance of Plant railroad trackage during May required 6,090 man-hours.

Completed the extraordinary maintenance and corrections to 100-K Area trackage incidental to acceptance and start-up as requested by the Commission on a work order. Other non-routine maintenance activities included the re-establishing of the railroad turnout to the 275-EA Warehouse in the 200-East Area, and modifying designed elevation of track and correcting other defections in the 313 Building spur in the 300 Area.

The Plant Bus System transported approximately 12% fewer passengers in May than in April due to the normal seasonal decline and one less day in the reporting month. The following statistics indicate the magnitude of service rendered:

Passenger volume	142,615
Revenue - Bus Fares	$ 7,744.35
Earnings - Transit Advertising (April)	$ 94.75
Bus Trips	7,056
Bus Miles - Passenger Carrying	194,299
Passenger Miles	5,144,024

"Express Shuttle Bus" service inaugurated in April for the 300 Area personnel has been so well received that the service has been expanded to the 200-East Area and studies are in progress to determine the possibilities at other locations.

[redacted]

Transportation Section

The special Public Relations Training Program for Bus Drivers has been completed. The participants expressed satisfaction with the course and some improvement in dealing with customers has already been observed.

Effective May 16 a revised work schedule was adopted for the Bus Drivers assigned to the seven letter groups. The new schedule offers a better day off arrangement for approximately 50 Bus Drivers and provides for greater utilization of manpower by more effective availability.

Special bus transportation was provided for officials of the Philadelphia Electric Company. This included two round trips to Hinkle, Oregon and a tour of the Plant areas.

The Richland Bus System transported 13.3% fewer passengers in May than in April due to the normal seasonal decline and one less day in the reporting month. The following statistics indicate the volume of service rendered:

Total Passengers Including Transfers	10,974
Revenue - Bus Fares	$ 640.72
Earnings - Transit Advertising (April)	$ 4.31
Bus Trips	1,062
Bus Miles - Passenger Carrying	5,629
Passenger Miles	29,205

Off Plant chauffeured automobile trips (Company business and/or official visitors) totaled 180 which were rendered to the following locations:

Benton City, Washington	13
Grandview, Washington	2
Hinkle, Oregon	15
Kennewick, Washington	38
Kiona, Washington	1
Pasco, Washington	54
Pendleton, Oregon	15
Prosser, Washington	5
Richland Wye, Washington	2
Seattle, Washington	1
Spokane, Washington	2
Sunnyside, Washington	6
Union Gap, Washington	1
Walla Walla, Washington	1
West Richland, Washington	11
Whitstrand, Washington	1
Yakima, Washington	12

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

	Gasoline	Diesel Fuel	50 Cetane	Kerosene	White Gas
Stock at Start of Month	64,385	18,140	7,100	2,772	137
Received during Month	109,129	19,350	33,000	2,400	0
Disbursed During Month	99,027	17,730	29,950	2,606	47
Stock at End of Month	74,487	19,760	10,150	2,566	90

Transportation Section

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

Motor Overhauls	54
Class A Inspections and Repairs	107
Class B Inspections and Lubrications	1129
Weekly Inspections - Fuel Trucks and Off Plant Vehicles	74
Semimonthly Inspections - Buses	190
Monthly Inspections - Railroad Rolling Stock	7
Visualiner Inspections	97
Routine Maintenance Repairs and Service Calls	1876
Accident Repairs and Paint Jobs	53
Tire Repairs	644
Wash Jobs	459
	4,690

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

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

Code	Type	No. of Units	Total Mileage
1A	Sedans	391	535,469
1B	Buses	132	202,848
1C	Pickup Trucks	458	227,450
1D	Panel,Carryall,Sta.Wagon	165	104,021
1G	Jeeps	3	278
1H	Power Wagons	50	21,506
68 Series	Trucks	226	113,436
		1,425	1,205,008

Installed a sound proof exhaust system in the dynamometer room of the Motor Repair Shop in the 1171 Building. This greatly reduced the noise level which had a decided effect on the assigned employees.

A study of the bulk fuel distribution system disclosed that the four routes could be satisfactorily combined into three thereby requiring one less truck driver. The released employee was transferred from the Heavy Equipment Maintenance Unit to the Road Maintenance Unit to fill a vacancy.

Established a biweekly inspection program for gasoline and electric powered fork lifts in the 300 Area. This has increased the operating dependability and reduced service calls.

The recently established time standards to perform maintenance jobs on light equipment are producing favorable results. This program has contributed to the reassignment of two mechanics and upgrade of a third without replacements

and undoubtedly was a factor in the increase of 8% in total equipment maintenance jobs over April. It is planned to expand this type of measurement to other types of equipment and eventually establish job standards wherever practicable.

Off-plant trips for transporting special materials and equipment were made to Vancouver, Spokane, Tacoma, and Auburn, Washington.

Initial ice deliveries to the areas for the summer were made on May 9 and lawn maintenance for the 700 Area was begun on May 2.

Contamination control required the covering of one acre in the 100-C Area, five acres in the 100-F Area, and 500 feet of surfaced roadway was sealed with asphaltic materials.

Maintenance of plant roads and the production of road aggregate material required 1,255 man-hours.

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

	MC 3	MC 5
Stock at Start of Month	48.16	23.89
Received During Month	0	0
Used During Month	33.5	0
Stock at End of Month	14.66	23.89

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

	3/4" to 0 Pre-mix Tons	1/4" to 0 Pre-mix Tons	5/8" Chips Cu.Yd.	1/4" Crushed Rock Cu.Yd.	3/4" Crushed Rock Cu.Yd.
Stock at Start of Month	771	946	5,065	514	6,234
Made During Month	742	0	520	0	1,289
Used Durimg Month	437	250	148	0	3,477
Stock at End of Month	1,076	696	5,437	514	4,046

ENGINEERING DEPARTMENT

MAY 1955

PILE TECHNOLOGY SECTION

Zirconium and Zircaloy-2 specimens exposed to pile gas at an average temperature of 410 C in the 100-H "X" test hole for 4000 hours (integrated exposure of 897 MWD/AT) have reacted with the gas at a rate dependent on temperature and independent of pile irradiation.

The irradiation of two uranium-magnesium specimens at the Materials Testing Reactor to 20,000 MWD/T is continuing. Present exposure of the test specimens is approximately 14,400 MWD/T. The post-irradiation examination of two similar specimens exposed to 10,000 MWD/T in the MTR has been completed. During decanning of these specimens it was noted that one fuel material specimen was fractured. Examination of the fracture areas indicated a flaw probably existed in the original casting from which the specimen had been machined. Bend test data obtained on the second specimen were similar to the bend test data obtained on like specimens exposed to 5000 MWD/T. The cumulative mechanical property data obtained on specimens of this material prove conclusively that the matrix fuel material is much more resistant to irradiation effects than other homogeneous materials. Two fuel elements of this material that are approximately HAPO dimensions are also being irradiated at the MTR and have accumulated about 800 MWD/T at the time of this report.

A detailed examination was started on an eight-inch, slug transformed, AlSi bonded uranium slug which failed after an exposure of 230 MWD/T, as typical of the current slug failures. Water-uranium interaction had caused a localized swelling of the can wall by corrosion product buildup. Scale formation on the can wall indicated that abnormally high surface temperatures existed on the side of the slug where the failure occurred. The relation of the uneven surface cooling to the slug failure will be sought in a critical study of the slug components in the region of the failure. Preliminary inspection of slug sections revealed no gross manufacturing or metal quality defects.

Operation of the low impurity canning line continued to substantiate the correlation between dimple or Al-Si spike weld defects and lead content of the canning bath; approximately 3 to 4 fold more defects when the lead content exceeded 0.25 weight percent.

About 3000 drilled slugs sealed with pressed in Al end plugs were canned for test elements without bath metal leaking into the core interiors. No observable damage to the Al end seals resulted from beta cycling selected slugs in the woodsplitter up to 200 cycles.

X-ray orientation and dilatometric data on unirradiated hot-pressed cored fuel elements of the type that failed in the pile at 625 MWD/T showed that the uranium end plug of rolled 3/4 inch rod would grow and expand more than

the core material during irradiation. This would contribute to stresses that could cause the type of core fracture experienced in the pile. Changes in design of the end plug and counterbore, and proper selection of uranium for the end plugs will be made to reduce such stresses in further test irradiations.

A calculation of the dry neutron temperature coefficient of reactivity of the K Piles has been completed. Although the green metal (zero exposure) coefficient is negative, by 600 MWD/T discharge exposure, a reversal in sign occurs and the pile gains reactivity as the neutron temperature increases. In this connection it was pointed out that since a thermal neutron originating in relatively hot graphite must pass through much cooler water, where it is degraded in temperature before it can enter a fuel slug, loss of water would result in a sharp rise in neutron temperature and thus pile reactivity. Under certain circumstances this gain in reactivity could be quite large. Sample magnitudes are presented in HW-36624. These results will be checked by measurement in the LTR.

Borescope examination of tube channels at H and F Piles indicate that tube blocks have been longitudinally cracked and in some cases displaced downstream as a result of process tube and stuck charge removal. Examination of two channels, 1586 and 4171, at H Pile have shown three to four inch separations between tube blocks and trunnion blocks. Split tube blocks and pieces of broken graphite have been observed in 1269-F at F Pile.

A series of simulated rupture tests has been conducted in an out-of-pile high temperature water loop. The purpose of these experiments is to determine the relative rupture characteristics of various fuel element cores and configurations in high temperature, high purity water, in the temperature range 240 to 280 C. A total of twelve different types of fuel elements has been tested to date, including solid, cored, and internally-externally cooled uranium cores, with jackets of aluminum, zirconium and stainless steel, plus uranium-magnesium matrix slugs and a thorium element. In each case of the uranium or matrix slugs, rupture of the elements caused stoppage of tube flow, usually in a matter of minutes after the first indication of flow reduction. The thorium slug exhibited a deep crack in the can and metal following exposure, although no swelling occurred. One slug comprised of alternating thin wafers of uranium and aluminum, when ruptured, split into two parts, but did not block flow. These tests point up a potentially serious problem in Hanford type piles using high temperature water as a coolant. This program is continuing along the direction of testing new configurations in an effort to determine practical means of solving the plugging problem.

A revision of Process Specification 4.00, reducing the process water pH from 7.65 to 7.3, was approved May 2. On May 18, a Reactor Process Standard embodying this improvement was approved. The new procedure is now in effect at all areas.

Since the first of May the following low exposure ruptures have occurred. All ruptures have been less than 250 MD/T: C Pile - 9; H Pile - 3; F Pile - 1.

All of these failures gave indications of hot spots and were caused by jacket penetration. In addition three of the C Pile failures exhibited uranium cleavage. The side failures were of a different type from those observed before the beginning of the calendar year. The present ones are characterized by well-defined elliptical markings or a tear drop pattern of failure. In most of the failures the aluminum has lost its luster and shades into a grey color with a structure that appears slatelike. The failures are tentatively attributed to local overheating originating from causes which may be in defective slugs or 100 Area operating conditions or a combination of both.

SEPARATIONS TECHNOLOGY SECTION

The release of radioiodine to the Redox stack has averaged about 0.2 curie per day for the month. Cooling time of the metal has been in excess of 110 days. High uranium losses were encountered in the Metal Recovery Plant early in the month. Following column flushes with 10% caustic, losses returned to normal. Acid and solvent runs in the Recuplex facility are nearing completion. Minor equipment difficulties have been rectified during this period. Cold uranium runs will be carried out during June.

Two full-level runs were made through the Hot Semi-works under Purex HW No. 3 conditions. Mechanical performance of the equipment was very satisfactory. In general waste losses were less than 0.2%. Decontamination factors, however, were a factor of 10 lower than flowsheet. Reasons for this poor decontamination are being explored. Studies are continuing on the 16-inch continuous UO_3 calciner in an effort to improve the quality of the powder.

Estimates are being made of the decomposition rate of water in the high radiation fields that are expected in the Purex waste tanks. A half-filled tank may form hydrogen at a rate that could occupy 10% of the free volume in one day. Water vapor is expected to purge the hydrogen from the tank. Oxygen concentration would be extremely low.

DESIGN SECTION

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

	Percent of Total Effort
Design Development Program	35
1952 Hanford Expansion Program	9
Reactor Plant Modification for Increased Production	14
4X Program	15
Other Design Projects	13
Customer Work and Miscellaneous	14

Total design for Project CG-558, Reactor Plant Modification for Increased Production, advanced to 81% complete. Design for the 190-B and 190-D Annex Buildings is complete. Design for 190-F and 190-H is well advanced. Design for the 183 Building modifications (filter plant) and for the 181 Buildings (river pump house) is complete with the exception of 181-H. In the 105 Buildings, design is complete for all the downcomers and "C" elevator design is progressing on schedule.

Design progress for Project CG-600, 100-C Alterations, is 87% complete based on the revised schedule which reflects scope changes to include ten new pumps.

Design progress status for the 4-X Program for May is as follows:

	Design Scope	Detailed Design
CG-599 - 4X Program - 100 Area	100	100
CG-603 - 4X Program - Bismuth Phosphate Plant	100	96
CG-613 - 4X Program - Metal Conversion Plant	100	53
CG-614 - 4X Program - 300 Area	100	96

Design progress for CG-603 was low during the month due to the addition of 13 drawings to the project for in-farm waste scavenging.

Major Reactor design development studies in progress during May included continuous charge-discharge facilities, improved process tube connectors, improved tube outlet temperature monitoring equipment and engineering feasibility studies for three high-temperature high-pressure recirculation test loops for installation at the DR reactor.

Separations design development continued on preliminary studies of the need and methods of providing facilities for additional plutonium separations capacity. Existing separation plant design development activity included Purex Plant capacity increase, improved radio-iodine removal facilities for existing separation plants, outside nitric acid recovery facilities for Redox, and canyon wash-down facilities for Redox contamination control. In addition, at AEC request, a study was made of the HAPO radiation sources for immediate utilization in food sterilization.

PROJECT SECTION

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

Project No.	Title	Completion Scheduled	Completion Actual
CA-512	100-K Area Facilities (excluding 1706 KER construction which has not been scheduled)	100%	99.9%
CA-513-A	Purex Facilities, Part A	100%	99.6%
CA-514	300 Area Expansion	94%	94%
CA-539	Additional Waste Storage Facilities, Redox	67%	68%
CA-546	Fuel Element Pilot Plant	50%*	50%*
CG-558	Reactor Plant Modifications	12%	9%
CG-603	Hanford 4X, Bismuth Phosphate Plants	32%	57%

* In accordance with schedules submitted on May 10, 1955, for AEC approval.

A work stoppage by 78 operating engineers in Minor Construction began about 10:00 A.M., May 24, 1955, and continued to the end of the month. The walkout followed a work determination made by the J. A. Jones Company concerning air compressors. Interference with Minor Construction work has resulted in furloughing of about 30 men.

Study of the possibility of utilizing other governmental agencies to accomplish a portion of off-site inspection for HAPO is underway. Preliminary findings indicate 10-15% of the workload might be so inspected. An on-site vendor inspection service has been approved and is being established.

Repairs to the 105-KE effluent line were completed by Minor Construction and closed out with expenditure of about $100,000.

Operability testing at Purex was continued in cooperation with Manufacturing Department. The average Minor Construction work force during the month was 970 to 980.

ADVANCE ENGINEERING SECTION

Studies indicate that the "free" gamma radiation from irradiated slugs being cooled before chemical processing would be worth millions of dollars per year if used for purposes such as low temperature sterilization of agricultural products. A substantial market appears to exist, and the irradiation service would be in the public interest.

ORGANIZATION & PERSONNEL

Total on Roll, May 1, 1955	1,419
Net Change	-6
Total on Roll, May 31, 1955	1,413

A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

ENGINEERING ADMINISTRATION SECTION

MAY 1955

Thirty-day inventory listings were sent to consultants and subcontractors for the first time this month. Out of five lists, three have been returned to date.

During the period all classified documents still remaining in the 700 Area File were transferred to the 300 Area File, releasing vault space in the 703 Building. This task was carried out by packing the documents still remaining in the 700 Area Files in transfer cases and storing these transfer cases a-top the files in the 300 Area vault. This will enable the destruction clerks to concentrate on the destruction of current materials (since the 300 Area Files is rapidly growing out of filing space) and to destroy the 700 Area surplus as time permits. Experience so far indicates that merely destroying more documents in a single year than are issued during that year (as was done in 1954, for example) will not wholly resolve the document storage problem since the field holdings of documents are steadily diminishing. In future, the excess of destruction over issuance must considerably exceed the 10% accomplishment of 1954.

Progress was also made on the program to bring Atomic Weapon Data Reports under tighter Security control. During the month HW-36713 was issued and distributed to Plant personnel for comments. This report "Interpretation of Weapon Data Definition Given in GM-172" defines those areas of 234-5 technology which are properly within the scope of Atomic Weapons Data. The review of reports controlled by Classified Files which contains Atomic Weapons Data has been completed. Approximately 2400 reports were reviewed and 1450 were found to contain Atomic Weapons Data.

During the month the following major contract activities were handled:

1. 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 executed by the Contractor and returned May 3.

2. Special Agreement No. G-59 between General Electric and Robley L. Johnson providing photographic services was executed by the Contractor on May 25.

3. Modification No. 1 to Special Agreement No. G-63 between General Electric and the McCray Marine Construction Company providing additional funds for payment was processed and executed by the Contractor on May 2. Modification No. 2 providing further funds and extending the completion date was executed by the contractor on May 17.

4. Modification No. 4 to Consultant Agreement No. 114 between General Electric and Dr. M. E. Ensminger providing for an extension of time and modification of terms was executed by the Consultant on May 6.

5. Modification No. 2 to Consultant Agreement No. 107 between General Electric and Dr. Sidney Marks providing for an extension of time and modification of terms was executed by the Consultant on May 16.

6. Modification No. 1 to Consultant Agreement No. 106 between General Electric and Dr. Edward James providing for an extension of time and modification of terms was executed by the Consultant on May 17.

7. Modification No. 2 to Special Agreement No. G-39 between General Electric and Telefilm, Inc. increasing the amount payable to the Contractor for postage and registry fees covering film returned to General Electric was executed by the Contractor on May 25.

8. Special Agreement No. G-62 between General Electric and Industrial X-Ray Engineers providing for examination of process pump castings was executed by the Contractor on May 11.

9. Modification No. 4 to Consultant Agreement No. 112 between General Electric and Dr. P. E. Church providing for extension of time and modification of terms was executed by the Consultant on May 23.

10. Special Agreement No. G-65 between General Electric and Phillips Petroleum Company as Prime Contractor for the Idaho Operations Office of AEC providing for MTR experimental work was approved by AEC on May 31.

11. Bids were received on May 26 for microfilming of certain Plant records. Recommendation was made on May 31 to AEC that the low bid of $5.40 per thousand images bid by Recordak Corporation be accepted and that the award be made to that firm.

R. J. Schier

R. J. SCHIER, MANAGER
ENGINEERING ADMINISTRATION SECTION

[redacted]

PILE TECHNOLOGY SECTION

MONTHLY REPORT

MAY 1955

VISITORS & TRIPS

W. G. Baxter, GE-ANP, Lockland, visited HAPO regarding process post-irradiation examination of GE-ANP materials, May 25-27.

J. J. Chyle, A. O. Smith Corp., Milwaukee, visited HAPO on May 26 to discuss AEC Corrosion Committee work and materials of construction.

H. W. Cooper, Superior Tube, Los Angeles, visited HAPO on May 9 to discuss zirconium process tube fabrication.

E. E. Emotta, NAA, spent May 3 at HAPO observing facilities of hot laboratories.

A. E. Guay, National Lead, Fernald, Ohio, attended Metal Quality Working Committee Meeting at HAPO on May 31.

J. L. Klein and R. T. Teeg, Nuclear Metals, Cambridge, Mass., visited HAPO regarding fundamental properties of uranium, May 4-6.

J. Kostalos and N. E. Wilson, Westinghouse, Pittsburgh, visited HAPO to discuss radiation monitoring of fluid in-pile control systems, May 16-17.

B. R. Kramer and F. M. Warzel, Phillips Petroleum, Arco, visited HAPO regarding in-line process instrumentation; miscellaneous mechanical development in pumps, gaskets, and flowmeters; recent development in sampling techniques and scheduling and future slug developments, May 5-13.

S. S. Minault, National Research Corp., Newton Highlands, Mass. spent May 18 at HAPO discussing vacuum melting equipment.

S. B. Roboff, Sylvania Electric, Pittsburgh, visited HAPO on May 3 regarding the fuel program.

N. F. Spraggins, duPont, Wilmington, visited HAPO regarding fundamental properties of uranium, May 4-6.

George Westfall, KAPL, spent May 26-27 at HAPO discussing KAPL-120.

Pile Technology Section

J. M. Atwood visited ORNL to discuss high temperature water technology, and attended AEC Corrosion Symposium at Savannah River Plant, May 16-19.

J. A. Berberet attended a meeting pertaining to discussions on new engineering test reactor at Division of Production, AEC, Washington, D. C., May 2-3.

L. P. Bupp visited KAPL to discuss cooling water technology; visited BMI, Columbus, and National Carbon, Cleveland, for graphite discussions, and attended Research Conference on Electron Irradiation at GE Research Lab., Schenectady, May 9-13.

M. W. Carbon and R. C. Lovington visited the duPont Savannah River Plant and KAPL, May 16-20, to discuss technical aspects of reactor design and operation.

E. D. Clayton visited North American Aviation, Downey, Calif., May 2-3, to discuss graphite lattices and exponential pile experiments.

V. R. Cooper and R. W. Benoliel visited National Lead, Fernald, Ohio, May 26-27, to discuss uranium specifications.

D. R. de Halas attended and presented a paper at AEC Corrosion Symposium at Savannah River Plant, May 17-19.

W. F. Ekern, S. S. Jones and C. R. McNutt delivered talks at the AIChE Meeting, Seattle, May 14.

E. A. Evans attended and presented a paper at the 4th Annual Project Corrosion Symposium at the duPont Savannah River Plant, May 17-19.

T. W. Evans spent May 9-13 at Phillips Petroleum Co., Idaho Falls, observing technical experiments in MTR.

M. D. Groves visited Allegheny-Ludlum, Brackenridge, Pa., U. S. Steel, Pittsburgh, and Crucible Steel, Pittsburgh, to consult with stainless steel producers; visited Allegheny-Ludlum, Pittsburgh to establish mutual testing program; conducted a refresher course for GE inspectors on administration and application of oxalic acid screening test at Lukens Steel, Coatsville, Pa., and attended an AISI meeting in New York City, May 16-27.

R. O. Gumprecht attended a Bluenose conference at ANL, May 18-19.

W. T. Kattner spent May 9-12 consulting on uranium at National Lead, Fernald, Ohio, Westinghouse Atomic Power Division, Pittsburgh, Argonne National Lab., Lemont, Ill. and Ames Lab., Ames, Iowa.

D. C. Kaulitz and T. W. Evans visited Phillips Petroleum, Idaho Falls, May 17-18, for technical consultations on experiments in MTR.

Pile Technology Section

N. R. Miller visited ORNL to discuss high temperature water technology, and attended AEC Corrosion Symposium at Savannah River Plant, May 16-19.

J. E. Minor and N. D. Groves attended an AEC Corrosion Symposium at the Savannah River Plant, May 17-19.

W. J. Ozeroff spent May 2-3 at KAPL consulting on KAPL-Hanford Assistance.

R. M. Peekema attended a conference on light metals utilization and fabrication at Washington State Institute of Technology, Pullman, Wash., May 4.

O. W. Rathbun visited National Lead, Fernald, Ohio, May 25-27, to discuss uranium specifications and metal fabrication.

J. W. Riches visted Mallinckrodt Chemical, St. Louis, National Lead, Fernald, Ohio, duPont Savannah River Plant, Augusta, Ga. and Bridgeport Brass, Adrian, Mich. for consultation on the metallurgy of uranium; also visited Atlas Steel, Welland, Canada, to do experimental work on heat treatment of uranium in connection with the joint Canadian-United States stability program, May 10-26.

W. R. Smith discussed pile materials at ANL, Lemont, Ill.; consulted with stainless steel producers at Allegheny-Ludlum, Brackenridge, Pa., Babcock & Wilcox, Beaver Falls, Pa., U. S. Steel, Pittsburgh and Carpenter Steel, Union, N. J.; also attended AEC Corrosion Symposium at Savannah River Plant, Augusta, Ga., May 9-19.

W. R. Smith, J. E. Minor and N. D. Groves visited Mallinckrodt Chemical, St. Louis, May 20, to discuss uranium pellets and plant corrosion problems.

N. O. Strand visited Byron Jackson Co., Los Angeles, to confirm engineering details to expedite design and fabrication of experimental equipment, May 14-17.

R. L. Tomlinson visited ORNL, May 16-17, for shielding contact work.

O. J. Wick visited Dow Chemical, Rocky Flats, Colo. and Los Alamos Scientific Lab., Los Alamos, N. M. to discuss plutonium fabrication, May 9-10.

L. A. Wilson and R. L. Tomlinson attended an AEC Shielding Conference at Division of Reactor Development, AEC, Washington, D. C., May 12-13.

Pile Technology Section

ORGANIZATION & PERSONNEL

Personnel totals are as follow:

	April 30	May 31
Administrative	2	2
Pile Engineering	94	90
Pile Materials	59	60
Fuel Technology	112	109
Physics Research	38	38
Metallurgy Research	70	72
Contact Engineering	4	4
Totals	379	375

Pile Engineering: Emil Leitz, Tech Grad (on rotation), new hire on May 19; J. K. Figenshau, Engineer I, terminated on May 31; S. R. Fields, Engineer II, terminated on May 27; J. M. Roberts, Engineer I, terminated on May 20; M. W. Hulin, Physicist II, transferred to Manufacturing Dept. on May 1; R. L. Loundagin and R. V. Bowersock, Junior Engineers, and J. D. Maguire, Facilities Controller, were transferred from weekly to monthly on May 1.

Pile Materials: A. G. Blasewitz, Senior Engineer, transferred in from Fuel Technology.

Fuel Technology: Peter O. Jackson and Roger H. Todd, Rotational Trainees, were transferred in from Radiological Sciences - Bio Physics and Metallurgy Research on May 16 and 23, respectively; Billie F. Hightower and David L. Rossi, Engineering Assistants, were transferred in from Metal Preparation on May 16; Vera M. Scott, Secretary C, was transferred in from Technical Administration on May 2. Josephine B. Beaty and Barbara V. Zier, Secretary B's, were terminated on May 20 and 13, respectively; John D. Sprowl, Engineer II, terminated on May 13; Phillip A. Riccobuono and Wallace H. Smith, Engineering Assistants, were transferred to Reactor Section on May 9 and 16, respectively. A. G. Blasewitz, Senior Engineer, transferred to Pile Materials on May 16. David O. Hunter, Engineer II, was transferred from weekly to monthly on May 1.

Physics Research: E. W. Wallace, Engineering Assistant, new hire on May 10.

Metallurgy Research: J. M. Tobin, Engineer I, and W. B. Weihermiller, Engineer II, were new hires on May 10 and 23, respectively; G. T. Geering, Tech Grad, was transferred in from Engineering - Design on May 23; G. A. Last, Senior Scientist terminated on May 27; R. H. Todd, Tech Grad (Rotational) was transferred to Fuel Technology on May 23.

PILE ENGINEERING SUB-SECTION

PROCESS TECHNOLOGY

Power Level Limitations

The maximum operating power level during May, 1955 was limited by 105 C outlet water temperature at B, C, DR, and F Piles, 100 C outlet at H Pile and trip before instability limits at D Pile. At KE and KW Piles the power is limited to 500 KW/tube to prevent extensive damage in case of a sudden and complete loss of water to the tube.

Process Specification Changes

Specification 4.00, Reactor Cooling Water Treatment, which controls the pH of process water, has been revised. As a result of PT 105-509-E conducted at F Pile, it was determined that a change in pH from 7.65 to 7.3 reduced the corrosion rate of tubes and slugs from 25 to 50 per cent.

Specification 26.01 a. - The slug corrosion limit has been relaxed to 900 MWD/T for central zone tubes having an outlet water temperature of 110 C or less, provided the pH of the process water is maintained between 7.2 and 7.45.

Pile Operation

During the month, operation of the piles has been essentially normal with the exception of an abnormally large number of slug ruptures at low exposures and the occurrence of a large number of water leaks. On May 12 a slug ruptured in tube 3578 DR and caused the tube to rupture. Since that date 2,450 gallons of water have been collected. The collection rate has continued to decline but was still abnormally high at 25 gallons per day at month end.

Tube leaks at F Pile continued through the month. The week of 5-4-55 to 5-11-55 was spent primarily in leak testing and replacing defective tubes. For the 21 operating days during the month, an average of 62.5 gallons of water per day was collected. At month end the rate had decreased to 12 gallons per day.

Unusually large amounts of water have been collected at H Pile since the startup on 5-14-55. By month end, 1,000 gallons had been collected. There was no indication as to the location of the water leak and the pile is scheduled to be shut down on 6-1-55 for leak testing.

Ruptured Slugs

Twenty-seven slug failures occurred during the month. These consisted of 17 failures of regular production metal, two failures of non-standard uranium slugs being irradiated under production tests, four failures of Al-U-235 "J" metal slugs, and four failures of Al-U-235 "C" metal slugs. The rupture experience for the month of May is summarized in Tables I and II.

TABLE I

URANIUM SLUG RUPTURE EXPERIENCE - MAY, 1955

Type of Metal	Tube No.	Failure Date	Exposure (MWD/T)	Failure Type
8" Normal U. - "L" lot	2088-H	5-3-55	213	Side
8" Normal U. - "L" lot	0777-H	5-3-55	230	Side
8" Normal U. - "M" lot	2673-F	5-4-55	26	Side
8" Normal U. - Recanned "Z" lot	4177-C	5-7-55	154	Non-classified
8" Normal U. - Cast into zirconium can	3385-C	5-9-55	< 1	Side
Unexamined	1055-B	5-10-55	1011	Unexamined
8" Normal U. - Recanned "Z" lot	0673-C	5-10-55	148	Side
8" Normal U. - Recanned "Z" lot	1271-C	5-11-55	102	Side
8" Normal U. - "B" lot	3578-DR	5-12-55	669	Split
8" Normal U. - "K" lot	1587-H	5-13-55	243	Side
8" Normal U. - Recanned "Z" lot	2580-C	5-14-55	229	Non-classified
8" Normal U. - "N" lot	3279-D	5-19-55	576	Non-classified
8" Normal U. - Recanned "Z" lot	0872-C	5-21-55	149	Side
8" Normal U. - Recanned "Z" lot	0969-C	5-21-55	181	Side
8" Normal U. - "M" lot	1064-C	5-22-55	184	Side
8" Normal U. - Recanned "Z" lot	1473-C	5-22-55	239	Side
8" Normal U. - Recanned "Z" lot	1068-C	5-22-55	132	Side
8" Extruded, Cored, U.	1576-C	5-23-55	797	Split
8" Normal - "Z" lot	3183-C	5-27-55	~120	Side
8" Normal U. - "L" lot	3281-D	5-28-55	616	Side

TABLE II

AL-U-235 ALLOY SLUG RUPTURE EXPERIENCE

Type of Metal	Tube No.	Failure Date	Exposure (MWD/tube)	Failure Type
"J" Metal	2670-C	5-14-55	81.5	Jacket split
"J" Metal	1884-C	5-15-55	77.6	Jacket split
"C" Metal	1594-C	5-15-55	124.5	Side (Chattering)
"C" Metal	2093-C	5-15-55	106.6	Side (Chattering)
"C" Metal	4381-C	5-15-55	93.5	Jacket split
"C" Metal	3393-C	5-19-55	76.9	Side (Chattering)
"J" Metal	2772-H	5-20-55	163.9	Jacket split
"J" Metal	3676-C	5-23-55	104.1	Uninspected

It may be noted from Table I that the majority of the C Pile failures this month occurred in "Z" lot material. However, essentially all of the metal shipped to C for the past few months has been of this type, and the great majority of the slugs in C Pile at the present time is probably reprocessed.

Three of the "C" Metal failures this month were caused by mechanical damage attributed to slug "chattering" in the process tubes. These are the first failures of this type to occur since November 1953, when several tubes were discharged for ruptures or "near ruptures" and the remaining "C" metal charges were manually reseated against the rear cap to eliminate cocked slugs.

Fourteen of the regular metal failures this month occurred at exposures below 250 MWD/T. The majority of these were side failures, and the others were unclassified pending further examination since they showed evidence of both side penetration and core cleavage.

These side failures have exhibited elliptical "patches" in which the aluminum was gray colored, porous, and flakey, with lines of film curved around these patches. The appearance of the ruptured pieces indicates that they have been overheated, possibly due to a local flow disturbance. In general the pattern observed is not that expected from a cocked slug. Postulated causes of the flow disturbance are column bowing, slug misalignment, in which a slug is not resting in its normal position on the ribs, or slug warping. Warp measurements are currently being made to investigate this third mechanism.

Preliminary examinations, in the Radiometallurgy Laboratory, of a ruptured piece and an unrpptured piece showing similar markings, showed no evidence of defective canning or defective slug components. A cross section view of the unruptured piece disclosed that about 1/3 of the jacket wall had corroded away from the "hot spot" area. Studies of canning variables, pile variables, and metallurgical examination are continuing.

Manufacture of Other Products

PT 105-567-A - Preliminary Irradiation of J-Q Columns - The irradiation of the block loading of J-Q slugs at H Pile is continuing. A rupture occurred on 5-20-55 at a tube exposure of 165 MWD. The present status of the 13 tube array is as follows:

9 tubes charged with J-Q on 3-14-54.
2 tubes charged with J-Q on 1-21-55 and 3-15-55.
2 tubes replaced with uranium slugs after discharge.

The final shipment to ORNL should be made in August of this year.

PT 105-579-A - Quantity Irradiation of J-Q Columns - This test as originally planned has been revised, the details of which are contained in HW-33170. Sixty-four tubes are loaded at C Pile and 60 tubes at H Pile. Goal exposure is 200 MWD/tube. Eighteen tubes at H will be irradiated to two ruptures.

Status of Fuel Production Tests

Test No.	Type Metal	Number of Tubes	Pile	Goal Exposure	Present Exposure	Remarks
105-570-A	Cored-Lead dip	4	2-C	Rupture	Discharged	Rupt. at 1158 and 1173 MWD/T
			2-F	"	1050-1150 MWD/T	
	Control	4	2-C	"	1 discharged at 1046 MWD/T	1 rupt. at 1128 MWD/T
			2-F	"	1050-1150 MWD/T	
105-578-A	"C" process canned solid	4	C	Rupture	Discharged	2 rupts.-161 and 221 MWD/T
	cored	4	C	"	Discharged	1 rupt. - 206 MWD/T
	Ni-Plate solid	4	C	"	Discharged	1 rupt. - 326 MWD/T
	control	4	C	"	750-850 MWD/T	1 suspected rupture - 714 MWD/T, not confirmed
105-583-A	IQS-7	4	H	900	710-725 MWD/T	Ingots differ slightly from regular production ingots. 3 discharged at 612-628 MWD/T
105-581-A	IQS-8	6	H	900	660-680 MWD/T	
105-592-A	IQS-9	6	H	3-900, 3-600	700-710 MWD/T	
105-586-A	U-Si Ingots	1	B	900 MWD/T	780 MWD/T	
	U-Si Dingots	4		Rupture		Not yet charged
	U-Si Cored	3		900 MWD/T		Not yet charged
	Control	4		Rupture		Not yet charged
105-587-A	Internally and Externally Cooled	7	C	600	1 tube discharged at 135 MWD/T	Other tubes not yet charged
105-588-A	Development Test of extruded and drilled cored slugs	3 tubes per mo.	1-C	900		Ruptured at 797 MWD/T
			3-C	1100	60 MWD/T	Loaded 3-7-55
			3-D	900	315-325 MWD/T	1 ruptured at 174 MWD/T
			5-D	900	190-220 MWD/T	Loaded 3-30-55
105-590-A	Extruded Cored	4	C	Rupture		Not yet charged
105-576-A	Powder Metallurgy	5	C	Rupture	Discharged	Ruptured at 813 and 922 MWD/T
	Control	8	F	675-775 MWD/T	Discharged	
		37	F	675-775 MWD/T	602 MWD/T	all but 1 discharged

Test No.	Type Metal	Number of Tubes	Pile	Goal Exposure	Present Exposure	Remarks
105-591-A	Cored Slugs	300 125 22	KE D C			Authorizes irradiation of production quantities
105-596-A	Dingot Slugs	9	F	2 - 300 2 - 600 5 - 900	125 - 190	Slugs charged alternately with control slugs from rod-transformed and slug-transformed metal
105-602-A	Cored	5	C	2 ruptures	95 MWD/T	Tubes charged around 2 "C" columns to give higher power
	Solid	5	C	2 ruptures	95 MWD/T	
105-597-A	Mg-U Matrix	1 1		3000 6000	not yet loaded not yet loaded	
105-593-A	Cored-Al end plugs	4		1 - 200 1 - 600 2 - 900	not yet loaded	
105-601-A-53-MT	Solid-delay of 30, 43, 50 and 80 seconds before quenching	12		2 - 300 5 - 600 5 - 900		circulating for approval
105-603-A-47-MT	Cored-crimped uranium end plugs	4		1 - 300 1 - 600 2 - 900		circulating for approval

PILE PHYSICS

Graphite Temperature Coefficient Measurements - PT 105-600-A

The first two measurements of a series of graphite coefficient measurements to be made at the KE Pile as the pile exposure increases were completed during the month. In the first measurement of a preliminary nature, a gain of about 10 inhours was observed as a result of increasing the CO_2 concentration about 7 per cent. In the full scale measurement carried out on 5-13 and 14, the pile lost approximately 45 inhours while the central coring zone graphite temperature dropped about 80 C as a result of decreasing CO_2 concentration from 75 to 50 per cent in one step. Although the proper weightings have not been applied to give a firm graphite temperature coefficient value, the two measurements demonstrated that the test may be successfully carried out with little effect on pile flattening efficiency.

Analysis of K Pile Startup Data

Analysis of proportional counter and Beckman pile period data has been completed during the past month, and least squares fits have been performed by IBM to obtain augmentation distances from the appropriate flux traverses. Refined calculations have been completed on the negative dry temperature coefficient result from the KW test which indicate the change in slope over the 150 C range measured to be no greater, if it does exist, than the range of experimental error.

It is currently planned to publish the final results of the KW and KE startup tests analyzed by the Pile Physics Unit in four documents -- one to discuss basic lattice data, a second to describe the wet and dry temperature coefficient tests, the third to give results of danger coefficient and flux perturbation measurements, and the fourth to describe the control and safety system capacity experiments. Data analysis has proceeded far enough to begin writing the first document, and the second document is presently in rough draft form. The results of special flux measurements made by other groups will be reported independently by them.

Induced Power Excursion Test

A production test has been prepared and will be circulated in the near future for signature approval (PT 105-599-A) to attempt to duplicate by control rod manipulation the type of excursion as recorded by KW Pile instrumentation on 4-6-55. Results of this test will indicate the potential hazards resulting from inadvertent control rod withdrawal rather than insertion and can be used as a basis for estimating the possible value of installing warning-light instrumentation for the console operator.

Enrichment Calculations Pertaining to Use of Depleted Uranium

Several cases of the use of a depleted uranium blanket in a Hanford pile were examined to determine the amount of enrichment necessary to compensate for the loss in reactivity; these calculations were in support of an economic study underway by the Process Technology Unit. If 0.2 per cent U-235 content depleted uranium were used in the outer three lattice units of the H Pile, a solid ring of "C" columns in the

4th lattice unit would be required in addition to the normal pattern of approximately half of the columns in the 5th lattice unit; the required "C" column density in the 4th lattice unit would be reduced to approximately three-fourths with the use of 0.3 per cent U-235 depleted material. The long term reactivity gains would be severe in either case unless some type of staggered discharge system were used. The thermal flux load on the shield would be reduced by a factor of two to four, the exact amount depending on the particular depletion concentration and exposure.

Reducing Side Shield Temperatures by Fringe Poisoning - PT 105-604-A

The production test of the above number and title has now been approved and preliminary base-point temperature data have been obtained. It is expected that the appropriate enrichment and poison changes in the far-side loading of the H Pile will take place early in June.

Shield Attenuation Calculations and Measurements

Calculations of shielding requirements of an external loop associated with a proposed re-circulating test facility at the DR Pile indicate that of the order of two feet of iron and masonite, or other material possessing equivalent shielding characteristics, would be required to adequately shield this facility for delayed neutrons and for potential fission product gamma activity.

A slug cask five feet in length having 6" walls was found on testing at DR to adequately shield the irradiated long term gains slugs scheduled for Test pile measurements.

Offsite Shielding Contacts

Two papers were presented at the May 12 and 13 AEC Shielding Information Meeting at Fort Belvoir, Virginia: "Deterioration Study on Original Hanford Biological Shields," by L.A. Wilson, and "The 36" Shield Plug Test Facility," by R.L. Tomlinson.

Mr. Tomlinson also visited ORNL to discuss neutron dosimetry instrumentation and measuring techniques. Although the Hurst dosimeter in principal shows a linear relationship with fast neutron biological dose, the circuitry and tedious chamber fabrication problems apparently require an undue amount of development effort. Oak Ridge personnel report that they are presently enthusiastic about the use of the Hornyak button, a crystal for a scintillation spectrometer containing zinc sulfide and lucite, which they think gives results which appear linear with biological dose.

PHYSICS DEVELOPMENT

Prototype Physical Constants Test Reactor

The installation of the mechanical systems for the prototype Physical Constants Test Reactor was delayed by shop fabrication considerations. However, all major mechanical components are now fabricated and in Building 305-B; on-pile installation should proceed rapidly next month. The electronic circuitry is currently being installed in the control room and the safety circuit interlock networks are ready for installation.

The fabrication of the lead-UO_2 matrix fuel elements was also delayed; a high priority requirement for UO_2 delayed action by Carbide and Carbon Chemicals personnel on our request. The UO_2 has now been completely fabricated and Metals and Controls Corporation has slug fabrication underway. A request for contract modification has been submitted to AEC:HOO to increase the quantity of fabricated lead-UO_2 matrix fuel elements from 500 (4.1 kilograms of U-235) to 700 (5.74 kilograms) to make possible additional flexibility in the way experiments in the continuing physics programs can be conducted.

Slug Rupture Detection

The installation of the initial gamma spectrometer slug rupture detection system (project CG-578) is now scheduled about July 1 at H Pile; most of the sample room installation is now complete. A report has been prepared on the system explaining operating principles in detail as assistance to Maintenance and Operations in system utilization.

Experiments have continued at C Pile to determine the effectiveness of ion exchange resins in the slug rupture detection application. Experience with several ruptures consistently indicated that cationic resins (Dowex 50) hold no advantage over directly monitoring gross water activity. Anionic resins (Dowex 1) showed some promise in contributing small increases to the sensitivity of rupture detection. A turret and gamma spectrometer unit has been installed at C Pile to monitor twelve "run-to-rupture" tubes and further studies on resins will be performed in this facility.

The complete delayed neutron detection system for the KAPL-120 high pressure and temperature recirculating loop is now fabricated for installation early in July. A Development Test for the "gammascan" installation, a system which directly monitors the outlet activity of each tube via a detector for each vertical tube row with the output displayed on an oscilloscope, has been prepared to authorize a test installation. Tests of halogen filled geiger-muller tubes as direct gamma activity integrating devices show them to be definitely superior to scintillating crystals in this application; they furnish 50-100 times the current at the expected radiation levels, operate at higher temperatures and are physically more compact. The "gammascan" design is being modified to accept these detectors.

Reactor Safety - Nuclear Instrumentation

The specifications for a sub-critical neutron multiplication detection system were developed and transmitted to Manufacturing with the recommendation that a system be installed in each pile immediately. The recommended system consists of two fission counters inserted in a process tube, one from each end, with the electronics totalizing the outputs. Both a level and a period trip function will activate the safety system; the monitor is expected to provide useful information from sub-critical levels (< 0.1 watt) to well within the megawatt range.

A process tube ionization chamber has been designed for operation in high temperature and flux regions of the piles. The immediate application will be that of providing octant monitoring systems at B, D, and F Piles which do not possess normal octant or test hole facilities.

The period trip amplifiers designed for the prototype Physical Constants Test Reactor have been modified to provide improved gain stabilization through feedback. The period indication now varies less than two per cent for line voltage changes from 95 to 135 volts. The stability of period indication with time appears to be within one per cent per twenty-four hours.

Reactor Safety - Tube Outlet Water Temperature Monitoring

The twelve point H Pile prototype outlet water temperature monitor is now in continuous operation at H Pile. The procedure and frequency of making trip adjustments to ensure adequate protection with a (1) one tube in twenty-five and (2) one in nine monitor frequency are being studied. A test to determine the stability of the "omniguard" bridge circuit and sensitive relay trip was performed by simulating temperatures cycling through 140 C; the system operated through an excess of 100,000 trips and the deviation of the actual trip "temperature" from the trip point was less than 5 C.

Lattice Neutron Economy

A series of danger coefficient measurements yielding resonance escape probability (P) of thorium, thorium oxide, and uranium oxide were completed for slugs of standard size. The effect of the cadmium covered slugs on Test pile reactivity was determined and P derived from (1) known values of P for natural uranium of similar geometry in the lattice, and (2) the approximation that resonance captures are in the direct ratio of the reactivity changes. The following values then obtain for resonance escape probability (P) and effective resonance integral (E.R.I.):

Slug Type	P	E.R.I.
Uranium	0.874*	10.8*
Uranium Oxide	0.941	13.58
Thorium	0.920	11.03
Thorium Oxide	0.927	13.67

*Values for natural uranium are taken from the literature.

A report is being prepared discussing the results of experiments determining the KW pile lattice parameters which were conducted as part of the startup program. Included are evaluations of (1) conversion ratio, (2) resonance escape probability, (3) slug and lattice disadvantage factors, (4) thermal utilization, and (5) fast effect. The data yielding fast effect (ϵ) have been re-evaluated to include α_{28} in deducing ϵ from the fast to thermal fission ratio. Numerical integration of the fast neutron cross sections over the energy spectrum of fission neutrons yields an α_{28} of 0.159; the same integration yields an effective cross section for fast fission - σ_f (28)- of 0.3036 barns which compares with 0.3056 barns reported in BNL-250. The correct value for ϵ is then 1.035 rather than 1.040 which was derived ignoring α_{28}.

The transmission of thermal neutrons through AGOT-KCF graphite was measured parallel and perpendicular to the axis of extrusion to determine the significance of scattering from the crystal lattice. The measured transmission was found to be significantly higher in the direction parallel to the axis of extrusion.

Arrangements have been made with Chemistry Research and Metallurgy Research Sub-Sections and the organizations participating in the analysis of "Bluenose" slugs, particularly Knolls Atomic Power Laboratory, to perform isotopic ratio and absolute abundance determinations on selected Hanford slugs as a function of slug radius; this program will be supported as a part of Project Bluenose. The initial slug possesses an irradiation equivalent to about 850 MWD per ton; measurements of the abundances of U-235, U-236, Pu-239, Pu-240, Pu-241, and selected fission products will be made at twenty radial positions. The radial sampling will be performed by Radio Metallurgy, chemical separations by Radio Chemistry, and the isotopic analyses by Knolls Atomic Power Laboratory. Measurements on the high exposure slug will be expedited and are presently scheduled to be followed by similar measurements on 200, 400 and 600 MWD/T equivalent material.

Test Pile - Routine Tests

The testing of virgin uranium slugs proceeded routinely; the reactivity of slugs produced from Hanford recycle material continued to be uniform.

Ten lots of Mallinckrodt billet eggs were tested with TDS values ranging from 10 to 14. Thirty-eight Fernald billet egg lots yielded TDS values ranging from 7 to 14.

HEAT TRANSFER

Program to Raise Pile Outlet Temperatures

Tests on the full scale mock-up demonstrated that tube flow and instability limits at the old piles are partially independent of rear crossheader pressure. It was found, for example, that the flow and instability temperature for a 1025 kw tube are independent of the rear crossheader pressure if that pressure is below 40 psig. For a tube power of 700 kw, the 40 psig becomes 19 psig. One result of these tests is expected to be that permissible tube Δt's can be increased with less rear crossheader pressurization than previously believed necessary.

An unexpected phenomena has shown up in the experimental Δp vs flow curves on which instability limits are based. The curves for high tube powers are of such shape that the low trip on the process tube Panellit would effectively be quite insensitive. Consequently, attainment of 120 C outlet temperature might be more difficult than previously anticipated. Efforts are being directed now toward verifying that this phenomena exists. In the experimental equipment it is apparently caused either by film formation or local boiling on the heater tube surface. Some delay will be encountered before the production test to take D Pile to 120 C outlet temperatures is written, but this delay should not be long.

Experimental tests have been started to obtain information on the flow of steam-water mixtures through the effluent piping. Equipment is also being prepared to permit study of the flashing of water to steam at the outlet of crossheader orifices.

Considerable difficulty has been encountered in obtaining rated output (1125 kw) from the generators used with the mock-up. In practice, the attainable powers have been about 900 kw due to overheating, and solutions to the difficulty are being sought.

Cooling-By-Boiling Equipment Development

Modification of the mock-up to withstand 2000 psi pressures is about 60 per cent complete. Delivery of some important components has been delayed, but testing of the modification is expected to start early in July.

When the modification is complete, the equipment will be subjected to an extensive series of functional tests. A draft of these tests has been prepared.

Activities have continued on the design and procurement of heater tubes, process tubes and special hydraulic fittings for use on the modified loop. Numerous difficulties have been encountered, but procurement of these items is expected by the time of completion of the mock-up.

Hydraulics Studies

Calibration of double orifices for use with Project CG-558 inlet fittings was initiated and is continuing on a low priority basis.

Slug Temperature Calculations

Assistance was given to people in other Units on miscellaneous slug temperature problems. Axial temperatures for solid and cored slugs were provided to correct erroneous temperatures in a production test document. Efforts were devoted toward helping other personnel to learn methods and techniques for approximating slug temperatures.

Pile Safety Studies

Preparation of a formal report which indicates the probable consequences of a loss of water to a HAPO reactor has continued. An error in the calculations was found in final checking; the rough draft will be completed when this error is rectified.

The study of the K Pile water plants showed the fact that about half of the cooling water could easily be lost from the KW Pile while it was at equilibrium level. This could occur if the operator accidently pushed two switch buttons (located side-by-side on a panel) in improper sequence. The possibility of such an occurrence was considered to be excessively high since these two buttons would normally be operated about once per month. Consequently, the recommendation was made that corrective action be taken, and the valves operated by the buttons have since been locked out mechanically.

Water Flow Reduction During Shutdown

Calculations were made to extend the specifications for flow requirements during shutdown at the old piles. These calculations will be transposed into useful form in the near future.

MECHANICAL EQUIPMENT DEVELOPMENT

Charging and Discharging Studies

Further testing on the segmental discharge project was delayed pending receipt of the fabric-type expanding spline from the vendor.

Horizontal Rod Studies

Galling of the CG-558 horizontal control rods was noted at 105 DR during their recent installation and a testing program was instituted to determine its causes and what steps were necessary to eliminate such damage. Test results indicated that greatly improved service would be achieved by changing the type of graphite used as a bearing material and removing some of the twist which occurs in the extrusion process. Work is in progress to determine a limiting amount of twist which does not result in galling of the rod surface or interfere with the proper operation of the gas seal. It appears that some rods will require straightening prior to installation.

Vertical Rod Studies

Fabrication was completed on the modified cushioning device for use on the air accelerated vertical rods. Some doubt now exists that assembly and testing can be accomplished before the White Bluffs test tower is condemned.

Supplementary Control

Development work on the fabrication of full length poison splines and the nozzle seal to be used with them has been completed. Design of the associated handling equipment advanced during the month. Receipt of radiation data on irradiated spline samples permitted shielding requirements to be calculated.

A document is being prepared in conjunction with the disaster control system study. This document will summarize the previously studied systems, their capabilities and economics, and will recommend the one considered most suitable for application to Hanford piles.

Process Tube Assembly and Piping

A preliminary analysis was completed of the effect of process tube creep on tube life at anticipated higher outlet water temperatures. A more detailed analysis is planned for the near future.

Completion of the flexible connector test facility permitted the start of testing of K Pile replacement pigtails. Samples of stainless steel connectors with several wall thicknesses, configurations and heat treatments were subjected to various tests which eliminated the thinner walled specimens from consideration as replacements. More of the thicker walled specimens have been ordered as the number available was not sufficient for accurate evaluation.

Tests on Resistoflex flexible connectors revealed them to be extremely durable. These connectors consist of a teflon tube reinforced on the outside by a double stainless steel wire braid. Installed on the flexing machine with up to a 270° twist in the hose, these connectors did not fail after ten times the number of cycles required for failure of the stainless pigtails. Tests are continuing as other samples arrive.

Work was continued on the refinement of rubber "Grommets" for use on stainless connectors.

Fabrication of the high-pressure, high-temperature loop was completed by Minor Construction. The first test section to be installed in this loop, a Van-Stoned Zircaloy-2 process tube, has been assembled.

Physical Constants Test Reactor

Fabrication was completed on the boral shield, synchro readout panel and flux leveling rings. Fabrication is proceeding on the movable face and rear face steel framing. The source mechanism and movable face indicating mechanism are the only remaining portions of this project which require design work.

Other Engineering Development Work

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

Assistance was provided to Project Engineering in the X-raying of some seam welded stainless steel piping intended for a 200 Area installation.

An investigation was started to determine the possibility of bridging Ball 3X System balls in a VSR channel with subsequent blocking of their entry into a pile. Information collected to date indicates that the possibility of such bridging is negligible.

SPECIAL IRRADIATIONS

ANP Feasibility

Documents pertaining to the design specifications, feasibility, and costs of the proposed GE-ANP facility have been issued. The cost of the facility, estimated by Projects, was set at $1,850,000. Conclusions of the feasibility study were that this facility would present unprecedented hazards to the pile in which it would be installed and that the potential benefit to the customer would be marginal.

KAPL-120 Loop

Minor Construction forces are now installing the new loop on the X-1 level at H Pile. Electrical components are also being installed in the Electrical Equipment Room. Delivery of equipment is 90 per cent complete. All phases of this job are

on schedule. The program for the performance of analytical work in support of future irradiations in this loop has been set up with the Analytical Laboratories Unit.

The in-pile tube from the old loop is now being cut up in the swimming pool especially built for this purpose. A section 32" long is to be sent to KAPL for examination. A second section 12" long will be examined in HAPO laboratories.

Loop Study

At the request of HOO, the feasibility and cost of installing three high pressure, high temperature, recirculating loops in DR Pile is being studied. As a basis for the study, it is assumed that these loops be of the type as proposed by WAPD earlier this year.

In-Pile Experiments

The irradiation of neptunium 240 samples in the Snout I facility at H Pile, as a portion of the program to determine the absorption cross section of neptunium 240 (HAPO 143) has been completed. Data are reported in HW-36440-H, authored by E.M. Kinderman.

Annular uranium slugs (0.75" ID hole) for use with the safety fuse assemblies being prepared by NAA, are being fabricated. A flow mock-up assembly has been built up to determine that adequate annular flow can be maintained in-pile with these slugs. NAA reports that the experimental assemblies are now being prepared.

The high temperature graphite facility, to be used for discharging large numbers of small graphite samples from the pile (HAPO 128), has been accepted and now is being installed at the X-2 level at C Pile.

Experimental equipment has been fabricated to support studies to compare in-pile damage to graphite to that suffered under identical conditions with the absence of pile radiations (HAPO 158). Testing is now in progress prior to installation at C Pile.

Two additional experimental assemblies for studying gas-zirconium reactions under in-pile control conditions are being readied for charging in F Pile. Assemblies charged earlier had to be prematurely discharged due to excessive heat generation in the gamma type heaters employed.

Equipment for measuring the core and annular coolant temperatures of I-E slugs are ready for charging. Charging of this equipment awaits the completion of the fabrication of I-E slugs.

The decay of induced radioactivity of poison spline material is being studied. The activity after 70 hours due primarily to impurities is 2.5 mr/hr/gm/10^{13} unit of thermal neutron flux.

A constant current generator to produce a simulated in-pile ionization chamber signal has been developed for use in calibrating and adjusting the K Pile octant monitoring instrumentation.

Facilities

Design of casks for the removal of irradiated materials from the Snout facilities in KW Pile is nearing completion. Casks will be provided with wheeled carriages; a hydraulic-operated guillotine, and will provide a ready means for cutting up unwanted portions of samples for disposal.

The full-size polyethylene sample carrier of the type to be used in the pneumatic irradiation facility will be irradiated in the KW Snout Facility to determine radiation damage effects upon such a carrier. Samples of high purity electrolytic iron have been obtained for the study as a potential rabbit material. Due to a minimum of induced activity, electrolytic iron appears to offer unusual possibilities as a rabbit material.

Process Tube and Graphite Stack Examination

Tube channel 1269-F was borescoped May 23. Numerous chips of graphite and two dirty swabs were found on the channel. Other examinations during the month included tube 2468-F, 1473-C, 1064-C, and Number 5 BSR thimble at 100-D. No significant information was obtained from these examinations.

PILE MATERIALS SUB-SECTION

PILE GRAPHITE STUDIES

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

This production test was suspended for one operating cycle from April 29 - May 9. Following an unscheduled shutdown on April 28, the pile was started up with a heavy poison loading to operate until the extended outage for rod replacement, scheduled for May 1. Postponement of the extended outage and indecision as to when it should be set caused the pile to continue operation until May 9. It was necessary to offset the reactivity loss of the poison loading by operating at reduced power with a low helium concentration to keep the graphite warm. Vertical bowing traverses taken May 11 show that no significant increase in tube bowing has occurred since March 31. This test will be continued until the extended shutdown or until the reduction of tube power as a result of inlet water temperature precludes test conditions.

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

Since C Pile has had only two operating cycles of greater than three days duration since this test began March 14, no samples have been removed. The first samples will be discharged from channel 2773 following the next operating cycle at which equilibrium is achieved. It appears necessary to conduct this test much longer than five calendar months to obtain any useful data.

Measurements of the cross section of the exposed bars indicate that the first two bars in the test hole have expanded whereas the remaining eight contracted. This phenomenon is in agreement with the results obtained from a previous experiment in the G test hole of C Pile. The maximum expansion in the transverse direction was 0.02 per cent and the maximum contraction recorded was 0.03 per cent.

Unfortunately, the measurements on the cross section of these bars were made with an uncalibrated micrometer. Four inch micrometers are usually off about 0.0005 inches. Therefore, an appreciable error is possible in the cross section measurements.

The results obtained in this experiment confirm those obtained previously and reported in HW-36095.

Mechanical Strength of Graphite

Graphite samples have been machined into proper shapes and dimensions to be tested for sheer and tensile strength. Tensile strength tests are to be conducted in a standard apparatus. An adaptor has been constructed to be used for the sheer strength experiments. This adaptor will permit the use of a compression test apparatus, thus obtaining reasonable results on sheer strength without the need for expensive and complicated devices.

A paper on the microspore structure of graphite has been prepared and approved by the proper authorities for presentation in the American Chemical Society meeting in Eugene, Oregon.

Pile Monitoring

The oxidation samples removed from DR and H Piles show an oxidation rate of less than one per cent per 1000 days. H Pile has operated at or near graphite limits of 500 C maximum graphite temperature and 50 per cent helium. B, F, and DR Piles have not approached graphite limits.

Borescoping at H Pile and at F Pile shows physical graphite damage in those channels where large forces were necessary for tube and charge removal. A separation of two-three inches was observed between a trunnion and tube block in channel 4171-H. Details of this borescoping are contained in HW-36814, "Graphite Condition of Channel 4171-H," by D. E. Baker. Channel 1269-F of F Pile was borescoped by Special Irradiations Unit personnel. Although no separations were observed, cracked tube blocks, graphite chips, and what appeared to be two small pieces of fused metal were observed.

Stability of Chromel/Alumel Thermocouples at Elevated Temperatures

Continuing last month's thermocouple comparison program, a series of 18 Chromel/Alumel couples (26 gauge) were selected which were shown to agree within a range of 2 C at 1000 C, and which had been subjected to only one heating cycle in helium for one to two hours at 1000 C.

From these 18, four groups of three each were exposed in open-end quartz protective tubes to atmospheres of air, helium, carbon dioxide, and carbon dioxide with the thermocouple junctions imbedded in graphite. The gases were supplied to the thermocouple bundles at approximately 100 cc/min. and were used without purification as received from cylinders or laboratory lines.

All four bundles were heated simultaneously in one combustion furnace at 1000 C for 100 hours. Only the bead junction and six inches of leads of each couple were held in the heated zone. At the end of 2, 21, and 100 hours, one thermocouple was withdrawn from each gas and set aside to be compared later with one of the standardized thermocouples which had not been reheated. None of the thermoelectric power comparisons have been made but visual examination of each thermocouple has been completed. The generalized observations are as follows:

1. The chromel wire becomes brittle with a formation of a surface scale and as a result the chromel wire breaks easily. This is particularly so in carbon dioxide.

2. The surface condition of each wire seems to become worse with successive heating.

3. The attraction of the chromel wire for a magnet seems to change in an erratic manner.

GRAPHITE AND MATERIALS DEVELOPMENT

High Temperature Irradiation of Graphite

Data from several irradiation facilities have been analyzed to determine the relationship between physical distortion and exposure at temperature between 330 C and 500 C. Samples of KC, CSF, and TS-GBF graphites were irradiated in hot test holes and empty channels. A plot of the dimensional changes observed on these samples shows an initial expansion of approximately 0.04 per cent for the first 100 MD/CT. At higher exposures a linear contraction rate of 0.03 per cent per 1000 MD/CT was observed. The data do not indicate any appreciable difference between the three types of graphite. Variations in the temperature coefficient of the contraction rate are negligible in the range studied, 330 C to 500 C, for exposures up to 4000 MD/CT. This indicates that the central zone graphites in the piles probably will not contract at a rate greater than is currently observed if graphite temperatures are increased.

Thermal Annealing of Damaged Graphite

A large change in the temperature coefficient of C_o (crystal lattice) distance with the state of graphite damage would cause errors in the interpretation of the thermal annealing rate data. In this case part of the change observed during isothermal anneals would be due to a changing temperature coefficient as damage is removed, and part to a true annealing of the damage. Experiments were designed to estimate the magnitude of these two effects. It was found that total changes both in C_o distance and rate of change of C_o distance with time are 100 times greater than the contributions from variations of the temperature coefficient. In interpreting the rate data, it will be assumed that the total measured changes arise only from annealing.

Graphite samples with exposures between 700 and 3400 MD/CT in a cold test hole have been annealed in a laboratory furnace. Successively higher annealing temperatures were utilized with the sample subjected to heat treatment for effectively infinite time. Results of this investigation indicate the expected contraction up to about 1200 C. Between 1400 C and 2000 C, all samples appeared either to expand or remain unchanged. The expansion was as much as 0.1 per cent on the low exposure samples. Because it has been found that annealing in the laboratory must be carried out at temperatures three times as high as inpile annealing temperatures in order to produce similar effects, the oven temperature range between 1400 C and 2000 C is applicable to present pile conditions. It should not be expected, however, that the central portions of the piles will begin to expand. The expansion caused by annealing damage induced at low temperatures will be small compared to contraction caused by irradiation at high temperature.

Relationship Between Distortion and Crystallite Size

Physical distortion data on samples removed from Channel 1075- F indicate a relationship between volume distortion induced by high temperature irradiation and crystallite size in the C direction. The derived curve was similar in form to the relationship between volume distortion rate and crystallite size on samples irradiated in cooled test holes. Like the relationship for cooled test holes, high temperature irradiation indicates a linear relationship for samples of crystallite size below 110 Å, but the slopes of the lines are different. While no graphite has yet been found that does not contract under irradiation at these temperatures the existence of this relationship indicates the possibility that such a graphite may exist. Such a graphite might have a crystallite size between 150 and 300 Å. Several such graphites are currently available and will be tested when the hot test hole facility is installed at C Pile.

High Temperature Irradiation Facility

A mock up of the high temperature irradiation facility to be installed in the Materials Testing Reactor at Arco, Idaho, is being fabricated in the shops. The mock up will be used for testing thermal characteristics of the facility.

About 60 per cent of the instrumentation required for the Arco facility has been received from the vendors.

PT 105-403-P, Controlled Temperature Irradiation of Graphite

Completion of the Series V and VI heater assemblies has been delayed due to difficulties in obtaining thermal conductivity measurements of the graphite samples. It is now doubtful that the July 1 target date for insertion of the experiment can be met.

Radiation Stable Elastomer

A literature search has been undertaken as the first step in attempting to find an elastomer or plastic compound suitable for water, oil, steam, and air service under irradiation at temperatures up to 200 C. Such a material is needed by the Process Sub-Section for O-rings and ball valve seats on the outlet end of process tubes.

Uncooled Test Hole Facility

A test run of the uncooled graphi[illegible]ity was satisfactorily performed with the facility mock-up at 189-D. Manufacturing approval has been obtained for installation of the equipment in the Y test hole at 105-C Pile. The installation will be accomplished during the first scheduled shutdown after the equipment has been transported from 189-D to 105-C. Operation of the test hole will commence immediately after installation. A charge consisting of pile grade and developmental graphites will be irradiated during the initial operation.

RECIRCULATION TECHNOLOGY

H Loop Studies

One charge of regular metal slugs was discharged from the H-Loop after 47 days exposure with an average outlet temperature of 197 C. Corrosion rates of the aluminum jacketed slugs were slightly over 2 mils/month, a rate appreciably less than predicted from extrapolation of earlier short termed runs. The tube was recharged with solid aluminum pieces to permit investigation of operating procedures required for controlling water pH in the range 5.0 to 5.5. Operation during the month was maintained with this pH range. Difficulty was experienced at the rear of the zirconium process tube due to slight crimping of the tube by the special compression fittings. Metallurgical examination of slugs exposed at 200 C showed that the force required to break the slugs was inversely proportional to slug surface temperature. Electron micrograph studies were made on effluent water from the clean-up deionizer after it was suspected that crud break-through was occurring. A new type particle was observed with a chain like arrangement; individual particle size was 0.01 micron.

Aluminum jacketed slugs were discharged from ELMO-2 loop following 59 days exposure at 182 C. The slugs were in excellent condition although no weight loss data are available as yet. Two additional slug rupture tests were completed in the ELMO-4 loop. The first was a thorium element which failed by a deep crack in the jacket and core; no swelling or flow stoppage resulted. The second test was with a wafer type element-alternating wafers of aluminum and uranium canned in aluminum. A slight flow reduction occurred when the slug failed, however flow returned to normal and at the end of the test the slug had split into two separate slugs, each intact.

Procurement of additional test loops continued. The 150 GPM Byron Jackson loop is scheduled for delivery by December, 1955. The Forced Convection loop by Babcock and Wilcox should be delivered in July. Minor Construction began fabrication of the LEMO-5 carbon steel loop with completion anticipated in July.

Bids are being requested for 10 zircaloy-2 tubes of KER cross section and 15 feet in length. Four vendors have replied to date to the effect that they will not contract to furnish the tubes on a fixed price basis. Requisitions for four full length KER ribless tubes are being prepared.

1706-KER Facilities

Design work on 1706-KER Recirculation Test Facilities is essentially complete. Minor items of hydrogen addition apparatus and instrumentation remain to be done. The KER operations manual was discussed with various interested groups and their

suggestions were incorporated in the writeup. Further evaluation of the KER pump requirements was made but no final decision was reached as to specific type of pumps to be installed in each loop.

Semi-Works Operation

Operation of the 1706 in-pile tubes with regular metal loadings and controlled quality water was initiated during the month. Only a minor amount of start-up difficulty was experienced. Installation of miscellaneous mock-up equipment proceeded and preparations were made for installation of service facilities for high temperature loops. Dismantling of the 105-D and 105-F Flow Laboratories was begun.

Mock-up loop ELMO-9 was removed from the 189-D Building and transferred to 1706. Modifications of the loop are in progress in preparation for installation in 1706. Material procurement for the 1706 single pass boiling experiment continued. All material for this program is scheduled to be on site by August.

PILE COOLANT STUDIES

Production Tests

Tubes 2071-C, 2276-C, and 2679-C, operating under PT 105-519-E, have operated at 116 C within three degrees of the instability limit during the past month. In order to prevent these tubes from limiting pile power levels, the charges in the tube were displaced 40 inches downstream. This will reduce power in these tubes approximately 10 per cent. Tube powers in the vicinity of the PT-519 tubes are to be increased approximately 8 per cent; hence, the PT-519 tubes should operate with outlet temperatures between 110 and 115 C.

Ten 63S aluminum process tubes are now installed in three reactors under PT 105-543-E. Two of these tubes are in the 100-D Reactor, two in the 100-F Reactor and six in the 100-H Reactor. All of these tubes are clad on the inside with 72S aluminum except two tubes at H Pile which are unclad.

The far side of D Pile has operated for eleven months 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 differences in slug and tube corrosion rates have been detected between the two halves of the pile during this test. The first phase of this test (0.5 ppm dichromate in pH 7.65 water) will be concluded at the next scheduled outage. At that time the second phase of the test will be started to determine the effect of low dichromate concentration used in conjunction with pH 7.3 process water.

The first zirconium canned slugs to be charged under PT 105-552-E were charged into two tubes at C Reactor on 5/8/55. These zirconium canned slugs were exposed to pilot future operation of the H Pile recirculation loop with zirconium slugs. Two types of slugs were charged, unbonded core and cast U-Si alloy core. Fuel Technology considers neither or these two types of slugs to be of a quality representative of that which can be expected from zirconium-canned slugs in the future; however, because these were the only zirconium-canned slugs presently available, they were charged. Four hours after startup on 5/9/55 one of the cast U-Si slugs ruptured. Examination of the rupture piece revealed no evidence of mechanical damage. It is postulated that

water entry, which caused the rupture, must have been made through an undetected flaw in the zirconium jacket which did not show up when the slugs were autoclaved. The process tube containing four unbonded zirconium clad fuel elements was continuing with three weeks operation at month's end.

Specifications

A revision of Reactor Cooling Water Treatment Process Specification 4.00, pH adjustment, was approved May 2. This revision reduces the process water pH from 7.65 to 7.3. The expected benefit of this change is a 25 to 50 per cent reduction of aluminum corrosion rates or a 5 to 10 per cent increase in power level. A process standard embodying this improvement has been issued and is now in effect at all areas.

Corrosion Monitoring

Nineteen process tubes were examined during the month. No new or unusual type of corrosion attack was observed.

Work was continued on adapting the Probalog for use in non-destructively evaluating the condition of process tubes in-pile. In laboratory tests it has been demonstrated that this instrument can detect changes in average tube wall thickness of 0.002 to 0.005 inches.

Laboratory Corrosion Tests

The initial "shake-down" run for the 1706-KE, Water Studies Semi-Works, in-pile facilities was made April 27 to May 18. During this period four in-pile tubes, loaded with solid aluminum dummy slugs, were fed water from the 1706-KE high head pumping facilities. A complete check of flow controlling, recording and indicating equipment was made during this operating period. At the outage of May 18 weighed, regular metal was charged into the four dummy tubes and since then water from 1706-KE was supplied to seven of the eight in-pile Semi-Works tubes. Water now being supplied to the tubes is filtered water containing 2 ppm sodium dichromate with pH adjusted for different tubes to 7.0, 6.5 or 6.0. One tube was left on process water and will remain under these conditions until the tube is replaced with an old pile type zircaloy-2 process tube.

A corrosion test of hot press aluminum slugs at 110 C in regular process water was started in the 1706-KE Semi-Works full scale process tube mock-up. The test was shut down when the pile process water pH was reduced from 7.65 to 7.3. To produce water with a pH of 7.65 for continuation of the test it will be necessary to filter flocculation basin effluent into one of the 1706-KER clearwells where facilities for caustic and dichromate addition are being installed.

Samples of aluminum sacrificial connectors in contact with brass and cadmium plated steel fittings have been exposed in flowing cold process water for five months. Some corrosion product barnacles formed, particularly where the aluminum was in contact with the cadmium, though the net damage to the aluminum was negligible. It was concluded that the use of brass fittings on the front faces of the reactors would not result in any serious corrosion problems by reason of galvanic corrosion of aluminum.

FUEL TECHNOLOGY SUB-SECTION

FUEL ELEMENT DEVELOPMENT

Irradiation of Slugs in High Temperature Water

Lead dip canned fuel elements were charged in C pile and the high temperature H-loop for observations on irradiation effects under various conditions of temperature, power, and exposure to provide some indications of fuel elements problems associated with future 100 Area plans. The observations made on the irradiated samples will be compared with unirradiated samples of equivalent canning history and core properties subjected to thermal cycling treatments to determine if in-pile behavior can be predicted from out-of-pile tests.

The cores of the fuel elements were selected for pile charging from production material and conformed to production slugs in all aspects. Each core was analyzed for orientation and impurity content by sonic orientation and MIZ-2 measurements; slug dimensions were taken before and after canning.

It is calculated that the 40 slugs charged in C pile under production test 105-602-A will operate at about 55.5 KW/eight-inch slug maximum, with 105 C effluent maximum. Under these conditions the slug centers should reach beta phase uranium temperatures. The H-loop charge will consist of 27 pieces operating at 6 to 25 KW/eight-inch slug with 13 of the slugs at water temperatures above 150 C; maximum water temperature will be about 200 C. Eleven of the samples in the H-loop were selected on the basis of close similarity to the sonic orientation and MIZ-2 data results of PT 105-602-A slugs so that a comparison of equivalent material could be made under high power, high temperature, and out-of-pile test conditions.

Following discharge the samples will be examined in C basin and radiometallurgy facilities for dimensional changes, weight loss, fracture strength, microscopic changes, and other significant manifestations of the irradiation. Attempts to correlate or duplicate in-pile effects by out-of-pile woodsplitter testing is planned for corresponding samples.

Evaluation of Dingot Uranium

Development of the dingot process for producing high quality fuel cores is continuing. The first shipment of slugs from approximately 3 tons of dingots press-forged at the Heppenstall Company and rolled at the FMPC was shipped to HAPO May 16. Continuing shipments are planned which will amount to slugs from approximately 15 tons of dingots fabricated per month. An interim report covering the hammer forged and rolled dingots canned under PT 313-51-MT, "Canning of Slugs from Unalloyed Dingot Uranium for Pile Irradiation", has been completed and issued as document HW-36544.

Vertical Heat Treatment of Uranium

Approximately ten tons of rods were heat treated in a vertical salt bath at the Atlas Steel Company in Welland, Ontario on May 18 and 19. Samples from this material will be evaluated to determine the advantages and disadvantages of the

vertical heat treatment procedure. Preliminary trials for vertical induction heat treating of uranium rods at HAPO were underway. Some difficulties with temperature measuring devices were experienced and these are being corrected.

It is expected that the vertical heat treatment will eliminate the inherent problems associated with horizontal heat treatment of uranium rods. These problems concern the effect on the metallurgical structure of the support hooks, the sagging of the rod between support hooks, and the subsequent cold straightening of the rods.

Alpha Phase Extrusion of Uranium

The evaluation of slugs machined from extruded rods is continuing. Tensile and metallographic data are not complete, but will be reported when available. Preliminary data substantiates the previous conclusions that the extruded uranium has more uniform physical properties than the rolled uranium. Twenty-five hundred slugs from the fifth production have been received at HAPO. A three tube control lot has been measured and is ready for canning.

Defects in Drilled Slugs

Routine examination of slugs from a drilled lot found five slugs with internal cracks or voids running the full length of the slugs. The cause of the cracks or voids is not known; however, it is indicated that they were caused either by secondary pipe in the ingot or by rolling. Further studies are being made in an effort to see if internal cracks or voids are a major porblem in the standard solid and cored production material.

Cold Closures - Punch Dimensions and Closure Quality

Approximately 75 cold closures were made using punches with a variety of hole diameters and radii; the quality of the closures was determined metallographically and only a few closures were satisfactory. Although to date, the variables contributing to poor quality have not been isolated, the only outstanding difference between these closures and those in the previous production test was the manufacturing source for cups.

Service Functions

Four special fuel elements were prepared for rupture studies in the ELMO-4 loop. These are standard Al-Si bonded slugs into which a longitudinal groove was machined and filled with special low melting alloys. Theoretically, these alloys will melt at specified temperatures, exposing bare uranium to hot water, and thus result in an abrupt rupture.

Melt plant modifications were proceding on schedule. Three 1% nickel-aluminum alloy ingots were melted and porosity was present in all of these. Variables contributing to this porosity are being isolated.

Assembly and checking out of fabrication equipment in the Pilot Plant was proceding on schedule. Metallography laboratory was utilized by several groups.

Jacketing Development

A three-section mold was prepared for casting a large diameter ingot which will be clad mechanically with stainless steel and extruded to HAPO slug diameter. Melt plant modifications have delayed the actual casting operation.

In an effort to establish the effect of zirconium can ductility on the formation of Zr-U bond in direct casting system, 19 Zr-2 jackets have been prepared by various heat treating schedules, thus resulting in varying can ductilities. Direct cast slugs will be prepared utilizing these jackets and the bond strengths will be assessed.

A cast bonded zircaloy-2 jacketed slug which had several large unbonded areas was charged into the pile in conjunction with a program to get an in-pile experience. This element failed after four hours of operation. It was anticipated that early failure of this material was possible because of deficiencies not susceptible to prior quantitative assessment; accordingly, characterization of the cast type of assembly is not implied by this early failure.

Zirconium Development

Various studies in zirconium metallurgy are underway. The effect of strain rate, annealing temperature, and residual stress on mechanical properties is being investigated. The ultimate goal of this work concerns the specification of fabrication processes which will result in higher billet to finished tube or can yield.

In cooperation with Pile Engineering and Design personnel, flanging tests on zircaloy-2 process tubes were conducted satisfactorily. Several types of tubing fittings are being analyzed and some will be tested.

Preliminary results from spot welding tests conducted off-site indicate that zircaloy-2 can be joined by this technique; however, considerable work will be necessary to insure uniform quality of the welds.

Fabrication Development

Swaging tests on short lengths of reject zirconium process tubes were conducted in an effort to salvage some of the material for jackets. Preliminary tests indicate that, with suitable mandrels, such a procedure is feasible.

Cored Slug Performance

Examination of the first lead dip canned ruptured cored slug from the C pile provides the following speculations: (1) cored slugs suffer split type rupture; the crack initiated at inside diameter and propagated radially to the outside; (2) the welded end plugs did not contribute to cracks; (3) no plastic deformation was observed in uranium. There are theoretical indications that the I.D. of cored slugs should be as large as 0.8-inch to minimize fracture from the inside out.

Inventory shows enough material to make 480 slugs from 0.8-inch I.D. material and 400 from one-inch I.D. Very little one-half inch I.D. material is available.

Arrangements are being made for a few pieces to be heat treated and welded for canning tests with the intent that an in-pile evaluation of the effect of hole size on cored slug performance can be completed.

FUEL ASSEMBLY DEVELOPMENT

Failure of Hot Press Cored Slug

The pile failure of the hot press cored slug was characterized by radial cracking of the core about the end plug, transverse failure near the base of the end plugs, and longitudinal splitting of the center portion of the core.

X-ray orientation and dilatometric data on unirradiated hot pressed cored fuel elements of the type that failed in the pile at 625 MWD/T showed that the uranium end plug of rolled 3/4-inch rod could expand more than the core material during irradiation. This would contribute to stresses that could cause the type of core fracture experienced in the pile. Changes in design of the end plug and counterbore, and selection of uranium for the end plugs of the same properties as the core material will be made to reduce such stresses.

Internally and Externally Cooled Fuel Elements

A total of about 150 hollow fuel elements with 3/8-inch and with 7/16-inch diameter inside holes have been canned. These pieces are currently being processed for pile charging. About 75 slugs are now being made with 1/2-inch diameter holes. When these are completed, slugs with each of the three sizes of holes will be charged to determine, empirically, the hole size necessary for obtaining equal internal and external water temperatures.

Temperature Distribution in Hot Press Furnace

A complete furnace assembly has been fabricated which utilizes a thick copper sleeve as a heat-pool to produce more nearly uniform temperature in the hot-pressing die. This design has heating elements mounted to give a higher energy input at each end than in the middle, and has a foil reflector surrounding the heaters. There is one fifth as much cycling of the furnace (on and off) as in the old style, resulting in increased life of the heating elements. First tests indicate that end to end temperatures can be held within 10 C as compared to 25 C (minimum difference obtainable) in the unmodified furnace.

Aluminum Treatment for Hot Press Closures

Three simulated closure samples that had been prepared using various chemical surface preparations were tested. The tensile strengths obtained from these Al-Al welds were not as high as those obtained with scrub and caustic preparations. The "Aluminon" method of preparation had an ultimate strength of 4,000 psi. Two displacement methods, zincating and nickel displacement, had ultimate tensile strengths of 4,500 psi and 3,400 psi, respectively. Additional closure samples are being prepared to study surface finish effects upon Al-Al diffusion.

Cold Closure Wafer and Segmented Slugs

Using cups machined at Hanford, two eight-inch cold closure fuel elements were produced using 1/4-inch wafers of uranium stacked without spacers. No difficulty was encountered in preparing these pieces and no misalignment of the wafers was noted in the finished element. Additional fuel elements are being prepared with Alsimag spacers between the pieces of uranium. One thirty-six inch long cartridge type fuel element was prepared by sizing 18 two-inch long cylinders of uranium into a piece of expanded aluminum tubing having a fifty-eight mil wall. The assembly was sized to an outside diameter of 1.440-inch in a drawing die and the closure was made by inert arc welding.

Uniskan Machine

Bids on the major items of equipment for the uniskan device were received during the month and orders were placed. Delivery of the drive spindle assembly is expected August 1. All other components will be received prior to this date, so fabrication will proceed as far as possible without the spindle drive.

Vacuum Braze Process for Canning Hollow Fuel Elements

The most likely fuel element for withstanding predicted pile power level increases to 150 percent of present levels in 1958 and 200 percent in 1961 appears to be a braze-bonded internally-externally cooled fuel element. A study was made of the feasibility of reactivating a vacuum process for producing a braze bonded internally-externally cooled fuel element. The study indicates that with improved equipment design and arrangement, a workable process can be developed.

Fuel Element Pilot Plant

At months end the revised project for the Fuel Element Pilot Plant awaited approval by General Electric management. Detailed design of previously approved items continued.

Low Impurity Canning Line

The low impurity canning line continued in operation this month with the dimple reject rate averaging approximately 1 percent while the lead content has increased from 0.10 percent to a maximum of 0.23 percent. The dimple reject rate for all other canning lines averaged 4.5 percent until May 9 when the rate decreased to an average of 1.6 percent for the rest of the month. This is associated with a reduction in lead content for these lines from an initial average of 0.34 percent to 0.25 percent. The cause of this sudden drop in lead content is not known at this time.

A series of tests were undertaken to characterize the effect of lead impurity in Al-Si of canning bath composition (about 11-12 percent Si). Weldability of Al-Si samples with greater than 1 percent lead was poor as evidenced by porosity and pin holes. Lead was visible in the microstructure when a concentration of about 0.2 percent was exceeded (the published solubility of lead in aluminum at the aluminum melting point). Corrosion tests of Al-Si samples with various lead concentrations were initiated.

Cored Slugs with Welded End Plugs

About 6800 acceptable canned slugs with drilled cores sealed by welding were made during May. There were slight increases, about 1 percent, in both the yield of sealed cores and in the canning yield.

Cored Slugs with Aluminum End Plugs

About 2960 drilled slugs with undercut counterbores were sealed for canning with pressed-in aluminum end plugs and were successfully canned. No instance of bath metal leaking into the interior of the cores was observed either during testing by gamma ray attenuation or by inspection of recovered canning rejects. Three slugs with about 7 1/2-inches of the can removed from their central portions were successfully cycled into the beta phase using the woodsplitter (two to 100 cycles, one to 193 cycles). No uranium-aluminum diffusion or other damage to the aluminum seal was observed.

Hot Press Canning of C Slugs

The hot pressed "C" alloy slugs canned during January and February under tentative process specifications (where some deviation from these specifications was noted) were tested using improved ultrasonic bond testing procedures and correlated observations from destructive testing. It now appears that 50 percent of January's and February's (1000) slugs and up to 80 percent of the (3200) slugs subsequently canned are acceptable for routine final examination and irradiation.

Fabrication of Double Length C Slugs

Inert-tungsten arc welding using alternating current was tried as an alternate method for joining pairs of C slugs into rigid assemblies. Paired assemblies were successfully welded using deeply-grooved caps to produce an appropriate joint design. Because of the encouraging results, a similar procedure with direct current will also be evaluated.

FUEL EVALUATION

Irradiation Status of Lead Dip Fuel Elements

In piles scheduled for high goal exposures, lead dip slugs fabricated from five-inch diameter ingots have been largely replaced by slugs from seven-inch diameter ingots. Charging of the latter commenced in September 1954. About 600 tubes of the five-inch diameter ingot (B-lots) remained charged. Of slugs from seven-inch diameter ingots (K, L, M, N, P, & Q) these reactors contain about: 2600 (K, M) tubes transformed as rods in a carbonate bath; 2200 (L, N) tubes transformed as slugs in a chloride bath; and 30 (P, Q) tubes transformed as rods in a chloride bath. About 60 percent of these tubes are at exposures below 250 MWD/T, 30 percent from 400 to 600, 1 percent (K-lot) over 600, and none over 800.

There are 200 tubes of drilled, two tubes of extruded, and 100 tubes of mixed, recovered eight-inch cored slugs with welded uranium plugs charged in 105-KE and some 50 tubes of drilled and extruded slugs in other reactors. Exposures of

these cored pieces are generally less than 200 MWD/T. By the first week of June about 60 tubes of eight-inch cored slugs with aluminum plugs should be charged; probably in 105-D.

Woodsplitter Expansion

The installation of four test stations to provide added test space is 90 percent complete. Initial trials of switchgear for cyclic operation of two test stations alternately were satisfactory.

Post Irradiation Examination

Cored Slugs

Both the W and X[1] type four-inch cored slugs from Production Tests 313-38-MT and 105-570-A, evidenced longitudinal radial fracture of the uranium within the slug cans. Sixty percent of the slugs of each type from tubes 1378-C (1130 MWD/T) and 1477-C (1210 MWD/T) were sufficiently distorted to be so classified. These pieces had an elliptical cross section with diametral differences of 60 to 80 mils. Three of the cored W type slugs picked at random were broken in the bend tester. Two of these, which were from the high power zone of the tube, showed longitudinal cracks in the uranium extending from the inner surface outward. The third slug, located in the lower power zone, showed no longitudinal cracking. This behavior is similar to that of the X type cored slugs reported last month.[2]

Only five of the solid control pieces,[3] from tubes 1377-C (1130 MWD/T) and 1478-C (1050 MWD/T), showed elliptical cross sections with 25 to 40 mil diametral differences. These five were from the high power portion of the tubes and included 3 X and 2 W types.

The average increase in diameter of the solid slugs, in the front half of the two tubes above, was five mils greater than the average for the cored pieces (those not having elliptical cross sections) in corresponding tube position. X type solid slugs grew an average of 6 mils in diameter as compared to an average gain of one mil for X type cored slugs in similar positions. W type slugs showed a 9 mil average gain for solid slugs and a 4 mil average gain for cored pieces.

Gas from Cored Slugs

Slugs from a tube of alternately charged drilled and extruded cored slugs (PT-588-A, PT-44-MT) exposed to 199 MWD/T were broken to determine the composition of gas present. The amount of gas collected was uniformly distributed among all the slugs including the ruptured piece, regardless of position in the tube. Mass spectrometer analysis of this gas showed the following percents by volume: CO_2 - 0.31; A - 14.43; O_2 - 10.48; N_2 - 26.82; CO - 2.77; H_2 - 25.38; Mass 4 (D_2 and/or He) - 19.82; and others - none.

1. HW-33575, The X category had surface flaws and striations, the W category was relatively of sound surface quality.
2. HW-36440-G, "Pile Technology Section Monthly Report," April 1955.
3. Four-inch cored and solid slugs in similar positions in adjacent tubes were fabricated by cutting an eight-inch slug into two equal pieces (one piece remained solid, the other was drilled).

Metal Examination Facility, 105-C

Equipment adjustment continued through May. Dejacketer waste permanent storage tanks were received. An order was placed for fabrication of the dejacketing vessel. Design of an optical profilometer for the 105-C MEF is 50 percent completed. This equipment is an improved and simplified version of the prototype model in use at 105-B. Preliminary equipment operating instructions were prepared.

Metal Examination Facility, 105-B

A motor drive and a digital position indicator were installed on the 105-B facility profilometer to increase accuracy and speed. Fabrication was started on a mechanical slug profile graphing attachment. Fabrication of a new slug viewing manipulator for 105-B was completed and installed.

TESTING METHODS

Ultrasonic Bond Test

Efforts on the ultrasonic bond test were directed toward determining if the incidence of bond porosity in canned production material had decreased enough to return to the original testing plan of counting the unbond echoes. It was concluded that it is probably possible on Fernald cast material but not on Mallinckrodt cast material; and, since it would be undesirable to test on two different bases, further experiments will be made using the count rate circuit. It is now felt that the second prototype (now being tested) has been improved as much as is reasonably possible. It has been proposed that a very extensive production run be made with this prototype to gain an appreciation of the problems which may arise in routine operation.

Meantime, the third prototype is being built. On this instrument particular attention is being paid to improving the response of the receiver to increase the signal amplitude at a time three to five microseconds after the surface echo is received. This is being done to reduce the extreme sensitivity (observed in the second prototype) to the time position of the gate generating circuit which selects the unbond echoes for transmission to the read out.

Sonic Orientation Test

All components have now been received for breadboard of the sonic orientation test including the filters on which some delay had been experienced. No breadboard has been started because of the press of other work; however, detailed design of a mechanical apparatus to handle the slugs through the test has begun.

Uranium Quality Test

In the belief that a uranium quality testing instrument is now ready for extensive operation, a test involving up to 150,000 slugs is planned for June. An automatic conveyor, originally purchased for the Manufacturing Department for use with the Sonotest, will be used with the uranium quality test. The conveyor was modified to make the automatic loading and unloading features operable.

Pulsed Eddy Currents

Work on this fundamental improvement of the eddy current testing method has resulted in greatly improved balancing circuits. The large signals, developed across the probe coil itself and produced when the probe coil is placed near a metal, were eliminated so small differences from standard conditions can be amplified and studied. To do this it was necessary to make a lumped constant transmission line to simulate the behavior of a metal with frequency and conductivity.

Internal Friction

In work on methods of measuring internal friction of fuel elements, it appears a method of suspending a slug on a nodal point, usually its longitudinal center, will be required. Slugs so supported by three set screws and a steel ring have been tested for internal friction with quite reproducible results. Further testing is in progress.

Mechanical Components

Tank, drive, and roll mechanisms of the new automatic conveyor were received from the shop; and, after initial re-adjustments to reduce noisy operation and to increase rate of slug travel, the unit is being left running to test the serviceability of the gears and bearings.

COATINGS AND CORROSION

Fundamental Corrosion Studies

A report, "The Determination of Aluminum Content of Aluminum Corrosion Products," C. Groot and R. M. Peekema, HW-35199, 4-25-55, was issued. The techniques described in this report were used to measure the aluminum content of corrosion product films from the 120 C autoclave studies. The rate of washing away of the film, determined by a material balance, was very rapid at first, then fell off to almost zero at the end of four weeks' exposure. This initial rapid washing away of film also occurred in the 90 C flow cup experiments and is entirely contrary to expectation. It could mean: (1) the corrosion process in these experiments was controlled by a film laid down from the water (boiler scale); or (2) the corrosion process was controlled by a film not of the primary corrosion product but by a film made of the products of some slow transformation of the primary corrosion products. For example, the primary corrosion product might be the amorphus, soluble, alpha-gel, and the protective film might be boehmite, the crystalline aluminum oxide monohydrate. The experiment points out a need for a firm basis for corrosion studies such as mechanism and kinetic research might supply. A literature study of these subjects is being conducted.

Testing

Evaluation of aluminum jackets recently received from Hunter-Douglas has been completed. Weight loss and type of attack studies indicate that the Hunter-Douglas material does not differ significantly from regular Alcoa fabricated cans.

Film studies are currently being conducted on aluminum sample exposed in the 314 Building Flow Tube Mock-Up. This facility is being operated at the highest temperature that does not deposit a boiler scale on the sample.

Exposure of Al-Si coupons containing various concentrations of lead has been completed. The samples are now being weighed and examined for corrosion attack.

A large constant temperature bath is being set up for 90 C operation to provide corroded samples for fundamental corrosion studies.

High Temperature Corrosion of Aluminum

Autoclave tests have shown that 2S or can stock composition aluminum (M339) are most corrosion resistant in the as-cast condition. Samples of .050-inch sheet in the H14 temper were exposed as received, and after annealing at 420, 520, or 600 C for 15 minutes then air cooled. As-cast samples were sawed out of a three pound casting. Corrosion tests were made in distilled water in the temperature range 265-315 C. From 265-291 C intergranular corrosion did not occur in either wrought or as-cast Al during the eight hour corrosion test. In this range the corrosion rates were lowest for the as-cast condition. At 303 C, all the wrought samples with or without annealing exhibited some degree of intergranular corrosion; the as-cast sample was not intergranularly attacked. At 314 C, all wrought samples were completely oxidized; the as-cast material still showed no intergranular attack.

Preliminary experiments also indicate as-cast is more resistant to intergranular corrosion than wrought high purity aluminum.

Tests of 2S-1% Ni aluminum alloy in 250, 300, and 350 C distilled water continue. Arrangements have been made with Alcoa for production of cans and caps as well as an assortment of sheet and rod. Castings of the alloy have been made at HAPO and soon fabrication of slug jackets will be possible here. Since there is high interest in the material as a candidate slug jacketing material, arrangements have been made for high temperature flow tests in and out of pile.

High Temperature Water - Thorium Reaction

At a request from the Metallurgy Research Sub-Section, the corrosion rate of various thorium samples and alloys was determined. Corrosion rates decreased in the order: thorium metal (Fernald), thorium metal (Ames), thorium - 2% U - 6% Zr, and finally, the most corrosion resistant thorium - 2% U - 10% Zr. At 240 C the 10% Zr ternary alloy had a corrosion rate of ~ 1 mil/hour. The Fernald thorium corroded at about 1 mil/minute, somewhat faster than uranium at the same temperature.

Anodizing

The two tubes of anodized pieces charged in C pile under PT 313-105-37-M, Suppl. B, were discharged after approximately 100 MWD/T exposure at 115 C water outlet temperatures to prevent these tubes from becoming pile limiting. Arrangements have been made for weighing and visual examination of the discharged pieces. A smaller loading will be prepared and irradiated to the goal exposure of 400 MWD/T.

Tests are in progress to determine the rate at which sulfuric acid included in Standard Alumilite films is leached in the 170 C sealing operation. Determination of the pH after 24 hours indicates about 1/3 of the available sulfate has been leached from the anodic film.

Nickel Plating Special Fuel Elements

A special slug for monitoring the temperature with thermocouples during hot pressing has been designed by the Fuel Assembly Unit. The fuel element required nickel plating for assembly and the unusual geometry was more readily plated using the electroless plating technique. The solution employed was the hypo-phosphite nickel acetate high pH composition. The coatings thus obtained were satisfactory for the purpose intended. This process, though quite practical, presents several disadvantages when compared to electroplating. The electroless method requires more expensive reagents, constant replenishment of certain chemical constitutents, and produces a brittle plate which contains phosphorus. These disadvantages are offset to a certain extent by the adaptability of the process for plating virtually any geometry and by the non-porous characteristics of the electroless plate.

A study to determine the capacity of the nitric acid baths has been completed. There are two 50% nitric acid baths: the first is used to remove the uranium oxide before the electrolytic etch, and the second is used to remove the etch coat prior to plating. If the concentration of hydrogen ion is maintained at 8-10 moles per liter, the capacity of each of these baths is limited only by the solubility of uranium. This solubility is equivalent to 5 sq.ft. of uranium surface or 20 eight-inch fuel elements per liter of etch coat removal solution.

Corrosion Behavior of Perforated Wafer Slugs

The corrosion behavior of hot pressed slugs containing alternating aluminum and uranium wafers has been investigated as part of the current effort by Fuel Assembly, Coatings and Corrosion, and Recirculation Technology Units to find slugs which can fail in high temperature water without plugging the process tubing or endangering the pile. Slugs containing uranium wafers 1/16, 1/8, and 1/4-inch thick and aluminum wafers 1/5-inch thick were tested by drilling a 1/16-inch hole through the jacket of each of the slugs to allow static, 170 C deionized water to reach one of the uranium wafers. Slugs having either 1/16 or 1/8-inch uranium wafers split in two transversely. They did not plug or injure the surrounding process tubing and only one wafer was corroded. Similar slugs were, therefore, sent to the Recirculation Technology Unit for evaluation in the higher temperature loops.(1) A slug with 1/4-inch thick wafers caused some swelling of the process tubing, but did not rupture it.

Multi-Jacket Slugs

Four-inch multi-jacket ("tell-tale") slugs(2) with uranium sleeving of 1/32, 1/16, 3/32, and 1/8-inch wall thickness have been autoclave tested at 170 C after perforating the jacket with a 1/16-inch hole to allow water to reach the sleeving.

1. HW-36787, "Autoclave Behavior of Wafer Slugs," H. C. Bowen and E. A. Evans, Confidential-Undocumented.
2. HW-36362, "Report of Meeting on Slug Rupture Testing," J. M. Skarpelos.

The slugs consisted of a solid uranium core, a surrounding sleeving of uranium, and an outer aluminum jacket, all bonded together by the Al-Si canning method. The 1/32-inch sleeves were converted into uranium oxide without visibly distorting the surrounding process tubing, although the slugs were not easily removed from the tubing. Slugs having uranium sleeves with walls thicker than 1/32-inch swelled enough to distort the process tube. A slug (with a 1/32-inch sleeve) was sent to the Recirculation Technology Unit for evaluation. Results showed that on rupture, uniform swelling occurred with no sticking or damage to the tube. The ruptured slug was easily removed from the tube.

Secondary Corrosion Barriers

Slugs having sweater coatings of electroplated nickel, iron-nickel, nickel foil, and carbonyl-deposited nickel were evaluated in the autoclave and flow tube tests. Part of the aluminum jacket had been stripped from each of these slugs by using 1% sodium hydroxide solution. All of the 18 slugs which were flow-tube tested are still good, with two exceptions: (1) a carbonyl coated piece having one mil of nickel failed, apparently because of abrasion between the exposed nickel and the process tubing ribs, and (2) one slug was removed from test and sectioned. There was no visible evidence of failure of the one mil electroplated nickel coating on this slug but the metallographic study showed a thick layer of uranium hydride under the coating. All of the slugs have now been removed from test and are being sectioned for metallographic study. Other slugs have been electroplated, hot pressed, and part or all of the aluminum jacket removed. They will be tested in 100-KE flow tubes as soon as the tubes become available.

PHYSICS RESEARCH SUB-SECTION

Lattice Physics

Theoretical intracell flux traverses have been calculated using diffusion theory which fit the experimental flux traverses fairly well. This calculation took into account the modulation of a single lattice cell's thermal flux by the overall cosine and exponential distributions. The ratio of the average flux in the graphite region of the dry 8-3/8 inch lattice to the flux at the process tube compared as follows:

AVERAGE THERMAL NEUTRON FLUX IN GRAPHITE/FLUX AT PROCESS TUBE

Measured with Indium Foils	1.37
Measured with BF_3 counters	1.41
Calculated from diffusion theory	1.40

The buckling of the wet, 4-3/16 inch, J-Q lattice was experimentally rechecked because of the uncertainty in the original determination. This completes the J-Q measurements for the present with results as follows:

BUCKLING
(in μb units, 1 μb = 10^{-6} cm^{-2})

Lattice	Wet Buckling	Dry Buckling
8-3/8"	70	143
6-3/16"	205	250
4-3/16"	255	235

In the wet cases above there were 2.33 cm^3 of water per cm of tube length.

Exponential measurements have been completed for the 0.925 inch slug in the 7 inches and 5-3/16 inches lattices with three different water annuli. The values for the standard water annulus were reported last month. The results for the larger annuli (1-3/4 and 4-1/2 times standard H_2O/U ratio) show a migration of the crossover point (lattice for which the wet and dry bucklings are equal) towards smaller lattices as the amount of water is increased. This measured migration agrees fairly well with the calculated changes.

Measurement of streaming of neutrons in large channels in graphite has begun.

Eight-inch uranium slugs of standard diameter were transferred to Manufacturing in order to reduce inventories to a minimum. A total of 1540 pieces (6 tons) were returned.

Reactor Physics

The status of the LTR fabrication is as follows: The "Boral" shielding has been placed on the top and sides of the reactor; the vertical safety disk thimbles have been installed; and installation of control instrumentation has begun and continues as laboratory tests are completed. Leveling slug drives have been fabricated and the

necessary steelwork for the front end was finished at month's end. Immediate installation of these components is scheduled.

Work on the TTR has proceeded slowly because of the man-power priority of the LTR.

A calculation of the dry neutron temperature coefficient of reactivity of the K Piles has been completed. Although the green metal (zero exposure) coefficient is negative by 600 MWD/T discharge exposure, a reversal in sig has occurred and the pile gains reactivity as the neutron temperature increases. In this connection it was pointed out that since a thermal neutron originating in relatively hot graphite must pass through much cooler water, where it is degraded in temperature, before it can enter a fuel slug, loss of water would result in a sharp rise in neutron temperature and thus pile reactivity. Under certain circumstances this gain in reactivity could be quite large. Sample magnitudes are presented in HW-36624. These results will be checked by measurement in the LTR.

More detailed plans are now being made as to the projected LTR measurements of temperature coefficients. Flux traverses to be made during these experiments have been detailed. An improved furnace to heat the LTR core has been designed.

Nuclear Physics

Work was resumed on measuring relative values of η, the yield of fission neutrons per slow neutron absorbed, for U-235 as a function of incident neutron energy. The range now being investigated lies between 0.025 and 0.1 ev.

New capsules have been fabricated for the Pu-240 burnout experiment. These capsules have a cadmium shield thick enough to be black to thermal neutrons throughout the entire experiment.

Physics Problems Connected with Plant Operation

A final critical mass safety review of the Purex and Recuplex processes is being conducted preparatory to operating these installations with fissionable material.

General specifications for use in design have been written to cover those cases in which contact maintenance of critically sized vessels must be carried out by personnel.

METALLURGY RESEARCH SUB-SECTION

Fundamental Studies

Since the study of radiation damage to metallographic specimens requires a non-corrosive, heat-conducting medium, laboratory tests designed to establish the extent of attack by NaK on uranium and Zircaloy-2 specimens have been conducted at elevated temperatures. Examination of a uranium specimen heated in NaK at 700 C (1290 F) for 18 days indicates that the NaK has attacked the uranium to a very slight extent. The selective etching or corrosive action by the NaK yielded a surface with many equi-axed, fine grains having a mean diameter of 0.0003 - 0.0005 mm. Minute cracks or striae with a depth of at least 0.0005 mm were found to progress intergranularly. The equi-axed subgrains revealed by the NaK have the same size as the domains in beta heat-treated uranium revealed by cathodic vacuum etching. X-ray and electron diffraction studies of uranium and Zircaloy-2 specimens heated in NaK are now in progress to further evaluate the effect of NaK on these materials.

U/Al and U/AlSi diffusion couples were annealed at a nominal temperature of 200 C (390 F) for 330 hours. During the anneal the temperature accidently raised to 265 C (510 F) for approximately 13 hours. Under these conditions the maximum diffusion of the uranium into the aluminum from the original U/Al interface was 0.003 inch. In the case of the U/AlSi couple there was no adherence; to confirm this, x-ray analysis and additional metallographic studies of the U/AlSi couple are being conducted in order to establish whether diffusion did or did not take place.

Initial data have been obtained in the investigation of the variation of preferred orientation in production fuel material. As was indicated from previous results, the (200) orientation has been found to vary to a far greater extent than either the (020) or (110) type of orientation. Consecutive electropolishings of 90 seconds each were given a sample for a total time of 33 minutes. This polishing treatment removed approximately 0.005 inch of metal. Diffraction studies after each polishing did not disclose an appreciable change in the diffraction patterns. The patterns for the (200) plane, obtained by traversing the beam in a series of concentric circles on the wafer, show maximum values, in general, at approximately every 90 degrees. A definite trend in the small variation of the (020) and (110) diffraction patterns has not been established at this time.

Mechanical and Physical Properties of Fissionable Materials

Electrical resistivity measurements obtained from two uranium bars, which had been sectioned longitudinally from a 520 MWD/T beta heat-treated slug at distances of 1/16-inch and 7/16-inch from the slug axis, revealed a larger value of resistivity for the centrally located sample. Measurements were made over a gage length located 2.4 to 2.9 inches from the cap end of the uranium. The resistivity at 20 C of the centrally located sample was $32.4 \pm 0.3 \times 10^{-6}$ ohm-cm as compared to $31.7 \pm 0.1 \times 10^{-6}$ ohm-cm for the sample 7/16-inch from the slug center. Measurements on non-irradiated uranium indicate an average value of $31.0 \pm 0.2 \times 10^{-6}$ ohm-cm.

Metallurgy Research Sub-Section

Reactor Structural Materials

Zirconium and Zircaloy-2 specimens exposed to pile gas in the 100-H "X" test hole for 4000 hours have reacted with the gas at a rate dependent on temperature and independent of pile irradiation. One Zircaloy-2 and two zirconium tube sections, together with sheet strips of both materials, were exposed at an average temperature of 410 C (770 F) to an integrated exposure of 897 MWD/AT (27×10^{19} nvt). The tube sections, which were experimental pieces received from Superior Tube Company, contained so many pits and gall marks that reaction rates based on a calculated surface area are in error on the high side. One of the zirconium tube sections had a piece broken out between the ribs during machining.

Out-of-pile tests show that the reaction of zirconium and Zircaloy-2 with oxygen is nearly independent of the partial pressure of O_2 and, also, that the reaction with CO_2 proceeds at the same rate as the reaction with dry air. This is taken as justification for making a comparison of the exposure to pile atmosphere (50% CO_2, 50% He) with an exposure to air. Extrapolation of a 2000-hour ex-pile test in dry air at 400 C (752 F) to 4000 hours gives a weight gain of 1.6 mg/cm^2 for Zircaloy-2. The in-pile 4000-hour weight gain for the Zircaloy-2 test strips and process tube sections was 1.7 and 2.5 mg/cm^2, respectively. In-pile weight gains of the zirconium test strips and process tube sections were 1.0 and 1.6 mg/cm^2, respectively. Some light colored oxide was apparent at the bottom of pits and scratches on all the in-pile specimens, but none showed evidence that the breakaway stage was reached. A comparison of 2000-hour in-pile data with the 4000-hour data shows the reaction to be about linear. Two additional sets of specimens charged with the others will be discharged after a year or more exposure.

Examination was completed of zirconium tensile samples and metallographic wafers which had been exposed to 780 MWD/AT. Tensile tests were conducted on samples having 0, 10, 20, 30, 40, and 50 percent cold work prior to irradiation with a post-irradiation vacuum anneal of 100 hours at 300 C (572 F). Tensile tests were also conducted on samples having 10, 30, and 40 percent cold work prior to irradiation with a post-irradiation vacuum anneal of 160 hours at 350 C (662 F). One hundred hours at 300 C did not completely remove the radiation damage produced in the initially fully annealed material. The post-irradiation annealing of samples with prior cold work resulted in varying degrees of recovery of both the radiation damage and cold work that was dependent upon the degree of prior cold work. No changes were observed in the microstructure of material exposed to 780 MWD/AT.

The investigation into the change in preferred orientation of the basal (002) planes in zirconium fuel element jackets as a function of reduction by the uniskanning process has been completed. The orientation of these planes changes from an apparent near random orientation to a definitely preferred orientation as the can wall thickness is reduced from 0.019 inch to 0.002 inch. The maximum population of basal planes is found at approximately 10 degrees from the rolling plane as measured from a tangent to the circumference of the can, and only a few degrees from the rolling plane as measured from the longitudinal axes of the can.

Fuel Materials

Three fuel-bearing materials are currently being tested to determine the applicability of such materials for higher temperature, higher power, and longer exposure service conditions. These materials are: a matrix fuel material consisting

of uranium particles surrounded by a magnesium matrix, a ternary alloy of thorium-uranium and zirconium, and compacted and sintered uranium oxides. Progress in the evaluation of these materials during the past month is reported below.

The irradiation of two uranium-magnesium specimens at the Materials Testing Reactor to 20,000 MWD/T is continuing. Present exposure of the test specimens is approximately 14,400 MWD/T. The post-irradiation examination of two similar specimens exposed to 10,000 MWD/T in the MTR has been completed. During decanning of these specimens it was noted that one fuel material specimen was fractured. Examination of the fracture areas indicated a flaw probably existed in the original casting from which the specimen had been machined. Bend test data obtained on the second specimens were similar to the bend test data obtained on like specimens exposed to 5000 MWD/T. The cumulative mechanical property data obtained on specimens of this material prove conclusively that the matrix fuel material is much more resistant to irradiation effects than other homogeneous materials. Two fuel elements of this material that are approximately HAPO dimensions are also being irradiated at the MTR and have accumulated about 800 MWD/T at the time of this report.

Work is continuing on the preparation of pellets by bomb reduction methods for use in a matrix fuel element. One 300-gram uranium trioxide charge was fired in a high temperature furnace. The slag composition was 48 percent calcium oxide in calcium chloride with a fifty percent excess of calcium reductant. The bomb was soaked four hours at 980 C. A yield of 50 percent +325 mesh uranium spheres was obtained. Since no booster was employed, the yield seems encouraging. One ten-gram uranium trioxide charge was fired with a slag of 89 percent calcium chloride and 11 percent calcium oxide. No apparent improvement in results was obtained using this large excess of calcium chloride. Several small scale uranium dioxide reductions have been performed in which a seed of -200 +325 mesh uranium was added to the charge. An arbitrary ratio of uranium seed to uranium as oxide of 1:5 was chosen with a slag composition of 20 percent calcium oxide in calcium chloride. The boosterless charges were heated to 1300 C for 40 minutes after firing had occurred. Yields were noticeably increased to about 57 percent +325 mesh uranium. Total recovery including the -325 material was 86 percent. The results of these seeded charges are encouraging since it may be possible to add all unusable metal fines from a charge to the succeeding reduction run as a seed. Such a procedure would appear to be feasible if the usable yield of shot from these seeded charges can be increased to 70 or 80 percent. A charge identical to the above seeded charges except for the addition of 0.5 mole of calcium-iodine booster per mole of uranium was fired. Yield of +325 mesh uranium was increased to 69 percent. Much of the metal recovered was 1/16 to 1/8-inch in diameter. Particles of this size tend to be irregular in shape while the smaller particles are spheres. A series of laboratory experiments has been initiated to determine fundamentally why the reductions of uranium fluoride with calcium yield a good button of metal whereas oxide reductions yield a mixture of small pellets and powders.

Study of the thorium-uranium alloy system indicates approximately two percent solid solution of uranium in thorium at 800 C. Above the eutectic temperature (1086 C) and the monotectic temperature (1400 C), the solubility is greater, approaching four w/o uranium in thorium. Specimens of several ternary alloys of thorium, uranium, and zirconium containing two w/o uranium and 5-10 w/o zirconium that were submitted for chemical analysis have been dissolved after about three weeks in acid solutions. The resistance of these alloys to chemical solution has prompted a test

of their resistance to water autoclaving. Initial results of a 16-hour test in distilled water at 240 C are summarized below:

Sample	Initial Weight	Final Weight	% Loss
Base metal, HAPO thorium slug	32.7 g	0 g	100
Ames metal, as-cast billet	16.8 g	5.0 g	70
Ternary, Th-2 w/o U-10 w/o Zr	99.4 g	92.0 g	7.5

Additional tests of the 10 w/o Zr and 5 w/o Zr ternaries will be made at 350 C.

Previous reports of this series have discussed the preparation of test specimens consisting of UO_2 compacted to bulk densities of 5.5 and 7.4 gm/cm^{-3}, having U-235 contents of 0.67 percent and 1.34 percent, and encapsuled in Zircaloy-2. Irradiation of these test specimens in the MTR began May 11, 1955. Following the irradiation, which is expected to be completed about July 1, 1955, the test capsules will be examined to measure any internal gas pressure buildup and to examine physical changes in the core during irradiation at temperatures near the UO_2 melting point.

Fuel Element Evaluation

Unbonded slugs, canned by the room temperature point closure technique, have been irradiated to determine their rupture resistance and to check the hypothesis that an unbonded fuel element should give improved performance under Hanford conditions. Under PT-105-580-A four solid slugs have been irradiated, one to 56 MWD/T at 9 kw/ft, one to 280 MWD/T at 47 kw/ft, and two to 490 MWD/T at 38 kw/ft. Four solid unbonded slugs were discharged from H-Pile May 5, after irradiation to a tube exposure of 700 MWD/T. The slugs operated at 42 kw/ft and achieved individual exposures of about 980 MWD/T. The slugs showed no evidence of preferential corrosion at the closure as viewed in the basin. They exhibited some variation in film deposits but showed no evidence of burned spots. 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 cored slug, had split longitudinally. It seems probable that the slug had been canned with pickle solution or water in the core, since there was extensive corrosion of the axial core but very little corrosion of exterior uranium surfaces. Water entry through the can wall or closure can be ruled out with a fair degree of certainty.

Two cored insulated slugs are being irradiated at the MTR to determine the characteristics of slugs operating at very high temperatures. One of the slugs is a cored uranium slug plugged with welded uranium end plugs and one has 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. The slugs were charged May 19. Power output of the slugs with the reactor at equilibrium has not yet been determined. The calculated maximum temperature of these fuel elements is approximately 900 C.

During the May 9 shutdown of the MTR the new basket-type B-block assembly for the MTR fuel element testing facility was inserted in the reactor. While flow testing was being carried out preliminary to startup of the reactor, a water hammer developed in the flexible steel leads near the quick disconnect couplers and a

complete water flow stoppage suddenly occurred. No quick solution to these problems could be found so the assembly was removed from the reactor, and the next reactor cycle was begun. It was subsequently found that the basket had collapsed near a weld at the top of the basket. Inasmuch as the water flow in normal operation is such that the pressure is highest inside the basket, it is difficult to explain the failure of the basket. The system was mocked up with the B-block out of the reactor, and the difficulties were worked out of the system so that it was possible to insert the B-block in the reactor during a non-routine but scheduled shutdown on May 17. The reactor started up on May 19, reaching full power at 8 AM on May 20. A fission break in another experiment caused a scram late on May 22. Thus, at the time of this report the two insulated slugs and one mechanically bonded slug had experienced 2-1/2 days of operation. The measured power generation was 54 kw/ft, which is lower than was anticipated. The power generation figure is subject to revision, for the abrupt water flow stoppage earlier in the month caused minor damage to the instruments and necessitated their recalibration. At the time of the startup the flow recorder did not agree with the rotameter (another flow meter in the water line). According to the rotameter flow value, the power generation is 63 kw/ft. A special fuel loading was used for this cycle. The nearest fuel element to position B-3 has been moved to the other side of the normal north slab fuel loading. These changes account for some of the decrease in power that is observed. The fuel will be arranged in the normal manner during the May 30 shutdown of the reactor.

Several notched cored slugs have been cold canned for evaluation in the MTR to test the effect of stress risers on the surface and in the core of cored uranium slugs. Three slugs will be irradiated next month. One has a longitudinal notch along the surface, one has a longitudinal notch along the core, while the third is unnotched. The surface notch is 0.050 inch deep with a 45° included angle and a 0.010 inch radius on the bottom. The internal notch is similar but is only 0.018 inch deep. A brooch of staggered tool steel teeth silver soldered to a steel rod was used to cut the internal notch. These slugs will be irradiated to rupture in the MTR fuel element testing facility.

A four-inch, Hanford diameter, cold-closed, aluminum-clad slug of 40 volume percent uranium chips in a magnesium - 1% silicon alloy matrix was defected and placed in the high temperature flow laboratory, Elmo 4. The defect was a 0.025 inch diameter hole through the 0.050 inch jacket one inch from the cap end. The slug began to hinder water flow when the water temperature reached 210 C with a velocity of 11.5 fp Water flow was stopped entirely three minutes after the water reached 220 C. The total time above 200 C was about six minutes. A similar slug has been sent to the low temperature flow laboratory to determine if the matrix material can maintain a protective coating in water at a temperature of 120 C.

Radiometallurgy Examination

A cored, AlSi bonded, natural uranium slug rupture from PT-105-570A was examined metallographically for uranium quality and effects of pile exposure on the uranium. The uranium quality appeared to be normal, and no evidence of beta-phase heating was found in the uranium microstructure. A partial breakdown of the uranium-AlSi bond was evidenced by a parting line at the uranium side of the compound layer. The cored slugs which occupied positions in the tube immediately upstream and downstream of the rupture were sectioned and examined for deformities. Both of these slugs contained longitudinal splits on each side of the core extending the full

length of the slug. The splits were about 0.05 inch wide at the core and were closed at the slug surface. The slugs had assumed an elliptical cross-section with the major diameter greater than the minor by about the width of the split. Detailed dimensioning and metallographic examination of the uranium of these slugs will complete this examination.

A detailed examination was started on an eight-inch, slug transformed, AlSi bonded uranium slug which failed after an exposure of 230 MWD/T. This slug was selected for study by the Fuel Evaluation Unit as typical of the current slug failures. Water-uranium interaction had caused a localized swelling of the can wall by corrosion product buildup. Scale formation on the can wall indicated that abnormally high surface temperatures existed on the side of the slug where the failure occurred. The relation of the uneven surface cooling to the slug failure will be sought in a critical study of the slug components in the region of the failure. Preliminary inspection of slug sections revealed no gross manufacturing or metal quality defects. Examination was started on an unruptured slug whose surface appearance indicated uneven cooling to determine if any corrosion or other process is involved which might result in can wall penetration. This slug had a slight (20-mil) warp with the "hot" spot on the top of the warp curve.

Examination of the unbonded "C" process failure from Production Test 105-578A continued. Metallographic examination of this slug from Tube 2686-C revealed intergranular corrosion of one of three samples of jacket taken from the top of the slug. This sample was located approximately 2-1/2 inches from the base end. Three samples from the bottom of the slug showed no evidence of intergranular corrosion. Chemical analysis of six samples of slug jacket showed silicon contents ranging from 4.3 to 10.4 percent; however, identification of the silicon by volatilization of insolubles was carried out on only one sample. Additional samples are being submitted for check analyses. The uranium content of five of these samples ranged from 0.022 to 0.068 percent and that of the sixth sample was 0.29 percent. The latter sample was one which had a microstructure similar to that of cast "J" metal. Hardness traverses made on a wafer from one of the unruptured unbonded "C" process slugs from Tube 2786-C indicate that the core of the uranium may have been heated into the beta phase. Hardness values ranged from 90-92 Rockwell G at the edge to 71-77 at the center. The macrostructure gave no indication of beta phase heating.

Examination of the mechanically bonded point closure failure from PT-105-584A continued. A transverse section made on the slug from Tube 2062-C approximately 1-1/2 inches from the base end revealed a number of very small cracks which covered an area approximately 1/4-inch in diameter at the center of the section. No evidence of radial cracks such as found in the wafer taken about 1-3/4 inches from the cap end was found.

Separations Plant Structural Materials

A correlation study of AISI type 304L stainless steel in Purex 2WW was performed to compare corrosion rates from the heat transfer testing equipment with those from the sealed glass capsules. The corrosion rates obtained from the sealed glass capsules are higher by a factor of about four. The corrosion rate reaches equilibrium in about 24 hours, and the reproduction is good considering the magnitude of the corrosion rate.

Metallurgy Research Sub-Section

Corrosion specimens, both hot-rolled and [redacted] of low carbon AISI 1020 steel and low-alloy-high-strength steels, Mayari-R and Corten, were placed in test for an estimated two years' duration in the Hot Semi-Works waste self-concentrator. The purpose of this field test is to study techniques for specimen exposure and removal from storage tanks containing highly radioactive waste concentrates and to collect short-time field corrosion data on these three steels exposed to the vapor and liquid/sludge phases of Purex waste solution.

Metallurgical Laboratory Examination

The stress analysis of the round-stem 100-K thermobulbs has been completed with the result that no stresses were measured that approach the endurance limit of the stainless steel used in the thermobulbs.

Tensile tests were conducted on uranium at temperatures from minus 10 F (-12 C) to 350 F (176 C) on extruded material representing eight variables of manufacture. Compression, hardness, and stress relaxation tests were performed on pilot-run rolled-sheet aluminum dummies for Manufacturing Department. The rolled-sheet dummies exceeded all the requirements stipulated by HAPO for pile usage.

A mandrel made from a low melting bismuth-tin alloy was plated with nickel and the alloy removed by melting it out, thus leaving the nickel shell. The coat had a light matte texture and readily polished to a mirror finish. It was deposited at a current density of 20-25 amps per square foot and was free from pits and imperfections.

It was attempted to electrodeposit nickel on an aluminum mandrel which was coated with a layer of Dag. This was unsuccessful, and the aluminum was attacked by the low pH bath. The plate that was formed cracked and would not adhere to the mandrel. This necessitated another purification of the solution.

The forming of enclosure cans to close tolerances by spinning has not proved practicable due to the thinness of the metal. A combination of pressing and spinning has been substituted, and promising results have been obtained.

Fabrication of the enlarged vacuum vessel for the cathodic vacuum etch-vacuum evaporation apparatus has been completed. The unit has been tested for vacuum leaks, and preparations are complete for the first trial run. A massive piece of uranium will be cathodic vacuum etched, then coated with a thin film of gold by vacuum evaporation. The quality of a coat thus deposited will be tested to determine the feasibility of its application to fabricated pieces of alpha plutonium.

PROJECT ACTIVITIES

Project CA-512-R

A gamma monitoring system will be provided at the K Piles. Detailed design has not started because funds have not yet been made available. Satisfactory samples of Panellit gage mercury switches have not yet been received from the vendors. The program to replace the faulty switches thus cannot get under way before September 1. Twenty-five hundred "interim bulbs" for the tube temperature monitor have been received from the Edison Company and a small number have been placed on KW Pile. These elements are round rather than flat to enhance their mechanical strength. Negotiations are being carried on with various vendors in an attempt to develop a "permanent" element. Design and fabrication of components for the revised Beckman system is complete. Installation by the 100-K Maintenance Unit is starting. The boron steel 3-X balls for the K Piles are being manufactured at the rate of 10,000#/week. A plating vendor has not yet been selected.

Project CG-558 - Phase I

The scope is complete and detailed design is about 80 per cent complete. The horizontal rods have been replaced at F and DR Piles. Considerable trouble was encountered at DR with rod scratching and the shutdown at D has been postponed until corrective action can be taken. This will probably consist of replacing the graphitar bearings in the rod bushings with a less abrasive material and enlarging the openings to the maximum permissible. The first full pile replacement of Panellit gauges will be about August 1 at H area. Delay has been experienced because of the change in specifications from brass to steel fittings. The lump sum contractor has begun construction of the 190 B & D buildings. The contract for the 190 DR building has not yet been let.

Project CG-558 - Phase II

The F & H area modifications have been designated as Phase II - CG-558. The project proposal to authorize this work has been prepared and is being circulated for G. E. management approval.

Project CG-600

The schedule for the nozzle and pigtail replacement is not yet firm but it is hoped that it can be done before Project CG-558 shutdowns commence.

Projects CG-578 and 579

The Gamma monitoring project for the old areas and C is on schedule with the first installation tentatively scheduled for July 1 at H area. Subsequent installations will be done at the same time as the Panellit installations under Project CG-558.

RESEARCH & DEVELOPMENT GROUP REPRESENTATION

Mechanical Development

The R.D.S. 13 group held one meeting at which the zone type temperature monitor was discussed and officially recommended for application to all piles except KE and KW. Scoping of this work will be by the Mechanical Development Unit, Design Section.

PROCESS AND SPECIAL STUDIES

Calculations on the economical aspects of pile pressurization were completed and preliminary discussions were held with Design Section and Operations Analysis personnel to acquaint them with process details and methods of economic analysis used. Work on the incremental production cost study was confined to the accumulation of additional details of present and projected operating costs.

The preliminary draft of HW-36714, "Record of Removal of Contents of Process Channel 4669 KW", was completed and assembled, and study was given to the preparation of a documentary film from the footage pertaining to the incident now on hand.

Assistance was rendered the Rocky Mountain Nuclear Power Study Group during their visit of May 16 and 17.

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 May, 1955, except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

Inventor	Title
M. D. Groves	Heat Transfer Corrosion Units (Report not yet issued)

O. H. Greager

Manager - Pile Technology
ENGINEERING DEPARTMENT

VISITORS AND BUSINESS TRIPS

George Watt, University of Texas visited Hanford on 5/2 through t/6/55 to render technical consulting services.

E. E. Motta, North American Aviation, Los Angeles, California visited Hanford on 5/3/55 to discuss separations chemistry and facilities for hot work.

B. R. Kramer and F. M. Warzel, Phillips Petroleum Co., Idaho Falls, Idaho visited Hanford on 5/9 thru 5/13/55 to discuss chemical process development.

F. Hittman and B. Manowitz, Brookhaven National Laboratory, Upton, Long Island, New York visited Hanford on 5/3/55 to consult on waste concentration losses.

C. T. Runion and C. Huntington, National Lead Company, Cincinnati, Ohio visited Hanford on 5/25/55 to discuss 60 - 100% UNH concentrations.

G. Luntz, editor of Nucleonics Magazine, New York, N. Y. visited Hanford on 5-4-55 to discuss the preparation of papers on nucleonics.

E. R. Edwards, C. W. Kuhlman, Jr., and J. E. Spooner, Mallinckrodt Chemical Works, St. Louis, Missouri visited Hanford on 5-17 and 5-18-55 to observe continuous calcination of UO_3.

J. G. Bradley visited Carbide and Carbon Chemical Corporation, Oak Ridge, Tennessee on 5/23 through 5/26/55 to consult on uranium oxide technology.

H. J. Anderson attended an ASTM E-14 Committee Meeting in San Francisco, Californi on 5-22-55 through 5-28-55.

R. E. Tomlinson visited Houston, Texas on 5-2-55 and 5-3-55 to attend the A.I.Ch.E. Meeting.

R. E. Tomlinson visited the duPont Co., Savannah River Works, Augusta, Georgia on 5-5 and 5-6-55 to discuss Purex flowsheet problems.

R. H. Moore and R. F. Maness visited ORNL, Oak Ridge, Tennessee on 5/23 thru 5/26/55 to discuss continuous calcination and separations processes.

M. D. Fitzsimmons visited KAPL on 5-25-55 to discuss reactor technology.

E. M. Kinderman visited Argonne National Laboratory, Lemont, Illinois on 5/18 and 5/19/55 to attend "bluenose" planning meeting.

R. E. Connally visited Seattle, Washington on 5-19-55 to attend meeting of Institute of Radio Engineers.

ORGANIZATION AND PERSONNEL

	APRIL	MAY
Separations Technology General	2	2
Plant Processes Sub-Section	54	57
Chemical Development Sub-Section	74	77
Chemical Research Sub-Section	61	60
Contact Engineering Unit	5	5
Analytical Laboratories Unit	33	34
Technical Shops Unit	28	30
	257	265

Plant Processes Sub-Section: J. B. Kendall, Engineer II transferred from Chemical Development into the Sub-Section on 5/12/55. L. M. Shuttleworth Laboratory Assistant D. transferred into the Sub-Section from Separations - Utilities on 5/2/55

Chemical Development Sub-Section: W. N. Carson, Sr. Engineer transferred into the Sub-Section from the Chemical Research Sub-Section on 5/1/55 and J. H. Kleinpeter Engineer transferred into the Sub-Section from Project Engineering Sub-Section. J. B. Kendall, Engineer II transferred from the Sub-Section to the Plant Processes Sub-Section on 5/12/55.

Chemical Research Sub-Section: W. N. Carson, Jr. Head, Chemical Research transferred from the Sub-Section to the Chemical Development Sub-Section on 5/1/55.

Analytical Laboratories Unit: Katherine M. Niessner transferred into the Unit from the Purchasing Sub-Section on 5/23/55.

Technical Shops Unit: L. E. Scott and V. A. Maling were hired into the Unit on 5-18-55 and 5-31-55.

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PLANT PROCESSES SUB-SECTION,

REDOX PROCESS TECHNOLOGY

Summary

The Redox Plant production has been characterized by steady and relatively uneventful operation during the majority of the month. The decontamination of both plutonium and uranium while processing metal with an average exposure of 770 MWD/T and an average cooling time of 135 days has been excellent.

The uranium recovery was good (99.5 per cent), while the plutonium recovery was lower than normal (98.9 per cent). The plutonium losses were traced to the Second Plutonium Cycle (2A Column) where many flowsheet changes were made in an attempt to determine and correct the cause of the loss. A combination of the most favorable changes made is now in use. The 2AW stream losses have been erratic with instantaneous losses ranging from 0.02 to 5.3 per cent. From the data obtained during the various flowsheet changes, it is believed that stringent flushing of the 2A Column during the next scheduled plant shutdown should result in much improved operation.

The release of radioiodine to the Redox Stack has averaged about 0.2 curie per day for the report period. A steady increase in iodine rates to the stack was noted near the end of the report period, coincident with the processing of shorter-cooled metal (approximately 110 days). A laboratory-scale "back-up" silver reactor is to be installed in the T-Plant pipe gallery to establish the benefits to be derived from the use of a second silver reactor in series with the presently installed reactors.

The new Plutonium Concentration Building (233-S) operated successfully with a minimum of operating difficulty. The product filter (L-5) of sintered stainless steel plugged and was replaced by a similar unit. The quantities of iron, chromium, and nickel in the product solution agree (within a factor of two) with the corrosion rate of the concentrator tube bundles expected by members of the Corrosion and Metallurgy Unit. It is believed that the life expectancy of the heat-transfer tubes is on the order of six months.

The auger agitator in the 241-SX-101 Tank operated continuously all month, and no bumping has been observed.

Feed Preparation

Metal charged to the dissolvers averaged 770 MWD/T (639 to 879) pile exposure, and 135 days (106 to 179) cooling time. Mercury has not been used in the dissolving step because of the extended cooling time of the metal charges. Since May 12, irradiated metal has been charged into the dissolvers containing sodium nitrate at 60°C. (vice 20°C.). The resultant reduction in heating time (and coating removal time cycle) is ca. 20 minutes

for each charge. The digestion period prior to the continuous acid addition to the dissolvers during uranium dissolution has been decreased from 60 minutes to 30 minutes since May 18, without change in dissolver operation.

All of the Head-End batches (including rework batches) were treated with 0.02 and 0.01 M $KMnO_4$ in the sacrificial "kill" and oxidation steps, respectively, followed by complete MnO_2 dissolution. Since April 30, all recycle has been added to Head-End batches prior to the sacrificial "kill" step, without apparent effect on ruthenium removal.

A total of 8900 gallons of concentrated salt waste was reworked through Head-End in 15 batches between April 27 and May 9 by blending with fresh metal solution. The blends varied from a volume ratio of salt waste to metal solution of 1:4 to 1:1.

The centrifuge was drawing excessive electrical current and was making unusual noises on May 7 due to unknown causes. The situation corrected itself and the centrifuge has since operated without incident.

Solvent Extraction Performance

Uranium recovery has been good throughout the report period, averaging 99.5 per cent. Recovery of greater than 99.7 per cent was typical of the latter part of the period. Plutonium recovery has been good except in the 2A Column, where performance has been erratic, with instantaneous waste losses ranging from 0.02 to 5.3 per cent. The overall recovery for the month has been 98.9 per cent. The following steps were taken in order to correct the 2A Column waste loss:

1. The IBS acidity was increased to 0.15 M in order to obtain acidic IBP solutions.
2. The 2AF acidity was raised to 0.2 M.
3. The 2AF sodium dichromate concentration was raised to 0.04 M.
4. Crossover oxidation was performed at 25 C. and at 50 C.
5. The extraction L/V in the 2A Column was lowered from 1.5 to 1.35, and finally to 1.2.
6. The 2AX mixing tee vent was blanked to prevent hexone losses.
7. Stream compositions (influent and effluent) were checked.
8. The 2A Column organic holdup was checked and found to be normal (10 per cent of the column volume.)
9. The 2A Column was steamed and flushed with hot 10 per cent HNO_3.

All of the above changes seemed to provide temporary improvement and the most favorable combination is now in use. A more extensive flush is planned for the next shutdown.

Flooding of the IA Column limited the plant capacity from May 13 to May 16. On May 16 the IS Column was placed in operation paralleling the IA Column without incident.

Decontamination

Decontamination for both uranium and plutonium has been excellent for the month. The following data are typical of the latter half of the month's operation.

Cycle	Gamma Decontamination Factors, dF	
	Uranium	Plutonium
Head End and First Cycle	4.5	4.0
Second Cycle	1.8	2.2
Third Cycle	0.7	1.3
Over-All	7.0	7.5

Of 78 uranium product (E-12) batches produced during the report period, 53 batches had gamma activities less than that of aged natural uranium and only four batches had more than twice the gamma activity of natural uranium.

The 3A Column interface has been maintained in the disengaging section (vice two to three feet below the top of the scrub section packing) since May 6 without any deleterious effect - possibly with slight improvement - on plutonium decontamination.

Flowsheet

The major changes made during the report period were (1) the IA Column flowsheet was altered to allow for the processing of waste rework, and (2) the Second Plutonium Cycle flowsheet was changed in an attempt to prevent further 2AW plutonium losses (see above). The Uranium Cycle flowsheet remained unchanged.

Plutonium Concentration Building

The operation of the 233-S Building has been good during the month. The unit has operated at 170 per cent of phase II rates for prolonged periods and at 220 per cent of phase II rates (600 MWD/T flowsheet) for several hours. The latter rate was shown to be the approximate capacity of the equipment, limited by vacuum in the concentrators. The average plutonium concentration in the product solution was 105 g./l. (89 to 119) and the average nitric concentration was 5.5 molar (5.0 to 6.3).

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On two occasions the concentrators were operated under slight positive pressure temporarily due to cold-side plugs in condenser cooling water supply, with no adverse effects.

The product filter element plugging frequency increased until May 9 when a complete plug developed that could not be removed by back-flushing. A new similar (sintered stainless steel) filter element was installed at that time. The new element has operated without plugging, to date, by backflushing prior to each filtration. Although the present filter has operated satisfactorily, experience at Z Plant has indicated that silicon carbide filter elements are much superior to stainless steel elements in this type of service. A letter has been issued recommending a change to the silicon carbide element.

Spectrographic and chemical analyses of the product solution have indicated the presence of 10,000 to 20,000 ppm iron, 2000 ppm chromium, 2000 ppm nickel, and 5000 to 10,000 ppm aluminum (plutonium basis). The quantities of stainless steel corrosion product impurities in the product solution agree (within a factor of two) with the corrosion rate of the concentrator tube bundles expected by members of the Corrosion and Metallurgy Unit. At these corrosion rates the heat-transfer tubes in the two vertical tube concentrators would be completely dissolved in ca. two years, and the actual life expectancy is probably on the order of six months.

The amount of recycle received from 234-5 Building Task I has decreased from 10 to 20 per cent to ca. 5 per cent by the end of the month. The reduction in recycle is believed to be at least partially due to changes made in Task I processing to overcome the effects of the high metallic impurities in the Redox plutonium product. The amount of recycle from the 233-S Building filter back-flushes has been reduced from ca. 7 per cent to ca. 2 per cent by improved operating techniques.

Iodine Problem

The average rate of radioiodine released to the Redox stack for the month was about 0.2 curie per day. The maximum input to the stack for a 24-hour period was 0.83 curie. A steady increase in iodine rates to the stack was noted near the end of the report period, coincident with the processing of shorter-cooled metal (approximately 110 days).

Development work on a continuous iodine monitor for dissolver off-gas has been completed. Detailed design of such a unit by the Design Section is in progress. A laboratory-scale back-up silver reactor has been assembled but has not yet been installed; it is to be located in the T-Plant pipe gallery.

Two of the three Redox silver reactors (A-3 and C-3) were regenerated during the month as scheduled. Each of the reactors was treated with 52 lbs. of silver nitrate in 7-molal solution. The off-gas line between the heater and Reactor A-3 became plugged about two days after regeneration and had to be

steamed out. This reactor had been installed in January 1954 and has been regenerated seven times.

Waste Storage

Coating wastes were routed to the 104-S Tank beginning April 30 due to a plug in 108-S to 109-S cascade line. The line has since been unplugged. Neutralized salt wastes began to cascade from 104-SX to 105-SX on May 11. No eruptions have occurred in 101-SX since the auger was started on April 19. The condensate flow from the 401-SX Condenser Building has decreased until it is no longer detectable on the instruments provided, indicating a marked decline in the boil-off rate.

PUREX PROCESS TECHNOLOGY

Rough draft operating procedures are approximately 95 per cent completed. Those remaining to be completed are the No. 2 Organic System and Plutonium Concentration.

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

A final review of the critical mass control methods to be used in the Purex Plant is in progress with assistance of Physics Research Sub-Section personnel. This is preparatory to issuance of the critical mass control specifications.

Effective May 16 coverage on a three-shift, seven-day-per-week schedule is being provided in order to assist in performance and diagnosis of operability and capacity tests. Six men are devoting full time to this program.

BISMUTH PHOSPHATE PROCESS TECHNOLOGY

Stack Emissions

The control of radioiodine released out the stack improved for this period. Radioiodine to the stack averaged 1.3 curies per day during the report period with a maximum of 6.9 curies on May 13 through the 3-5R dissolver system. This reactor containing U.S. Stoneware porcelain "Intalocks" was replaced with a reactor containing porous, non-glazed, berl saddles obtained from the Maurice A. Knight Co.

The 3-5R dissolver system continues to evolve approximately two to three times as much iodine as the other two dissolver systems. No differences in operating equipment can be found among the three dissolver systems except for the make-up of the four-way thermohm connector. With the 3-5R four way connector being capable of by-passing some of the off-gas around the reactor by a failure of the thermohm wells, a new connector will be installed at the earliest opportune time. Since the installation of the last reactor in 3-5R and the

lowering of the indicated entrance temperature in 3-5R to 355 F, no unusual high emissions have been observed in the charging, coating removal, or dissolution steps. Previous to these latest changes at least two emissions of greater than five curies had been observed during coating removal and another two during the charging period. To further evaluate differences in operating equipment in the three cells, watt meters are being installed to determine the amount of energy supplied to the individual cell off-gas heaters.

Neptunium Recovery

A preliminary survey of scheduling and feasibility to recover ten grams of neptunium for off-site shipment was made in accordance with an informal request of an off-site customer. This recovery of neptunium would require the processing of sixteen extraction wastes at an estimated cost of $50,000-75,000. The earliest feasible date appears to be December, 1955.

URANIUM RECOVERY PROCESS TECHNOLOGY

Summary

High RC and RE Column losses (five to six per cent each) were encountered during the early part of the report period. The losses were not brought under control until after the first cycle solvent was replaced and the RC Column flushed with ten per cent caustic. Coincident with a downward trend in waste losses, sanitary water was substituted for demineralized water in both RCX and REX. Losses have subsequently been less than 0.2 per cent.

Decontamination performance for the two-cycle plant was good with uranium product fission product gamma activity averaging 60 to 90 per cent of aged natural uranium gamma activity. Coincident with the high RC and RE Column losses, however, the first cycle logarithmic decontamination factor dropped from 3.6 to 2.6 with one RCU batch reaching a gamma activity of approximately 40,000 per cent aged natural uranium. During this period the plant operated with a very low feed inventory and tank heels containing solids and/or stagnant organic were presumably routed to the columns. Decontamination performance has returned to normal.

Metal Removal

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

Tank	Fraction	Age(a)	Average MWD/T(b)
109-111-112-BY	0.028	37	582
104-105-106-BX	0.045	44	371
105-106-108-TX	0.830	26	506
101-102-103-U	0.097	14	444

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 U farm were started on May 1, 1955. To date, the TBP Plant feed has contained up to 30 weight per cent (uranium basis) of uranium from U farm which has a minimum age of 14 months since pile discharge. Supernatant sluicing is being employed in U farm. Initial results indicate that the present U farm sludges are not as hard as those previously encountered in U farm when uranium waste stored approximately seven years was sluiced. Metal removal operations in the BX-BY tank farms are essentially complete, except for final cleanout in tanks 109 and 112-BY.

Solvent Extraction

Feed of approximate, average HW No. 6 flowsheet composition was employed to operate the solvent-extraction batteries. Variations from HW No. 6 stream compositions were those reported earlier. Flows were adjusted, as needed, to reduce the nitric acid content in product streams, to compensate for varying feed uranium concentrations, to attempt to reduce stripping losses, etc.

The average uranium losses from the solvent extraction batteries were as follows:

Period	Average Per Cent of the Feed Uranium			
	RAW	RCW	RDW	REW
4/22 to 5/5	0.4	2.1	0.4(a)	1.5
5/7 to 5/13(c)	0.5	4.0	0.06(b)	1.2
5/14 to 5/17(d)	0.02	1.8	0.05(b)	2.6
5/18 to 5/20(e)	0.09	0.19	0.03(b)	0.3

a) RDW backcycled for use as RAIS.

b) RDW backcycling discontinued; RDW sent to waste.

c) Following a dilute nitric (30 weight per cent) flush of the extraction system, and a hot (50 C) 10 per cent HNO_3, 0.1 M $Na_2Cr_2O_7$ flush of the RC column.

d) Following a hot (50 C) 10 weight per cent NaOH flush of the RC column and replacement of the first cycle solvent with new fresh solvent.

e) Following substitution of sanitary water for demineralized water in the RCX and the REX.

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As indicated in the above table the RAW losses decreased to less than 0.1 per cent following a complete replacement of the first cycle solvent with a batch of freshly prepared new solvent.

Until the first cycle shutdown and caustic flush (see below) on May 14, unsuccessful efforts were made to reduce RCW and REW losses by flow adjustments, reduction in RC Column frequency, increased carbonate scrubbing of solvent and RA Column interface jetting and RC Column overflowing. Beginning with the caustic flush on May 14 both the RCW and REW losses started a downward trend. Representative samples of this flush solution (500 ml.) contained 5 to 10 volume per cent of a dark brown organic compound which resembles interface "crud". On May 17 sanitary water was substituted for demineralized water in both the RCW and REX streams and the RCX and REW losses dropped off sharply to less than 0.2 per cent. Since the losses had started down before the sanitary water was used in RCX and REX makeup, it is not known whether the decrease in losses resulted entirely from the purging of "crud" deposits from the column by the caustic flush or from the use of sanitary water in RCX and REX. However, it is felt that the high losses were caused by the passage of accumulated cruds and/or stagnant organic through the solvent-extraction columns, since the plant operated with a very low feed inventory during the last few days of April and the first few days of May. Therefore, it is suspected that troublesome cruds entered the system. This is partially confirmed by the fact that during this period the decontamination fell off significantly (average daily logarithmic decontamination factor decreased from approximately 3.6 to 2.6) and the RAW loss increased for no other known reason.

Average decontamination data are:

	Logarithmic Gamma dF		Product Gamma Activity, Per Cent A.N.U.	
Period	First Cycle	Second Cycle	First Cycle	Second Cycle
4/22 to 4/29	3.7	1.6	2,420	56
4/29 to 5/6	3.0	2.0	15,300	92
5/6 to 5/13	3.1	1.8	5,850	96
5/13 to 5/20	3.3	1.5	2,480	78

During the past week some of the feed batches processed through the 221-U Building contained as much as 30 per cent of the uranium from 14-month-old (minimum aged) stored uranium from 101-U. This feed was processed in the 221-U Building with no apparent increase in the product activity.

Intercycle Concentration and Stripping

Daily "grab" samples indicate that the uranium losses from the intercycle stripper tower (T-8-4) averaged 0.15 per cent of the new feed uranium for the month, compared to approximately 0.15 per cent for the previous month. Reflux water (one to two gallons per minute) was used but, was not effective in giving sustained stripper tower uranium losses of less than 0.1 per cent.

On the other hand, the pooled condensate (from the feed evaporator, Section 7; the waste evaporator, Section 8; the primary 224-U Building evaporators, Cell B and D; and the intercycle evaporator, Section 8) uranium loss averaged 0.6 per cent of the feed uranium and it is assumed that the major portion of this high loss is from the intercycle stripper tower; as the long term average composite condensate loss, prior to installation of the intercycle stripper tower, was about 0.1 per cent. To insure sustained intercycle uranium losses of less than 0.1 per cent from the intercycle stripper tower, it may be necessary to make additional tower modifications (e.g., four "dry" plates instead of two).

Waste Handling

Approximately 6,700 gallons of concentrated scavenged waste per ton of uranium at an average pH of 8.8 were returned to storage for settling in 108 and 110-BY. The average compositions of the waste are summarized below:

Tank No.	Sr^{90}, $\mu C/ml$	Cs^{137}, $\mu C/ml$	Averaged dF Sr^{90}	Averaged dF Cs^{137}
9-107-BY	2.36	0.72	1.4	2.2
10-108-BY(a)	0.64	0.44	1.9	2.1

(a) First tank of scavenged waste containing calcium. Approximately 20 per cent of the tank was filled before calcium nitrate addition was started.

The disposition of these supernatants are awaiting soil column tests.

Since April 21 calcium nitrate (final waste concentration approximately 0.016 M Ca^{++}) has been routinely added to the nickel-ferrocyanide scavenged waste to improve strontium-90 scavenging. Analytical data obtained on "grab" samples taken from the calcium scavenged waste indicate a residual strontium-90 concentration of 0.3 to 0.7 microcuries per milliliter or a 4 to 10 fold improvement in strontium-90 scavenging, as a result of calcium nitrate addition.

In Line Monitors

On March 29, the control of the waste neutralization system was changed, for test purposes, from a caustic-to-waste flow ratio control system (based on a laboratory titration of a waste sample) to a direct pH control system in which an impulse from the pH meter controls the flow of caustic to the waste neutralizer. The results of the test were so successful that the automatic pH control system has remained in use.

To date, direct pH control of the neutralization system has been satisfactory with the pH being maintained within 0.2 pH unit of the desired value except during short periods when the flow of waste to the neutralizer is interrupted (sampler tank change) or during the short period when neutralization operations are being started. However, waste processing steps subsequent to the neutralization (e.g., concentration, calcium nitrate addition) appear to produce an inconsistent variation in the pH of the final scavenged solution sent to storage (pH values varying at times from 7.5 to 10.0). The operating procedures and the control system currently employed are being studied to determine whether closer control might be attained by slight equipment and/or procedure modifications.

URANIUM CONVERSION PROCESS TECHNOLOGY

Summary

Total metallic impurities, fission product gamma activity, and plutonium in product UO_3 averaged 187 parts per million parts of uranium, 96 per cent of aged natural uranium gamma, and 3 parts per billion parts of uranium, respectively. The average reactivity was 1.09 using nominal 0.05 weight per cent sulfamic acid as an additive.

Anti-Caking and Reactivity Improvement Tests

A series of six test calcinations were made using 0.08 weight per cent sulfamic acid plus 0.2 weight per cent urea (uranium basis) as pot additives. Considerable sidewall and agitator caking occurred in the first three pots which were cold when charged. On the next three test pots which were hot when filled, very little caking occurred during calcination and a significantly shorter time cycle was achieved. (8 hours 35 minutes average for cold pots as compared with 6 hours 37 minutes for hot pots.) The average reactivity ratio for the first three test calcinations was 1.28 and the average ratio for the last three was 1.25. The average ratio for three control calcinations using 0.05 weight per cent sulfamic acid (standard practice) was 1.18. The control calcinations were started-up cold. Comparison of time cycle data for these control pots with similar data for the three sulfamic-urea test pots started cold indicates an hour shorter time cycle (average 7 hours 38 minutes) for the control pots. Additional tests are planned.

Process

Evaporator E-D-1 was given a series of flushes prior to disassembly for repair. The flush sequence was: HNO_3, Water, KOH - $KMnO_4$, Water, KOH, Water, HNO_3 - Ferrous Ammonium Sulfate, and Water. After disassembly of the unit, maximum radiation at the top and bottom tube sheets was 150 mrads/hour as compared to approximately 5 rads/hour on a similar job in the past. Favorable low radiations levels probably resulted because of the flush and/or the low radioactivity of REU processed since starting two-cycle operation in 221-U Building.

On carloads 282 through 285 reactivity values as low as 1.06 were obtained. These lower reactivities are believed caused by the inadvertent addition of 0.03 weight per cent sulfamic acid instead of 0.05 weight per cent.

Current higher than normal product total-metallic-impurity analyses including a value of 312 p.p.m. on carload 286, are probably caused by:

(1) Higher than normal impurities in Redox and TBP product.

(2) Higher corrosion rates during REU concentration since higher acid concentrations exist when the system is operated with the E-B-1 evaporator only in use (E-D-1 down for repair).

(3) A leaky valve between the TBP uranium storage tank (X-1) and a new 224-U Building waste transfer line.

Product lot 3517 (approximately 94 per cent UO_3) failed to meet the 97 per cent UO_3 purity specifications because a large quantity of fine UO_3 from the bag filters and the vacuum cleaner was emptied into the product hopper without proper blending.

Equipment

First stage (5 to 60 per cent UNH) concentrator steam condensate samples from both E-B-1 and E-D-1 indicated process leaks into the steam chest with the more serious leak in E-D-1. Therefore, E-D-1 was shutdown and the entire evaporation load was shifted to E-B-1. After flushing E-D-1 for decontamination, the top and bottom sections were removed. Crater corrosion of the tube sheet welds and deep knife line corrosion of the longitudinal tube welds at the junctions between the weld and the tube were apparent. The repair required plugging 13 tubes.

An inspection of part 6 liner, removed for a Class A overhaul, revealed a one-inch long crack (depth of crack unknown) in the pot bottom. The remainder of the liner, except for vapor phase corrosion on the pot lip, appeared to be in good condition. The liner was reinstalled.

The nitric acid fractionator (T-D-4) reboiler developed two leaks apparently due to corrosion; one in the bottom plate and the other at the weld junction between the bottom and side. These were welded and the unit was returned to service following the replacement of the tube bundle gaskets.

Three unloading (X-3) wool bag filters and six ventilation (X-11) bags were replaced. To prevent nitrogen oxide fumes from reaching the X-11 filter bags via the leaky slide valves, hand operated gate valves were installed in the two Luckey pot ventilation headers. This will probably reduce the frequency of X-11 filter bag failures.

Installation of the new triangular cross-section reversible test agitator in electric pot 9 has been started. This unit is designed to minimize pot caking.

Construction of the Purex facility uranium receiving station has been started.

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

Isolation Building

Feed material consisted of low MWD/T plutonium from T-Plant only, and all product was shipped off-site as liquid nitrate. No process difficulties were encountered during this period. A supplement to Production Test 231-15, "Reduction in Sulfate Concentration" and Production Test 231-16, "Single Peroxide Process" have been issued. Work on these tests will be started as soon as the runs can be scheduled.

Flowsheets for peroxide processing in "G"-Cell, 224-T Building, are being prepared. A two peroxide strike process has been assumed but provisions for a single peroxide strike are to be incorporated. Production test 231-16, "Single Peroxide Process", should be completed at an early date to verify that a single peroxide process can be used for F-10-P solutions isolated and shipped off-site where a peroxide precipitation is employed prior to hydrofluorination.

Purification - Fabrication Building

Task I (Oxalate Precipitation)

Redox product solution was processed through this task routinely during this period. The average instantaneous time cycle has averaged about three hours. The loss to recycle decreased from about ten per cent to about four per cent when the oxalic acid and hydrogen peroxide volumes were increased to compensate for the high iron content (10,000 ppm) of the feed material. Some solids are present in the supernatant solutions. At this time, it is not known whether these solids are passing through the filter or are occurring as a result of post-precipitation.

Hot permanganate cleanouts are now being made routinely. Since they have been employed, plugged lines and slow filtrations have not been a problem.

The chemical addition systems have been converted to allow addition of the strike solutions at the top of the reactor; original equipment provided for chemical additions at the bottom of the reactor via the dip tube. With this conversion, it is now possible to add the chemicals directly from the chemical head tank to the reactor utilizing the needle valve control. Previously, it had been necessary to drop the chemicals to the transfer head tank and make manual chemical additions. Chemical addition rates are not uniform with this system; they diminish rapidly as the liquid level in the chemical head tank falls.

The Task I chemical addition system was mocked up in the laboratory using glass tubing and found to be inadequate for the chemicals involved. The decomposition of hydrogen peroxide produced enough gas to vapor-lock the 1/4 inch diameter tubing. By replacing all 1/4 inch diameter tubing with 3/8 inch diameter tubing, a self-venting system was realized. Based on these findings, it has been recommended that the chemical addition line be replaced with minimum 3/8 inch I.D. tubing, vented at all restrictions to prevent loss of head by gas accumulation.

One reactor broke during a cleanout operation. Overheating of the reactor and subsequent addition of room temperature chemicals have been established as the cause for the failure.

Task II - Hydrofluorination

The rehydrofluorination rate averaged about 30 per cent during this period. Equipment failures have been the primary cause for the high fluorination rate. The boats equipped with liners gold-soldered to the Hastelloy C bodies continue to operate very satisfactorily. Although re-hydrofluorinations have been encountered using these boats, equipment failures have

been considered the major cause. It is now planned that all boats will have the liner gold-soldered to the body since their operation has been more satisfactory than the conventional boats.

Task III - Reduction

Reduction yield for this period averaged 97.7 per cent. Sticking of the button to the crucible continues as a major problem but at month end seemed to be lessening. The ram of one furnace was modified by putting an insulating material on the head that would reduce the conduction of heat away from the pressure vessel. A run made in this furnace using iodine in the charge and applying heat for 3 minutes after firing occurred, produced a button that separated from the crucible quite easily. Subsequent to this, runs have been made utilizing this ram and the power hold after firing with good results. Indications are that the additional heat is contributing to the production of satisfactory material.

A series of buttons produced during this period had abnormally high gamma emissions. Normal production gives radiation readings of 80 to 150 mr/hr, but the series of high buttons gave readings of 170 to 410 mr/hr. The source of the gamma emitter is not known since Redox C/AT data did not show shipment of any material having high gamma emission. Qualitative measurements indicated the gamma emission to be about .6 to 1 mev and from this, it has been concluded that zirconium-niobium contamination probably caused the high radiation readings.

Final Inspection

Inspection operations were normal for the month. Non-uniform flow of material to inspection h as caused a 6-day operation during this month.

234-5 DEVELOPMENT

Filtration of Redox PR Solution

When trouble was encountered in the 233-S Building with plugging of the in-line, PR solution filter, a run of unfiltered PR solution was obtained and subjected to a series of experiments which gave the following results:

1. The solution contained 79 per cent plutonium (VI).

2. A sample of the solution readily passed through a coarse grade, fritted glass funnel (40-60 micron pore size) but rapidly plugged a medium grade funnel (10-14 micron pore size). No visible solids could be isolated. Evaporation of the solution to a plutonium concentration of 343 grams per liter made no improvement in its filterability.

3. Samples of the unfiltered and filtered (medium grade fritted glass, with filter aid) PR solution were processed into metal by the oxalate process. Gamma analyses showed a) little or no decontamination by filtration; and b) decontamination factors (solution to the metal) of 6.6 and 10 or more for zirconium-niobium and ruthenium, respectively.

Task II - Continuous Process

Plutonium runs with the vibrating tube reactor are continuing, with the object of accumulating operating time and experience with the equipment. These runs have provided the opportunity of demonstrating that rapid and excellent calcination is obtained by the use of a shallow, rapidly moving reactor bed; while longer residence times, achieved by the use of a deeper, more slowly moving bed, are necessary for adequate hydrofluorination. An adjustable damping mechanism has been devised for the suppression of extraneous vibrations in the system.

A continuous drum filter and drier-calciner are being prepared in the technical shops for the coupling of Task I to the continuous Task II equipment.

Recuplex - Laboratory Work

From small-scale dissolution studies with slags produced in the reduction-casting of plutonium in the new Task III equipment, it now appears that the slags will have to be crushed (to 20-200 mesh particle size) in order to achieve flowsheet dissolution times (1-2 hours). A slag containing no calcium iodide, and broken up to 2-3 mesh particle size, dissolved at the rate of eight per cent per hour. A slag containing five mole per cent calcium iodide (from a reduction with 0.1 mole iodine per mole plutonium) dissolved at the rate of about 15 per cent per hour.

Laboratory studies of valence adjustment procedures in oxalate supernatants have shown that:

(1) In solutions containing no iron, 2.5 M or less nitric acid, and 0.5 g/l plutonium, the plutonium(VI) is rapidly reduced by hydrogen peroxide but forms a relatively stable plutonium(III) solution. The latter needs additional treatment, such as the addition of sodium nitrite, for quick conversion to the desired tetravalent state. The preparation of plutonium(IV) is more rapid at higher acidities and plutonium concentrations.

(2) In solutions containing 0.1 M iron, 2.5 M H^+, and 0.5 g/l plutonium, plutonium(III) and (IV) are oxidized to plutonium(VI) by hydrogen peroxide.

Recuplex flowsheets C-9 (recovery: 0.23 g/l Pu in feed, 20 g/l Pu in product) and C-11 (coupling: 19.4 g/l Pu in feed, 80 g/l Pu in product) were tested in the laboratory pulse columns. The results appeared satisfactory, although analyses have not yet been obtained and the C-11 run was stopped before the column inventory became high enough to give 80 g/l Pu in the product. The columns were shut down with full inventory for three days and then started up again, only the C-11 run running into any difficulty (from emulsification in the stripping column). Flowsheet C-9 was tested, with good results, with aqueous feed containing unfiltered aluminum nitrate solution from Redox, and with used, unwashed solvent.

RECUPLEX FACILITY

Acid runs through feed make-up solvent extraction, and waste neutralization equipment, in progress throughout the month, are now near completion.

The cartridges originally installed in the extraction columns (dual-faced plates 1/16 inch holes) have been replaced with nozzle-plate cartridges. Flooding velocities have been measured with the nozzle plates and found to permit ca. 25 per cent greater volume velocities than the dual-faced plates.

The stripping column cartridge has been replaced with uncoated plates and gives excellent performance.

The cold shake-down runs have been effective in revealing equipment problems, most of which have now been corrected. Highlights of repair maintenance during the month are the following:

(1) All agitators have been balanced and re-installed.

(2) Solid polythene ring gaskets have replaced the Chemseal gaskets at glass column joints, and no further leaking has developed.

(3) One Chempump failed. This, and two others also in column pump-out service were replaced with Eastern pumps to provide a more adequate supply of Chempump spares. The start-up maintenance items are estimated to be 80 per cent complete.

CHEMICAL DEVELOPMENT SUB-SECTION.

PUREX DEVELOPMENT

Chemical Engineering Development

IA Column Scrub-Section Capacity. Nineteen Purex IA Column scrub-section flooding studies using "cold" uranium were made during the month with a one-inch-diameter glass pulse column. These studies are the first of a series to be made to determine the reason for the relatively wide variations noted in previous HA and IA Scrub and IB Extraction Column flooding capacities. Decreased uranium concentrations in the organic phase resulted in an increased throughput capacity, as shown by the following comparison (based on data obtained with one uranium-bearing solvent batch):

G. U/L. In Feed-Point Organic Phase	Complete Flooding Capacity,(a) GPH/Sq.Ft., Sum of Flows
88	620(b)
62	>1000(c)

Notes: (a) 0.65-in. pulse amplitude, 40 cyc./min.
(b) No local flooding observed.
(c) Cyclic local flooding threshold: 650 gal./(hr.)(sq.ft.), sum of flows.

Separations Equipment Development

Pulse Generator Development. In line with changes proposed for the Purex Plant pulse generators, the diameter of the weep hole in the Purex Plant pulse generator being tested on the prototype HA Column in 321 Building was reduced from 3/32 inch to 3/64 inch. Leakage of process solution past the piston under simulated operating conditions was satisfactorily reduced from approximately 0.6 to 0.2 gal./min., or less. With the 3/64-inch-diameter weep hole, air was introduced under the piston at a pressure sufficient to balance the column contents, thereby preventing leakage during shutdown of the column. Results were very satisfactory, with only three standard cu.ft./min. of air required to maintain the balance.

A small (Size No. 1) Purex Plant pulse generator (No. 202A PG-JH-0.S.) was obtained from spare parts and installed for testing on the 321 Building prototype 2A Column.

HOT SEMIWORKS PUREX STUDIES

Hot Semiworks Runs PX-1 and PX-2 processing full Hanford level irradiated slugs were completed during the month. The primary objective of these runs was to demonstrate satisfactory performance of the HW #3 Purex Flowsheet in the Semiworks equipment. Mechanical performance of the equipment was very satisfactory with no major equipment piece failures. In general waste losses were on the order of 0.2 per cent or less; however, the decontamination factors in the HA and IA Columns failed to meet flowsheet specifications. Possible reasons for the approximately 10-fold low decontamination factors, particularly in the IA Column, are being investigated at the present time. Process Chemistry laboratory tests indicate that the Semiworks solvent is satisfactory and have revealed no evidence of emulsions or colloidal solids in the process solutions.

REDOX DEVELOPMENT

Process Chemistry

Plutonium Waste Losses in the 2A Column. Abnormally high plutonium waste losses (greater than 1%) occur periodically in the Redox Plant 2A Column. Batch contacts of portions of plant 2AW, produced during periods of high loss, with equal volumes of fresh 2AX give plutonium distribution ratios (E_a^o) ranging from four to 20. Plant samples of 2AF obtained during periods of high waste loss were mixed with 0.5 volume of plant 2AS and contacted five successive times with equal-volume portions of reagent 2AX. Plutonium remaining in the aqueous phase was, in all cases, less than 0.05 per cent of that in the 2AF. These results indicate adequate extractability of the plutonium and point to some physical condition (such as poor phase contact) as the cause of the high waste losses.

Chemical Engineering Development

Cold Semiworks Thiosulfate-Scavenging Studies. Five "cold" pilot-plant tests of thiosulfate-scavenging head-end treatment for Ru decontamination were carried out during the month, employing non-radioactive ruthenium chloride. The procedure which was developed jointly with Process Chemistry was as follows: (a) Sodium thiosulfate was added to a simulated Redox dissolver solution; (b) the solution was digested at 65°C.; (c) sodium dichromate was added to the solution which was (d) then oxidized at 90°C., cooled, and finally, (e) centrifuged. Highlights of the new findings are as follows:

1. Oxidizing the solution with dichromate before -- rather than after -- centrifugation yields a centrifugate free of finely divided free sulfur. Centrifugates containing less than 0.01 g./l. of free sulfur were consistently obtained.

2. With the procedure described above (oxidation before centrifugation), the cake volume was about one-tenth of that obtained with the earlier oxidation-after-centrifugation procedure.

3. It was found that melting of precipitated sulfur (melting point 120°C.) on steam coils did not result in crusting of the coils with sulfur. The melting was done with 120 lb./sq.in.ga. (175°C.) steam with no liquid in the tank. The coils were inspected, and found free of crust, after a feed-solution treatment step carried out after the melting.

4. Agitation by air sparging was insufficient to prevent the formation of large particles of precipitate when a large excess (0.1 M vice 0.033 M) of $S_2O_3^=$ was added. However, an agitator did prevent the large particles from forming.

5. No operating difficulties were encountered when an acid (rather than an acid-deficient) digester solution was used.

Separations Equipment Development

Agitator Development. A preliminary design has been completed for a replacement agitator for the Redox Plant. The major difference between this and the present agitators is in the use of a larger (4-inch-diameter) shaft and the elimination of the submerged bearing. It is planned to fabricate one 7-1/2 Hp. prototype agitator of this design for test purposes.

One Redox Plant agitator A-108, a 7-1/2 Hp. model, is being procured from spare parts for testing. The unit will be subsequently dismantled and the motor and gear box used in the fabrication of the test agitator mentioned above.

URANIUM RECOVERY DEVELOPMENT

Process Chemistry

High Uranium Losses in Uranium Recovery Plant RC and RE Columns. During the month, high uranium losses occurred in the Uranium Recovery Plant RC and RE Columns. Dispersion, uranium transfer, uranium distribution and miniature pulse column tests made on plant RCW, REW and ROO solvents gave no indication of poor solvent quality. Also, miniature pulse column studies using plant RDW as RAS and plant feeds (including dilute feed from the BX farm) as RAF indicated that neither backcycle of RDW nor contaminants from tank farm feeds currently used was responsible for the high uranium losses.

Considerable "crud" was removed from the RC Column by a NaOH flush. The crud was not soluble in water but was readily soluble in acetone and methanol. The residue after ignition was readily water soluble.

Recently, sanitary water has been substituted for demineralized water in the RCX and REX. Following this change, uranium losses in both the RC and RE Columns dropped to, and remained at, satisfactorily low levels. While there may be no connection between the decreased waste losses and the change to sanitary water, this possibility is being investigated since the ion-exchange material in one of the cation beds was changed recently. Studies of the effect of the demineralized water on stripping column performance are underway.

Reduction of UO_3. Studies of the rate of reduction of UO_3 produced in the 321 Building continuous calciner were continued using the recently installed thermobalance. The following information was obtained:

1. Ninety-eight per cent complete reduction of some continuous-calciner UO_3 powders in as little as 1.5 minutes was obtained when the powders were ground to pass a 325 mesh screen and reduced at 575°C. About one minute at 575°C. was required for 98 per cent reduction of UO_3 powder produced in the 224-U Building.

2. An induction period preceding rapid reduction was found for continuous calciner powders both ground and unground. No similar induction period was noted for 224-U Building UO_3.

A monel reactor and necessary supporting equipment is being installed on the thermobalance to permit study of the hydrofluorination as well as the reduction cycle.

Continuous Calcination

The 16-in. diameter semi-plant scale continuous calciner was operated with a feedpoint powder temperature of 450°C., which was 100°C. above the highest temperature used previously. The reactor was operable at a rate of 50 to 60 lb. of UO_3 per hour with maximum shell temperatures in excess of 700°C. Product quality data are not yet available. An off-gas filter containing 8 sq.ft. of 250 x 30-mesh Dutch-twill calendered stainless steel cloth was tested successfully during the run.

Further development studies of continuous calcination will be directed toward increasing the reaction rate of the continuously-produced UO_3 in the hydrogen-reduction step.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

Process Chemistry

Waste Treatment. Decontamination of Uranium Recovery Plant Wastes. Further studies on the pH change obtained when calcium nitrate is added to neutralized, concentrated Uranium Recovery Plant aqueous wastes were made to provide operating data for the plant. The calcium nitrate addition step has been added to the scavenging procedure in the plant to improve strontium removal. Grab samples taken from the plant scavenged-waste stream have strontium concentrations ranging from 0.2 to 0.5 μc./ml. and indicate strontium removal improvement (a factor of five over that obtained without calcium) comparable to that predicted from laboratory studies.

Search for strontium scavengers alternate to calcium has continued. The most promising so far found is strontium nitrate. Earlier studies on the use of strontium as an isotopic diluent indicated no improvement, and in some cases a decrease, in radio-strontium decontamination when inert strontium was added in amounts up to 15 times the total strontium calculated to be present in the wastes. However, recent studies showed that, at higher concentrations of strontium (where precipitation of strontium compounds would be expected), removal of radio-strontium was markedly improved. In laboratory experiments, residual radio-strontium concentrations of about 0.3 μc./ml. were obtained when the usual nickel ferrocyanide scavenging was supplemented by the addition of 0.004 mole of strontium nitrate per liter of waste. This is considerably less than the 0.03 M calcium nitrate required to achieve the same residual radio-strontium and would result in the need to store less solids. Other advantages of strontium over calcium as a scavenger are (1) it may be added either before or after neutralization of the waste and (2) it appears less sensitive to pH than calcium. Scavenged samples are now being prepared for soil column studies to determine the effect of the residual inert strontium on soil retention of radio-strontium.

Separations Equipment Development

In-Line Chemical Instrumentation

An analysis of the performance of the in-line chemical instruments installed in the Hot Semiworks has shown that the instruments are very useful in the experimental program but that a further substantial development effort is required for the improvement of the sensing elements and consoles. Component failures have been numerous, particularly solenoid valves and switching mechanisms. The failures and shortcomings of the instruments are being analyzed to provide design data for future development work. At present, most of the effort has been placed on making field repairs on the instruments in order to keep them in operation. In general, the laboratory analyses and monitor results have been in agreement. Sampling of the process tanks has been satisfactory to date.

An installation in the 321 Building for testing new pH sensing units and control systems under process sampling conditions has been completed. A new sensing unit design which is a flow-type cell rather than the present surge-type cells used in the Uranium Recovery Plant and at the Hot Semi-works will be tested as soon as the electrodes are received from the vendor.

$BiPO_4$ Centrifuge Studies. An investigation was undertaken using a 12-inch-diameter centrifuge to determine whether there was any noticeable probability that a $BiPO_4$ centrifuge cake would assume an uneven distribution in the centrifuge during any of the possible operational manipulations, including those due to error or equipment failure. A variety of $BiPO_4$ precipitates were formed and deposited as cake. Granular precipitates, formed by proper operating procedures, settled readily, slurried easily, and showed no tendency to agglomerate.

A sticky, colloidal precipitate, formed by a reverse strike in the cold with no digestion, forms a cohesive centrifuge cake that is difficult to remove. Since it was shown in the 12-in.-diameter centrifuge that this material can form in a "heap" under certain off-standard conditions, a substantial relaxation of batch size limits in the $BiPO_4$ Plants will probably not be recommended at present.

CHEMICAL RESEARCH SUB-SECTION,

PUREX

Continuous distillation experiments simulating the operation of the Purex No. 1 acid concentrator were performed to determine the effect on ruthenium volatilization of:

1) dissolved solvent (30% TBP-70% Soltrol 170) in the nitric acid feed,

2) nitrous acid in the solvent-saturated nitric acid feed,

3) a vented condenser, and

4) a dry de-entrainment section, this condition being achieved by heating the de-entrainment section of the apparatus to a temperature sufficient to prevent condensation.

The nitric acid residence time in these experiments was ca. 9 hours and the bottoms acidity, 6.9 to 7.6 M HNO_3.

The results obtained may be summarized as follows:

1) Operation with a dry de-entrainment section results in a marked increase in entrainment. Decontamination factors (bottoms/distillate) observed for cerium were only 1×10^3 to 5×10^3 with the heated de-entrainment section versus 1.5×10^5 with the de-entrainment section at ambient temperature.

2) With a dry de-entrainment section the presence of organic in the nitric acid feed results in only slightly greater volatilization of ruthenium than is obtained with 0.26 M nitrous acid in the feed. Ruthenium decontamination factors, corrected for entrainment, were 760 for the case of an organic-saturated nitric acid feed containing no nitrous acid and in the range 960 to 1.4×10^3 for organic-saturated nitric acid feeds containing ca. 0.26 M nitrous acid.

3) Operation with the de-entrainment section at ambient temperature and with an organic-saturated nitric acid feed containing 0.26 M nitrous acid yielded a total ruthenium decontamination factor of 5.3×10^4. In this case the apparatus was vented downstream from the condenser. This result may be compared with that obtained in an earlier experiment in which continuous distillation in a closed system of an organic-free solution containing 0.24 M nitrous acid yielded a ruthenium decontamination factor of ca. 7×10^3.

From these results it is inferred that the presence of dissolved organic in the nitric acid feed to the No. 1 concentrator will not interfere with the suppression of ruthenium volatilization by nitrous acid and may actually be beneficial in suppressing ruthenium volatilization. Also, it appears that loss of nitrogen oxides to the No. 1 concentrator vent system will not detract from the suppression of ruthenium volatilization by nitrous acid.

Further studies will have as their objective the detailed study of the effects of dissolved organic on volatilization and elucidation of the origin of the increased ruthenium volatilization observed with the heated de-entrainment section.

An experiment employing an equilibrium still was performed to determine the feasibility of preventing the volatilization of ruthenium by formation of phosphate complexes. In this experiment nitric acid was distilled from 10 M H_3PO_4 bottoms. Ruthenium volatilized to about the same extent as found in previous studies with nitric acid. The gamma decontamination factor decreased to a steady state value slightly less than 200 in ca. 19 hours and stayed at this value for the remainder of the run (ca. 24 hours). No data have yet been obtained to permit the degree of entrainment to be computed, but there is little doubt that ruthenium distilled since a visible deposit of ruthenium appeared in the condenser.

To estimate the DBP formed in the 2A column, TBP hydrolysis experiments were performed at 50 C and 70 C covering a range of acidities. Approximately 4 ppm DBP will be formed in the 2A column solvent for an exposure of one hour to extraction conditions at 50 C. The rate of DBP formation was found proportional to the square root of the nitric acid concentration (organic) and independent of nitrite concentration. Plutonium was not present in these tests. These data indicate that approximately 0.5 to 0.6 percent of the plutonium might remain with the 2BW; however, the experience in the Hot Semi-Works has shown the product loss to be far below the above estimate.

Solvent purification by steam distillation is being tested to find a positive clean-up procedure. A sample of poor quality Uranium Recovery solvent from 386 Tank was distilled at 180 C with steam. Constant pot volume and continuous feed addition were employed. With 94 percent recovery (TBP) a decoloration factor of 16 was obtained, and the uranium distribution "C" test was reduced (improved) a factor of four. The "C" test was 0.018 at 80 percent recovery. Further effort is under way to find conditions which will consistently yield a reusable solvent.

The high irradiation field in the Purex waste tanks will result in the decomposition of water with the formation of gas. Calculations are in progress to estimate whether an explosive mixture can be formed. A half-filled tank may form 15 to 30 moles of hydrogen per minute which could occupy ten percent of the free volume in one day. Water vapor is expected to displace the released

hydrogen and continuously purge air from the system, thus reducing the explosion hazard. The release of oxygen by decomposition of water is less predictable and depends on the mechanism involved. Dissolved organic compounds will react with free radicals or hydrogen peroxide, the oxygen forming intermediates. In any case, the oxygen is of such low concentration that fast reactions with a separate organic phase are not likely.

THOREX

Further studies have been made to determine the feasibility of processing irradiated thorium in the Redox plant.

Batch countercurrent studies were made to determine the degree of separation of U-233 from Th-232 which would be possible in the existing Redox 2A column. Partition would be accomplished in this column by selectively extracting U-233 out of an acid-deficient aqueous phase into hexone. The purpose of these runs was to determine the effect of feed acidity on U-233 recovery and partition from thorium. The flowsheet tested was substantially that employed in the ORNL pilot plant studies of this operation and was as follows:

Feed: 1.55 M $Th(NO_3)_4$, 0.02 M HF, pH variable; Relative Flow: 100
Scrub: 1.0 M ANN, ~0.2 M HNO_3; Relative Flow: 25
Extractant: Neutral Hexone; Relative Flow: 125

With five extraction and five scrub stages, the thorium decontamination factor, from the aqueous feed to the U-233 (organic) product, was only 84 with a feed pH of 0.6 but was greater than 7×10^4 with a feed pH of 1.3. Distribution coefficients (organic/aqueous) for uranium in the extraction section were in the range 6.5 to 7.8 with a feed pH of 0.6 and 4.5 to 5.0 with a feed pH of 1.3. Assuming an HTU of 2.7 feed for this system in the present Redox 2A column, a distribution coefficient for uranium of 4.7 or greater would be required in the extraction section to obtain a U-233 recovery of 99.9 percent or greater. Thus, this flowsheet with a feed pH of 1.3 may be marginal with respect to U-233 recovery in the existing Redox 2A column.

Further studies will determine the effect on U-233 recovery and partition from thorium of feed pH's between 0.6 and 1.3 and will determine the effect of feed pH on fission product decontamination in this column.

The decontamination potential of thorium solvent extraction cycles employing hexone has been examined in a series of full-level batch extraction-scrub studies employing as feed 200-day-cooled, 3200 g/T material. The results obtained may be summarized as follows:

1) Adequate separation of thorium from protactinium and from fission products other than ruthenium can probably be effected by use of phosphate as a complexing scrub. A batch extraction of thorium

from an aqueous solution 0.4 M in Th, 2 M in ANN, 0.02 M in H_3PO_4, and 0.01 M in HF into hexone 1 M in HNO_3 (organic/aqueous volume ratio = 2/1), followed by two successive scrubs of the organic extract with 2 M ANN (organic/aqueous volume ratio = 5/1), followed by stripping into water (organic/aqueous volume ratio = 1/1), resulted in an over-all decontamination factor of 590 for Zr, >490 for Pa, and $>1.1 \times 10^4$ for Ce. This procedure resulted in recovery of ca. 50 percent of the thorium in the initial feed.

Using the same procedure but employing hexone 0.5 M in HNO_3 and using 0.05 M H_3PO_4 in both the extraction step and the two scrub steps, over-all decontamination factors of 1.6×10^4 for Zr, 2.4×10^4 for Pa, and greater than 6×10^3 for Ce were obtained. Thorium recovery in this case was ca. 60 percent.

2) The necessity for use of high salting strengths and acidified hexone to effect thorium extraction into hexone will result in very poor ruthenium decontamination in thorium extraction cycles. The conditions employed in the experiments cited above result in ruthenium distribution ratios equal to or greater than those for thorium, implying that hexone flowsheets capable of yielding quantitative recovery of thorium may also yield quantitative recovery of radioruthenium.

Further decontamination studies of thorium extraction cycles employing hexone as the solvent will obviously have as their objective the improvement of ruthenium decontamination. The possibility of increasing ruthenium decontamination by reduction in the column or in a feed pretreatment step will be examined as well as the possibility of removing ruthenium in a head-end step.

Since precipitation of thorium oxalate is the first step in current thorium metal preparation flowsheets, the possibility of accomplishing some decontamination of thorium in this step has been examined. It was found that rather impressive decontamination of thorium from ruthenium can be effected by slow precipitation of thorium oxalate from heated solutions. Precipitation of thorium oxalate from the strip solution resulting from the first of the above-mentioned extraction-scrub experiments gave decontamination factors of 240 for ruthenium but only 1.6 and 4.0 for gross gamma and beta activities. Decontamination from other fission products is improved by precipitating thorium oxalate from fluoride-containing solutions. Precipitation of thorium oxalate from the thorium product solution resulting from the second of the above-mentioned extraction-scrub studies, with the thorium solution made 0.01 M in hydrofluoric acid before the precipitation resulted in a decontamination factor of 270 for ruthenium, 140 for gross gamma, and 50 for gross beta.

Thus it appears that a considerable fraction of the over-all ruthenium decontamination factor of ca. 1×10^3 necessary for the thorium stream could be obtained

by a tail-end precipitation of thorium oxalate. However, such an operation would require shielded precipitation and centrifugation equipment and the difficulty of dissolving thorium oxalate would complicate the problem of reworking off-standard thorium products.

Rates of dissolution have been compared for cold thorium and irradiated thorium under identical conditions in the same apparatus. The irradiated metal used was irradiated to 1200 MWD/AT and had been cooled 100 days. Employing 13 M HNO_3, 0.03 M HF as the dissolving medium and dissolving to a 200 percent heel, rates of dissolution were only slightly different, the irradiated metal dissolving slightly more rapidly. This contradicts results reported by KAPL in which it was found that irradiated metal dissolved more slowly.

Further studies have been made of scavenging with manganese dioxide as a means of recovering protactinium from short-cooled Thorex feeds. The protactinium-carrying capacity of manganese dioxide was tested in three successive scavenger precipitations of 0.05 M MnO_2 out of a solution 1 M in Th, 1 M in HNO_3, and 0.01 M in HF prepared from thorium metal irradiated to 1600 MWD/AT (ca. 3200 g/T) and cooled 200 days. Excellent protactinium carrying was obtained, the protactinium decontamination factors being, respectively, 220, 6, and 1 in the three successive scavengings, or a total of 1.3×10^{3} through the three precipitations. These results may be compared with previously reported results obtained in an identical experiment with the same metal but cooled only 100

This effect is much less pronounced with 200-day-cooled feeds. An identical experiment with 1200 MWD/AT metal cooled 200 days gave an initial protactinium decontamination factor of 140, which increased over 13 hours to a maximum value of 340, then decrease slowly, reaching values of 190 and 120 at 114 hours and 133 hours, respectively.

It is planned to study the effect of nitrite suppressors on the stability of manganese dioxide in radiation fields. Previously reported results from pile basin irradiation studies indicate that nitrite suppressors are effective in reducing the rate of dissolution of manganese dioxide in a radiation field.

U-233 Precipitation Process

A second 1# full-level run was carried out during the month. In this case, 200-day-cooled, 1600 MWD/AT material which had been subjected to a triple scavenging with manganese dioxide was used as feed. The flowsheet was also somewhat modified in that the lanthanum fluoride by-product step was carried out prior to the LaF_3-UF_4 product precipitation. The product cake from the latter was then methathesized with aqueous potassium hydroxide to remove fluoride and facilitate solution in nitric acid.

Again, ruthenium proved limiting and was the only activity detected by gamma-scan of the product. Over-all decontamination factors through the manganese dioxide head-end and precipitation cycles were 600 for ruthenium, 3.7×10^4 for gross beta, and 4.5×10^4 for gross gamma. On the basis of a gamma-scan detection limit of five percent of the total gamma activity, lower limits for decontamination factors can be set at 5×10^5 for Pa, 10^6 for Zr-Nb, 2.5×10^5 for Ce-Pr, and 10^5 for Cs-Ba.

Consultation with technical personnel regarding the capacity of a Bismuth Phosphate plant for processing thorium gives reason for optimism that a processing rate of 50 tons Th/month could be obtained. However, it is probable that such a rate could be met only by using canyon equipment only for extraction and hydroxide concentration cycles and handling the fluoride cycles in Building 224 equipment. Principal areas of uncertainty are the handling characteristics of thorium oxalate precipitates (i.e., ease of slurrying as it relates to time cycles in this step), whether decontamination across the hydroxide cycles will be sufficient to permit product transfer to the 224 Building, and U-233 losses in the hydroxide and fluoride cycles. The latter two questions are the subject of current laboratory investigations.

SILVER REACTOR

The effect of ammonia on the efficiency of the silver reactions used in the separations plants for removing iodine from the dissolver off-gas is being studied. Ammonia gas at elevated temperatures reacts with the following substances to form volatile compounds: silver nitrate, silver iodate, and silver

nitrate plus 45 percent equivalent iodine. No reaction occurs with silver iodide. When the reaction with silver nitrate is conducted at 190 C, a white, crystalline, silver-containing substance deposits in the cold portion of the apparatus. This product is indicated by x-ray diffraction patterns to be $AgNO_3 \cdot 2NH_3$. The reactions with silver iodate and with the silver nitrate-iodine mixture commence below 190 C, but the white sublimate is first observed at this temperature. The reaction becomes quite violent as the temperature is raised to approach 360 C. The white substance from these latter reactions is believed to be $AgI \cdot 1/2\ NH_3$, based on x-ray diffraction and chemical evidence. In all cases water is also formed as a reaction product. The volatile ammoniates are unstable in air and decompose as soon as the ammonia atmosphere is removed; however, as little as five percent ammonia in air at 170 to 200 C will prevent this decomposition. Ammonium nitrate heated with silver iodate results in the evolution of iodine gas.

An intensive study of the silver nitrate-iodine vapor reaction is under way. When air saturated with iodine vapor is passed through a solid bed of silver nitrate at room temperature, the reaction proceeds with the release of nitrogen dioxide fumes. At higher temperatures the evolution of the brown fumes is intensified. Two distinct color bands appear in the silver nitrate when the reaction is carried out at 70 to 90 C. The first band is yellow, and the second is tan. These colored zones could be mixtures of silver iodide and iodate. If these are the actual compounds, analysis indicates that their ratio in both bands is about the same, five to one. From a reaction at 150 C, the two bands could not be separated, but the mixed product yielded an iodide-iodate ratio of seven to one, indicating that higher temperatures favor iodide formation over iodate. The two bands in the 70 C experiment showed different silver nitrate utilization. Further work will elicit the exact chemical species involved in these reaction zones.

Experiments at 150 C or higher are complicated by the formation of low melting product mixtures. Thus with five percent equivalent iodine reacted with silver nitrate the melting point is lowered from 210 C to 196 C. With 25 percent the initial melting point is 142 C and final solidification at 84 C. With 50 percent the liquid super-cools to room temperature without crystallization. However, in a simple tube reactor at 150 C where melting had occurred there was no tendency of the low melting material to drip or run off.

In view of the foregoing reaction of silver nitrate and silver iodate with ammonia, it may become desirable to remove ammonia from the dissolver off-gas stream before it reaches the silver reactor. Further, it may become advisable to lower the temperature of the reactor such that no portion of the reactor will ever exceed 160 C.

FLUREX

The double fluoride of sodium and uranium was prepared in a very successful 48-hour run in the 1/2 kg/day Flurex cell. The mol ratio of sodium to uranium in the product was about two, or nearly twice the ratio found in the same salt prepared by chemical reduction.

Bomb reduction of this material resulted in metal yields of 60 to 70 percent, and the coalescence characteristics were poor. The high sodium content of the salt may be responsible for these undesirable reduction characteristics, although it is unlikely that it is a simple concentration effect. Flurex preparation of the double salt with sodium to uranium ratio approaching one will be attempted.

The potassium to uranium ratio of the Flurex-produced potassium uranium fluoride discussed previously was 1.3 which agreed well with the ratio determined for the same salt produced by chemical reduction. As may be recalled, neither of these salts underwent bomb reduction satisfactorily.

ISOTOPE

Chemical exchange in the system uranium(IV) resin-uranium(IV) chloride was found to occur with a half-time of about three hours. The exchange rate is thought to be diffusion controlled, and experiments with lower cross-linked resin will be performed to verify this conjecture.

Continuation of experiments on the tartrate elution of plutonium(III) from Dowex 50 defined the conditions for elution under near equilibrium conditions. These were 0.05 M tartaric acid neutralized to pH 3.3 with ammonium hydroxide, a flow rate of 0.2 $ml/cm^2/min$ and a temperature of 80 C. The resulting elution curve gave rise to a stage height of about two centimeters and a distribution ratio of about 80.

The 500-cycle zone melting run described in the April Progress Report was successfully completed from the operational standpoint; however, no significant isotope separation was obtained.

A new approach to isotope separation (tentatively called isoelectromigration) makes use of the fact that in some complexing systems, UO_2^{+2} may form cationic, neutral or anionic species depending on the pH. If a band of UO_2^{+2} in a properly buffered complexing system is established in a cellulose packed column and an electrolytic process initiated, the pH will be found to increase at the cathode and decrease at the anode. This will result in a pH gradient across the column which, in the region of the uranium, will be very flat because of the uranium buffering. Because of this pH gradient, the uranium will be preponderantly the cationic species near the anode, the anionic species near the cathode and the neutral species in between these regions. Under the

influence of the electric field, the cationic species will migrate toward the cathode and the anionic species toward the anode, but because of the effect of the pH gradient, conversion to the neutral or oppositely charged ion will occur before either species can leave the packed section. The net result is a countercurrent electromigration process contained in a fixed region by reason of the pH restrictions on the ionic equilibria. It is believed that such a system offers opportunity for many cycles of chemical exchange to occur which may result in an increase in concentration of the lighter isotope in regions of higher pH. At present, an investigation is under way to determine the systems and conditions necessary for experimental demonstration of this idea. The complexes of tartaric, malic, glycolic and benzene m-disulfonic acids were examined with respect to solubility, stability, and tendency to polymerize. Titration curves were also obtained to establish buffer conditions.

ANALYTICAL DEVELOPMENT.

The effect of fission products as interfering elements in the polarographic determination of uranium in Purex process first cycle waste streams was studied. From the standpoint of concentration in the HAW or 1AW streams, only cerium and ruthenium are likely possible interfering elements. These two elements were studied polarographically, and it was found that ruthenium but not cerium would yield a polarographic reduction wave in the range of -0.1 to -0.3 volts and, therefore, appear on a uranium polarogram. At ruthenium fission product concentrations, however, the interference becomes significant only at very low uranium concentrations. Thus, a lower limit for uranium of about 10^{-4} molar is attained in some Purex streams.

In the development of a spectrographic water analysis method, working curves were made up for six elements; copper, iron, aluminum, chromium, nickel, and zirconium. The evaluation of recovery and precision data for each element by the combined procedure of ion exchange concentration and spectrographic analysis is under way. Variable results have been obtained for copper, but this was caused by incomplete regeneration of the ion exchange column between runs, and more reliable washing procedures are now being used. Zirconium is eluted in a different fraction from the other elements, and some variation in the position of the zirconium band has been found. This may not be a serious problem, but it may reduce the concentration factor for zirconium by a factor of two.

The development work on a spectrographic method for gallium in plutonium alloy was discontinued when it was determined that the precision of the method on 234-5 laboratory equipment would be limited to about ±10 percent. The method introduced earlier for gallium in nominally pure plutonium was improved slightly and is meeting the current requirements. The method is based on ether extraction of gallium chloride from a strongly acidic chloride solution with the plutonium reduced followed by the copper spark excitation of an aliquot of the organic phase.

Assistance to 234-5 process analytical personnel was given in setting up detailed purchase and performance specifications for an automatic spectrograph (Quantometer). After subsequent consideration the manufacturer concluded that he could not guarantee meeting all of these specifications, and as a result, the pending order has been canceled. The main problem on the Quantometer was meeting the desired precision specifications in a uranium isotopic analysis, and this is also the greatest potential source of economic benefit with the instrument. Current research at HAPO on hollow cathode excitation methods may result in the stability needed for this uranium isotopic analysis.

The study of uranium fluorimetry has been essentially completed, and improved methods and apparatus have been supplied to the Analytical Laboratories for evaluation in routine work. The methods show promise of faster, more precise analyses. A new method for determining the quenching correction was studied, but it is not generally applicable since some quenching agents, e.g., chromium, appear to quench by a mechanism other than by optical absorption, and, therefore, the method does not apply. It was also concluded as a result of the study that since the "spike" technique is more susceptible to errors, quenching should be eliminated by dilution or removal of the quenching agent if possible.

Development of a method for chlorine in uranium metal to satisfy a specification requirement was started. A turbidimetric method which appears to be sufficiently sensitive is being tried.

In the study of x-ray diffraction patterns of uranium trioxide from varying sources, a technique for obtaining the patterns reproducibly was developed. It was found necessary to grind all samples to a fixed degree of fineness, to add an internal standard (UO_2), and to carefully protect the samples from moisture since hydration seriously affects the intensities of the lines of interest. Typical oxides obtained by continuous screw calcination having a widely varying reactivity, which is related to sulfate content, were found to have diffraction patterns which differ only in the relative intensities of two of their lines, as mentioned last month. These line intensities bear a crude relationship to reactivity, but many anomalies exist in present data. As a consequence, x-ray diffraction patterns seem to be valuable only as a simple means of crudely sorting oxides by reactivity; of identifying phase II uranium trioxide obtained from uranium peroxide or by flash calcination, which has an entirely different diffraction pattern; and of determining the state of hydration of UO_3. The latter two types can also be distinguished by infrared absorption. A series of nine samples of experimental UO_3 representing a continuous series of specimens from uranyl nitrate through the basic nitrate stages of calcination to uranium trioxide were received from the Mallinckrodt Chemical Works. These have been analyzed chemically, and complete infrared and x-ray diffraction patterns were obtained in order to compare data on identical samples with the Mallinckrodt laboratory.

IN-LINE ANALYSIS

During the month several members of the unit assisted in the start-up of the Hot Semi-Works in its full level "hot" runs by providing around-the-clock coverage on in-line instrumentation during all runs. Activities during this time included training of engineering, maintenance and operating personnel in operation of the instruments and interpretation of data, trouble shooting and diagnosis of instrument difficulties, development of modifications to correct operational and maintenance headaches, and assistance in processing of run data. During the three hot runs completed during the month, more than 80 percent of the in-line monitoring instruments were on-the-line continuously and yielded good data. During the last run, P-3, of 100 hours' duration, 19 of the 23 installed in-line analytical instruments were in operation. Redesign activities and maintenance during the current shut-down are expected to put the remaining instruments into operation before the next run.

The gamma monitors performed throughout the month with but a few, temporary shut-downs. Several sample cells were replaced because build-up of absorbed fission products caused excessive gamma backgrounds. The gradual build-up of gamma contamination, particularly zirconium-niobium, in the sample cells is a major problem with some streams, and many experimental cells are in use in order to evaluate and obtain the best types of cells. Polyethylene cells are working well for zirconium-niobium in aqueous streams, but they are poorer than expected on organic streams. Several other cells are being studied, but the data are not sufficiently complete for drawing any conclusions. Two recurrent maintenance problems on the gamma consoles involving contact resistances of relay contacts and connectors are under study. Last minute changes which were made in several organic stream sampler systems (return leg plumbing) before the hot runs started have proved out successfully, but samples are not yet being obtained at the gamma monitor on the 1WD stream.

The gamma absorptometer, for plutonium in the 2AP stream, has been operating without incident although the plutonium concentration has been too low and cannot be read reliably at present by the absorptiometer.

Of the six uranium photometers, those on the HAF and 1AF streams were out of service throughout the month because of sensing unit failures. The difficulty appears to have been moisture entry due to inadequate seals around electrical cables. The remaining four units and the associated turbidity monitors have performed according to design. Some maintenance difficulties on the consoles (relays and switches) and a leaky standard solution valve were encountered. Several disc materials for the solenoid valves are still under test usage in the plant.

Both uranium polarographs operated during the first hot run, but a severe contamination of plumbing from a suck-back due to a leaky valve plus a combination of operational errors put the HAW unit out of service for the remainder of the

Assistance to 234-5 process analytical personnel was given in setting up detailed purchase and performance specifications for an automatic spectrograph (Quantometer). After subsequent consideration the manufacturer concluded that he could not guarantee meeting all of these specifications, and as a result, the pending order has been canceled. The main problem on the Quantometer was meeting the desired precision specifications in a uranium isotopic analysis, and this is also the greatest potential source of economic benefit with the instrument. Current research at HAPO on hollow cathode excitation methods may result in the stability needed for this uranium isotopic analysis.

month. The HAW unit showed poor polarographic waves, but the LAW unit performed very well except during difficulties with the helium gas flow regulation. The latter problem has been solved. A replacement of a polarograph sensing unit probe was accomplished without difficulty.

The pH units have performed well, and the alpha printer (alpha in 2AW stream) was put into operation on the second hot run by Instrument Design and the instrument worked very well throughout the month.

Other in-line analysis activities during the month included installation and testing of a gamma absorptometer in the Recuplex plant, and preparation of a subject report, HW-36788, on the gamma absorptometer. In addition, some design work on a dissolver off-gas iodine monitor was begun. Other design activities included completion of the HAPO x-ray photometer shop drawings, and design of a protective alarm system for the projected 325 Building cobalt-60 source.

LABORATORY SERVICES

One million two hundred thousand (1,200,000) gallons of "retention" level waste was processed to ground in the 300 Area. Average gross alpha total was < 1 d/m/ml. Average gross beta was $< 8 \times 10^{-7}$ uc/ml.

Forty-five thousand (45,000) gallons of "cribbing" level waste was transported to 200 West Area for discharge to 200 SL cribs. Average gross plutonium analysis was 5.0×10^{-4} uc/ml. Average gross beta was 7.0×10^{-2} uc/ml.

Excavation of a new burial pit was completed at 300 North Area, and the area was refenced and regraded.

Three slug cut-off "gunk" catchers and a quart bottle of high level waste were concreted at 300 North burial. These units read about 500 rads/hr at 6 inches.

Four barrels of waste exceeding crib limits were concreted in 325 Building, and the barrels were buried at 300 North burial ground.

The "crib" loading pump at 340 Building failed during May and was repaired by maintenance. A standby pump has been received from the La Bour Company. This will allow removal of old pump for overhaul. High radiation levels and mask requirements makes maintenance difficult in pump pits.

A special dolly was built for transporting the janitors' mop bucket in 325 Building. This dolly has two sets of wheels; one set for use in cold zones, the other for "regulated" zones. This arrangement will remove a potential source of contamination spread.

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

ANALYTICAL LABORATORIES,

General Chemical Laboratory

Three methods of analyses were used in the determination of water in alkali and alkaline earth-uranium fluoride salts. Results obtained by the Dean and Stark distillation method agreed with results obtained by the Karl Fisher titration method and established the water at less than 0.05%. The micro-absorption train method gave a rather wide range of values and as high as 0.9%. For some time the latter method has been suspected of yielding erratic results due to some phenomena other than volatilization of water. Only recently have samples of sufficient size been available to submit to the Dean and Stark procedure for referee. The problem is not entirely solved as some abnormalities are also detected in the Karl Fisher method when analyzing these salts.

The new Jarrell-Ash Company fluorimeter, referred to in last months report, was put into operation for routine analysis of uranium following preliminary calibration and testing. Response of the instrument is linear up to 5×10^{-6} gram of uranium, however when greater amounts of uranium are present, self absorption occurs. Only 70% of the expected response was noted when the dish contained 7.5×10^{-6} gram uranium. Ease of operation, automatic checking of reference standard and stability are desirable features of the new instrument.

Dowex A-1 exchange resin was used to extract 10 - 200 microgram quantities of uranium from aqueous solution containing up to 5600 micrograms of thorium. The attached uranium was then detached and eluted from the resin. Preliminary tests indicate complete extraction and subsequent removal, in the indicated range, is possible.

Expanded service to the Chemical Engineering Development Unit included analysis for ruthenium, free sulfur, thiosulfate, total soluble sulfur, total chromium and hexavalent chromium.

Radiochemical Laboratory

Fission counting, for the determination of Pu^{240}, was trouble-free except for the loss of a week-end count due to a rectifier tube failure in the power supply. Eleven of fifteen high priority samples were completed. A cleaning procedure was instituted which allows reuse of the platinum discs used in fission counting. Discs may be cleaned to less than 1000 d/m with one cycle of a 8M H_2SO_4 + 0.5M HF, saturated oxalic acid, 0.1M $KMnO_4$, and 6M HCl treatment.

The gamma scintillation well counter, referred to in previous reports, has been set up permanently and is being used for all Hot Semiworks Operation Unit gamma assays. Frequent application is being made to research samples.

All methods used in support of Hot Semiworks Operation Unit work have been satisfactory except tributyl phosphate (TBP) by flame photometry. Study showed that TBP soltrol - 170 standards and TBP shell-spray base standards are not interchangeable. The assumption had been made that either standard could be used since solvent blanks were exactly the same.

Spectrochemical Laboratory

Work on the enclosed source for "Hot" work is well advanced. The source has been mounted and aligned and a lead barricade errected. Operation is now contingent upon mounting of controls and standardization.

Mass Spectrometry

Start-up of the Consolidated-Nier isotope-ratio mass spectrometer was completed. A slight background spectrum remains and sensitivity figures need to be firmed up, but the spectrometer is operative.

A second automatic liquid nitrogen cold trap filler was built to service the C-N Spectrometer.

A General Electric model ion-resonance mass spectrometer is scheduled for delivery next month. Preparations are being made for installation of the instrument in Room 4-7B, 325 Building.

The vacuum fusion apparatus for gas in metal analysis was operated with low blanks at 2600° F; however, that temperature is too low for zirconium oxide analysis. The use of graphite powder in the furnace permitted 3400° F although an excessive outgassing (mainly CO) rate of 0.9 cc/min. resulted.

Twenty-four hours outgassing showed promise of reducing the rate, however further study ceased when the induction furnace failed requiring several days for repair.

Water Quality Laboratory

All work was resumed satisfactorily following the move to 1706-KE Building last month.

A photomultiplier microphotometer was acquired from Operations and an attempt is being made to put it back into operation and determine its usefullness in water analytical procedures.

	APRIL		MAY	
	Number of Samples	Number of Determinations	Number of Samples	Number of Determinations
Research and Development				
Pile Technology				
Metallurgy Research	62	681	41	427
Pile Materials	56	875	75	660
Fuel Technology	45	257	60	814
Separations Technology				
Chemical Research	333	915	717	1606
Chemical Development	544	2476	590	1931
Plant Processes	10	10	98	144
Process Technology	268	1065	365	1327
Customers	74	301	137	462
Total	1392	6580	2083	7371

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CONTACT ENGINEERING UNIT -

As a result of recent considerations for more stringent HAPO iodine emission goals, a review of separations processes iodine emission experience was made and several flowsheet schemes were prepared as suggested methods for improving iodine emission control. The results of this study have been published in Document HW-36819, "Iodine Emission from Separations Processes and Flowsheets for Improved Emission Control".

Flowsheet scope information was forwarded to the Design Section providing for calcium addition during in-farm TBP Plant waste scavenging and reactivity improvement additions in uranium oxide manufacture.

A work order has been issued to Minor Construction covering site preparation at 224-U Building for the prototype continuous calciner installation.

TECHNICAL SHOPS UNIT -

Mechanical Shops

The work load has increased to the point where it was deemed necessary to place the shops on a six day week for the month of June. The majority of the urgent work is connected with the start-up of the Purex facility, the non-destructive testing of the pile fuel, the completion of equipment for the Physical Constants Test Reactor in 300 Area, and development work in the 234-5 Building operation.

Negotiations have been in progress with responsible authorities in the A.E.C. and G.E. Property Management and Financial groups to obtain twelve pieces of used machine tool equipment for the shops. This equipment is located at the Fairchild Engine Division and the Carrier Corporation plants and is owned by the A.E.C. It is late model, heavy duty, precision type equipment and if obtained will replace worn, obsolete equipment now in use.

Buildings and Grounds

Clarification of responsibilities in regard to service piping and building structures in the Laboratory Area was obtained as a result of meetings held with the area landlord. It was determined that the Buildings and Grounds Engineer representing the building occupants would be responsible for service lines in the laboratory up to the valve or receptacle on the wall. The landlord's responsibility in regard to the building structure can be stated as maintaining the structure "as built" with any modifications or additions being the responsibility of the Buildings and Grounds Engineer representing the occupants.

An interim plant defense plan for the laboratory Area was devised, and individual building procedures are being formulated.

Engineering services in connection with the modifications to laboratories were furnished.

Project CG-576, General Improvements to Laboratory Area Buildings again exceeded the scheduled accomplishment. 75% of the detailed design was completed as compared with 58% scheduled, and there was 56% field progress as compared with 54% scheduled.

A request was submitted to Engineering Department management for the preparation of a Project Proposal to convert an existing structure to a 300 Area Graphite Fabrication Facility.

Drafting and Design

Total productive man-hours for the month was 2919 including 336 hours of overtime work. A major portion of the drafting work required in the 300 Area display prepared in connection with the visit of G.E. president Ralph Cordiner was completed by the group. Two drafting trainees were added during the month for a total of 14 productive personnel.

Glass Shop

Total productive man-hours for the month was 1169 with practically no existing backlog. 113 jobs were completed with no outstanding or unusual work being encountered. A suggestion turned in by a member of the glass shop, regarding the use of a trap installed in vacuum lines to prevent contamination of the pump by mercury or other extraneous material resulted in a suggestion award of $270.00 to the individual.

Photo Laboratory

Work requests received from the Technology Sections were as follows:

	Orders	No. of Negatives	No. of Prints
Pile Technology	62	452	6403
Separations Technology	8	92	155

Total cost to the Technology Sections amounted to $5227.00.

INVENTIONS

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

Inventor(s)	
W.H. Swift and J.L. Swanson	"The Use of Steam Distillation for the Purification of Tri-N-Butyl Phosphate"

Separations Technology Section [redacted] HW-36928 [redacted]

Inventor(s)

H. H. Hopkins, Jr. — "Use of Partitioning "A" Column for Simplified Uranium-Plutonium Processing by Solvent Extraction"

J. S. Buckingham and J. L. Carroll — "A Method for Improving the Solvent Extraction Decontamination of Fission Products"

O. H. Greager

for Manager, Separations Technology
ENGINEERING DEPARTMENT

RB Richards:khs

MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

R. A. Noble, U. S. Steel Company, Gary, Indiana visited Hanford April 29th to discuss proposed standard stainless steel specifications.

D. S. Brereton and C. C. Young, General Electric Company, Schenectady, New York visited Hanford May 2nd through 5th to witness staged fault tests on 13.8 kv system in 100-K Area.

E. D. Pettler, Consolidated Engineering Corporation, Seattle, Washington visited Hanford May 4th for consultation on mass spectroscopy as a means of pile gas analysis and application of Consolidated computers to flow and temperature monitoring systems, and to discuss differential pressure transducers for flow monitors and oscillographic equipment.

J. P. Butterfield, Armco Steel Corporation, Middletown, Ohio and R. W. DeWeese, Electric Steel Foundry, Portland, Oregon visited Hanford May 5th to discuss proposed standard stainless steel specifications.

M. F. Parr, Foxboro Company, San Leandro, California visited Hanford May 6th for consultation on Foxboro equipment.

R. W. Coyle, ANP - Idaho Falls, Idaho visited Hanford May 10th to discuss ANP irradiation facility feasibility report.

W. D. Gerstell, G. O. Carlson, Inc., Thorndale, Pennsylvania visited Hanford May 13th to discuss proposed standard stainless steel specifications.

D. G. McAllister, Pacific Scientific Company, San Francisco, California and C. K. Shanks, Pacific Scientific Company, Portland, Oregon visited Hanford May 18th through 25th for inspection of gas analysis equipment, gas moisture detection equipment, and Pacific Scientific Company furnaces and controls.

R. D. Rowe, General Machinery, Spokane, Washington and L. Haight, Johnston Pump Company, Pasadena, California visited Hanford May 18th to discuss special designs of liquid agitators.

G. C. Conner and J. C. Jolliffee, Bonneville Power Administration, Portland, Oregon and N. A. Gilquist, Bonneville Power Administration, Walla Walla, Washington visited Hanford May 19th to discuss availability of reactive power when synchronous motors are installed.

J. J. Chyle, A. E. Smith Corporation, Milwaukee, Wisconsin visited Hanford May 26th and 27th to discuss fabrication and corrosion problems related to stainless steels.

C. S. Slenning, Minneapolis-Honeywell, Richland, Washington visited Hanford May 26th and 27th for consultation on Brown instruments.

C. J. McVey, Thomas A. Ediwon Company, Chicago, Illinois visited Hanford May 26th through 27th to investigate temperature monitor primary element failures in the 105-KE and 105-KW reactors.

A. J. McCrocklin visited the University of California, Los Angeles, California April 27th through 29th as a member of Panel on Power Reactor Control During Load Changes.

D. R. Schiebel visited the General Electric Company, ANP - Idaho Falls, Idaho May 1st through 4th to interview for transfer.

A. B. Carson visited Atomic Power Study, KAPL - Schenectady, New York May 2nd through 5th to discuss reactor technology.

M. E. Forsman visited the General Electric Company, Ithaca, New York; Schenectady, New York; and Cincinnati, Ohio; and the University of Florida, Gainesville, Florida May 2nd through 10th for employment interviews.

R. D. Switters visited the Allied Chemical and Dye Company, Camden, New Jersey; Allegheny Ludlum Steel Company, Brackenridge, Pennsylvania; Mallinkrodt Chemical Works, Stl Louis, Missouri; and the National Lead Company, Cincinnati, Ohio May 2nd through the 6th for materials consultation, for UO_3 continuous calciners and general nitric acid service.

O. H. Pilkey visited Washington State College, Pullman, Washington May 5th and 6th representing the local ASCE Society in the presentation of an award to the outstanding civil engineering student for the year ending June, 1955.

B. R. Elder visited the Argonne National Laboratory, Chicago, Illinois; Allegheny Ludlum, Babcock & Wilcox and U. S. Steel, Pittsburgh, Pennsylvania; Carpenter steel, Union, New Jersey; Armco Steel, Baltimore, Maryland; Nuclear Metals, Cambridge, Massachusetts; Allegheny Ludlum, Wallingford, Connecticut; and Allegheny Ludlum, Watervliet, New York May 9th through 20th to review non-destructive testing methods and current materials advanced technology.

W. M. Harty visited Seattle, Washington May 13th and 14th to attend a joint meeting of Columbia Valley and Washington-Oregon Sections of ASChE.

A. E. Engler visited the General Electric Company, General Engineering Laboratory, Schenectady, New York May 19th to attend an Industrial Acoustics Course.

G. F. Ehlers visited the Pacific Northwest Instrument Conference and Exhibit, Portland, Oregon May 25th and 26th as official delegate of the Richland Section of

ORGANIZATION AND PERSONNEL

Personnel Statistics:	April 30 Exempt	April 30 Non-Exempt	April 30 Total	May 31 Exempt	May 31 Non-Exempt	May 31 Total
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	70	12	82	71	12	83
Design Planning Unit	17	14	31	17	14	31
Design Engineering Sub-Section	84	12	96	84	11	95
Design Drafting Unit	8	83	91	8	82	90
Total Section Personnel	181	122	303	182	120	302
Technical Graduates (Rotational)	-	7	7	-	4	4
Total	181	129	310	182	124	306

Accessions - 1

Separations - 5

GENERAL

Design Section engineering and drafting effort for May was distributed approximately as follows:

	Engineering Man Months Expended	Drafting Man Months Expended	% of Section Effort
1952 Hanford Expansion Program	17.0	5.4	9.1
Reactor Plant Modification for Increased Production	19.2	16.4	14.0
4-X Program	20.0	19.4	15.4
Design Development	70.3	15.5	35.2
Other Design Projects	17.1	14.7	12.4
Customer Work and Miscellaneous	20.5	15.0	13.9
	164.1*	86.4*	100.0

*Equivalent man months expended included 120 hours of engineering and 51 hours of drafting overtime, which represents 0.3% of the Section based on the total available hours for a normal 40 hour week. Principal six-day work involved detailed design for the Metal Conversion Plant expansion.

The Design Drafting Unit production for May was 196 new drawings and 337 drawing revisions for an equivalent of 6.5 man days per drawing.

DESIGN DEVELOPMENT

Statistics:

The total number of engineering and drafting man months applied to design development activities during May were as follows:

	Engineering Man Months	Engineering % of Total	Drafting Man Months	Drafting % of Total
Metallurgical Design Development	2.7	3.8	0.1	0.6
Reactor Design Development	36.5	51.9	8.8	56.8
Separations Design Development	26.9	38.3	4.3	27.8
Chemical Processing & Reduction Design Development	2.1	3.0	1.4	9.0
234-5 Design Development	2.1	3.0	0.9	5.8
	70.3	100.0	15.5	100.0

Metallurgical Design Development

Study of the problem of excessive noise associated with the 313 Building semi-automatic cut-off machine was curtailed during the month pending delivery of "Ultra-coustic" fiberglass lining for the test enclosure. Investigation is also in progress to find a substitute acoustical lining material.

Test procedures were completed for the testing program to determine the optimum air flow requirements for ventilation of the 300 Area welding machines. Actual test work will start after installation of required exhaust blowers.

A preliminary study was made to determine comparative costs for the fabrication of alternate types of fuel elements using zirconium jacketing.

Reactor Design Development

The program for development of improved process tube connectors for the 100-K reactors continued during May. Tests are in progress to evaluate several prototype stainless steel and flexible connectors for comparison with the presently used aluminum connectors.

Preparation of preliminary design scope for continuous charge-discharge facilities at 100-C reactor was completed during May; however, scope is currently being modified based on the decision to delay full-pile installation at 105-C.

A preliminary study was completed for the evaluation of continuous charge-discharge facilities at the 100-K reactors.

A study of the economic feasibility of converting existing water plants to liquid alum was completed. Results of the study show that conversion to liquid alum at the present time is not feasible and it is recommended that the problem be given further study prior to completion of the current Reactor Plant Modification Program.

An engineering feasibility study was started for the installation of three recirculation high-temperature, high-pressure test loops at the 100-DR reactor capable of operation following fuel element rupture. These facilities are to be of a general purpose type suitable for use by off-site groups and companies.

The program for development of a zone temperature monitor system for existing reactor application continued during the month. A specification was submitted to prospective vendors for bids on prototype equipment.

Work continued during the month on a study of power generation from reactor effluent water at proposed outlet water temperatures of 120° C to 150° C. The present study involves the determination of practical optimum pressures and temperatures for steam generation and the application of such steam generation to existing turbine designs.

A study is in progress to evaluate the food sterilization potential of HAPO irradiated fuel elements, investigate the feasibility of project application, and to estimate the potential role of HAPO in the food irradiation industry.

Mechanical development studies active during the month included: resistance temperature detectors; reactor tube removal equipment; alternate dummy decontamination facilities; ruptured slug detection; process tube flow monitoring; and mechanized handling of process material for food irradiation.

Separations Design Development

Work continued on preliminary scope studies of methods to provide facilities for additional plutonium separations capacity. The coupling of higher HAPO reactor output together with a potential low exposure forecast (450 MWD per ton of uranium) would result in greater demands for separations capacity. In addition, preliminary scope studies were started for a continuous dissolving facility equally applicable to a new separations plant or as an adjunct to the Redox or Purex Plants to achieve increased production.

Progress continued on the preparation of preliminary scope for the Purex Plant capacity expansion to include process equipment replacements, 216-A-5 and 216-A-6 cribs, uranium lag storage, remote crane facilities, iodine removal equipment, HC column intervals and waste tank agitators.

Work is progressing on the development of draft tube type liquid circulators for underground waste storage tanks in order to eliminate the potential for excessive burping by continuous dissipation of superheat as it is formed.

Preliminary studies continued on improved radio-iodine removal facilities for application in existing separation plants. Items being developed include an improved, replacement, silver reactor for the Redox Plant, and a continuous iodine monitor for the Purex dissolver off-gas silver reactors. Scope designs were prepared for the installation of stubs in Purex off-gas lines to make provisions for a future iodine removal facility for the dissolver systems.

Scope design of outside facilities for nitric acid recovery at Redox continued.

A study is in progress to determine the most feasible and economic method of providing expanded chemical addition facilities for TBP Plant waste scavenging. These facilities are to be adequate for the make-up and addition of calcium nitrate to the waste scavenging process on a continuous basis.

Preparation of preliminary scope for the installation of outside ozonization facilities at TBP Plant is in progress.

Mechanical development studies which were active during May included in-line alpha monitor testing and evaluation, dissolving of zirconium jacketed fuel elements, and column interface monitor.

Chemical Processing and Reduction Design Development

A report summarizing the test program for the vertical, replacement type, Task II furnace was prepared for issue. The furnace will be brought into a "ready-to-install" condition following completion of necessary drawing revisions.

Purchase orders have been placed for material to fabricate a prototype spiral-feeder type continuous fluorination furnace. The fabrication drawings for the feeder were started.

234-5 Design Development

Development work on the Task XII conveyor system is essentially complete.

Experimental testing of a horizontal vacuum check for Task V was completed. The feasibility of machining both surfaces with a horizontal lathe was confirmed.

During the month work on the development of a remotely operated final shape machining device was accelerated.

Engineering Standards & Materials Development

Cost to date for development of engineering standards for the current fiscal year is $73,432.

Status of progress of standards and studies during the month of May is as follows:

a. Standard Drawing D-1-80 - 100 amp 480 Volt Receptacle, Welding and Other Heavy Duty, was completed.

b. The preparation of a standard specification for electrical wire and cable advanced to 55% complete. This specification will include high voltage cables of several types and multi-conductor control cable.

c. Work was started on the preparation of standard instrument drawings for five-fold hand and foot counters.

DESIGN PROJECTS

Statistics:

Engineering and drafting effort of the Section on projects for the month of May was as follows:

	Engineering		Drafting	
	Man-Months	% of Total	Man Months	% of Total
1952 Hanford Expansion Program	17	18.2	5.4	7.6
4-X Program	20	21.3	19.4	27.4
Reactor Plant Modification for Increased Production	19.2	20.5	16.4	23.2
Other Design Projects	17.1	18.2	14.7	20.7
Customer Work and Miscellaneous	20.5	21.8	15.0	21.1
	93.8	100.0	70.9	100.0

CA-512-R - 100-K Area Facilities

Designs for the emergency repair of the 100-KE effluent water line were completed during the month. An as-built drawing will be prepared which will show the as-built condition of the line and details of the method used to repair and anchor the line.

A staged fault test on the 13.8 kv electrical system in KE was conducted with beneficial results from both an operating and engineering standpoint. A preliminary report has been issued giving general conclusions of the test.

Revisions to design drawings are being made for the 1706 KE Water Studies Semiworks Building to enable completion of exceptions noted during final inspection. Bids were received on a Dowtherm Circulating Unit for the mock-up tubes and are being reviewed.

Design for 1706 KER progressed to 99% complete during May and is scheduled to be complete by the end of June. The design estimate was increased from $144,000 to $160,000 reflecting an increase in the number of drawings required for this facility. The test loop for testing KER components has been fabricated and is now being installed in the 189-D Building.

CA-513 - Purex Separations Facility

A revision request for the 216-A-8 condensate and cooling water crib, changing the 6" cooling water inlet to 10", has required revisions to drawings, 7 of which have been completed. The field was advised on methods of testing and calibration of the various instrument systems. Design of the 216-A-10 condensate crib was started. Design is 100% complete for both the lump sum and Minor Construction work on the disposal facilities for failed equipment.

CA-514 - 300 Area Expansion

Design activity was limited to revision of miscellaneous 313 Building equipment layout drawings.

CA-539 - Additional Waste Storage Facilities

Status of detailed design for project revision No. 5 is as follows:

Part A - Design is complete.
Part B - Design for the emergency water facility is 70% complete. Purchase orders have been placed for the pump and prefabricated steel building.
Part C - Design was completed for the jumpers, shielding tanks and cover slab modifications.

CA-546 - Fuel Element Pilot Plant

Design of the development equipment for the Fuel Element Pilot Plant is approximately 70% complete. Design for equipment installation is 60%. Design for the electroplating room in the 306 Building was completed. Purchase specifications for the motor control center have been issued.

CG-558 - Reactor Plant Modification for Increased Production

Total design advanced on schedule to 81% complete, an increase of 6% during May. Design scope is complete and detailed design 78% complete.

Shop drawings for 190-B and 190-D Annex Buildings are being reviewed.

Design of the 183 Buildings modification (filter plants) and the 181 Buildings (river pump houses) are complete except for 181-H which has not been started.

In the 105 Buildings, design is complete on all the downcomers and "C" elevators except for the "C" elevators in DR and H which are 80%. Design for the solids feed pump foundations is held up pending receipt of vendor information. The riser platforms in B are 80% complete and the valve pit modifications in F have not been started. Bids were reviewed for the power calculating system and panel wiring assemblies for B, D, and F.

The design of the Raw Water Lines and Effluent systems are complete.

Drawings have been issued for comment for the 151-D and H Sub-station additions

CG-578 - Effluent Water Monitoring Improvements, 100-B, D, DR, F and H Areas

Detailed design advanced to 99% complete. Fourteen approved drawings were revised during the month after receipt of correct vendor information on the print impulse device for the recorders. Completion of the acceptance test procedures is scheduled for June.

CG-579 - Effluent Water Monitoring Improvements, 100-C Area

Detailed design advanced to 95% complete, an increase of 8% during May. Completion of design is dependent on receipt of certified vendor information.

CG-586 - First Capacity Increase - 230 KV System

Detailed design for additions to the 230 KV System advanced to 57% complete. Purchase specifications for conductors, insulators and hardware have been prepared. Vendor's drawings were reviewed for the 1200 amp. disconnect switch, bushing potential device and coupling capacitor.

CG-598 - Purex Vacuum Fractionator

General Electric design for the project advanced to 84% complete. Work in progress includes 202-A Building modifications, acid fractionator building addition, and associated outside facilities. Six drawings were deleted from the design as the result of a simplified design for the proportionate sampler on the waste line.

Changes were made in the fabrication specification for the fractionator in the interest of reducing the cost for the Lummus Company Phase II (fabrication) work.

CG-599 - Hanford 4-X Program, 100 Areas

Scope and detailed design work were completed in April.

CG-600 - 100-C Alterations

Design progress at the end of May was 87% complete based on the revised schedule which reflects scope changes to include ten new pumps. A revised Project Proposal is being prepared for the submission to HOO-AEC in July.

CG-603 - Hanford 4-X Program - Bismuth Phosphate Plants

Detailed design is 96% complete. A design scope revision is being prepared which proposes the deletion of F-10 facility modifications in the 224-B and T Buildings. Thirteen additional drawings were added to the project for in-farm waste scavenging tanks and miscellaneous details.

CA-612 - Alterations of 713 Building for Electronic Data Processing Machine

Vendor drawings for mechanical, electrical and instrument equipment were reviewed and approved. Remaining design activity on this project will involve design field liaison in support of equipment installation and testing.

CG-613 - Hanford 4-X Program - Metal Conversion Plant

Detailed design for the UO_3 Plant expansion advanced 16% during May to 53% complete. Design for the Minor Construction portion of the 224-UA (new annex) is well advanced and scheduled for completion in June. Specifications have been started for the building structure and calciner foundations to be done by a lump sum contractor.

Drawings for the six calciner units were completed during May. Pertinent drawings were forwarded together with detailed specifications to the fabrication vendor for the calciners, to enable procurement of corrosion tested stainless steel.

CG-614 - Hanford 4-X Program - 300 Area

Detailed design advanced to 96% complete during May. All drawings have been completed with the exception of the ventilation system for the recovery furnaces. This phase of design is held up pending study of design problems in the ventilation of the furnaces.

CG-616 - Installation of Acid Feed Equipment, 100-B, C, D, DR, F and H Areas

Revision No. 1 to the Project Proposal was completed and submitted to HOO-AEC during the month. This proposal requested authorization of funds in the amount of $500,000 for detailed design and construction.

CG-617 - Additional Air Drying Facilities - Building 234-5

The required mechanical drawings were completed and issued to the Project Section for approval. The electrical drawings are well advanced and scheduled for comment issue June 1.

CG-621 - Redox Contamination Control Facilities

Detailed design for In-Cell Ozonization advanced to 82% complete. Approximately 25 drawings have been issued for ozone installation and new jumpers.

Work continued on the preparation of Project Proposal Revision No. 2. This revision requests construction funds for the Redox canyon wash-down facilities. Revision No. 1 which provided for the design of this portion of the contamination control program has not been authorized to date.

CG-624 - Redox Railroad Tunnel Ventilation Barrier

Authorization was received from HOO-AEC for the design of this installation.

CG-625 - Additional Waste Disposal Facilities, 200 Area

Design for Phase I, to include an eight tank farm addition to the existing 241-SX Tank Farm, advanced 50 55% complete.

As a result of a Manufacturing Department study on waste tank usage, the required date for Phase I tanks was extended and the design schedule is currently being revised.

CG-626 - Alterations to Redox Inert Gas System

Authorization for design was received from HOO-AEC during the latter part of the month. Detailed design for this work is scheduled to start the first week in June.

D.O. 100757 - "As-Built" Area Maps

Due to higher priority work, this assignment was inactive during May. Progress remains at 88% complete with 327 drawings started out of 370 scheduled.

D.O. 101036 - Moisture Monitoring System, 105-C Building (CG-584)

Design is 97% complete. Of six drawings, five have been approved and one is out for comment. All requisitions have been written.

D.O. 101045 - Discharge Area Television Viewer, 105-B Building (CG-593)

Design for the closed circuit television chain in the 105-B Building advanced to 92% complete.

D.O. 101063 - Alum-Activated Silica Water Treatment Facility, Phase II

Project proposal preparation continued during the month. Issuance of a rough draft proposal is scheduled for early in June.

D.O. 101212 - Classified Scrap Disposal

The design for the installation of a paper pulper in the 300 Area library for classified scrap disposal advanced to 95% complete.

D.O. 101218 - General Improvements to Laboratory Area Buildings (CG-576)

Detailed design advanced during the month to 92% complete. Design work was started on two electrically heated quench tanks for the 328 Building; this work reflects an increase in the scope of the original project.

D.O. 101249 - Gage for MEF Slug Breaker, 105-C

Due to a change in requirements, some redesign was required during the month. Fabrication is now scheduled to be completed during July, upon receipt of materials based on the new design. The over-all status of this work remains at 40%.

D.O. 101283 - Building 327 - Cell for Tensile Testing Machine

Design of the shielding has been completed. Additional design will be required when vendor shop drawings are received. Total design is 90% complete.

D.O. 101287 - Redox Stack Particulate Sampler - Project Proposal

A project proposal was started during the month covering the installation of an improved particulate sampler for the Redox ventilation stack.

D.O. 101325 - Additional Service Facilities - Redox Plant - Scope Design

The preparation of preliminary design for additional service facilities for the Redox Plant advanced to 75% complete.

D.O. 101331 - Additional Service Facilities - Redox Plant - Project Proposal

During the month, a draft project proposal covering additional service facilities for the Redox Plant was prepared and reviewed with representatives of the Manufacturing Department.

D.O. 101361 - Water Plant Component Test Loop - Scope Design

A composite instrument and mechanical drawing was issued for comment during the month covering a high-pressure, high-temperature recirculation loop for operational testing of water plant components. The scope design is 80% complete.

Design Work Completed During May

D.O. 100668	Horizontal Safety Rod Design, 105-C (CA-431-B)
D.O. 100717	Acceptance Test Procedure for Pile Tech. Building (CA-414)
D.O. 100946	Foxboro Dewcell Moisture Monitoring System (CG-583)
D.O. 101035	Installation of Car Pullers, 100-B, D, F & H (CA-595)
D.O. 101039	H-4 Oxidizer Redesign
D.O. 101313	Redox Plant Jumper Design
D.O. 101321	TBP Plant Jumper Design
D.O. 101328	Painting 100-DR Water Structures
D.O. 101340	"T" Plant Jumper Design
D.O. 101342	Purex Plant - PR Can Stopper
D.O. 101343	"U" Plant - Calciner Prototype Floor Loading
D.O. 101353	Redox Plant - Design Sampler Bottle Holder
D.O. 101358	"T" Plant Jumper Design
D.O. 101360	"U" Plant - Decomposition Pot
D.O. 101371	"Z" Plant - Drawings for Metallographic Polishers
D.O. 101377	"Z" Plant - Exhibit Sketch

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.

R H Beaton

Manager - Design
ENGINEERING DEPARTMENT

RH Beaton:HDT:ibt

DESIGN SECTION WORK STATUS
ENGINEERING MAN MONTHS

PROCESS ENGINEERING SUB-SECTION

Description	Backlog Start of Mo.	Work Sch'd Dur. Mo.	Time Spent Dur. Mo.	% of Total Effort	Backlog End of Month	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Bal.of FY 1956 & Later	Total
1952 Exp. Program*	53.3		7.2	10.2	46.1	6	5	5	4	3	3	20.1	46.1
CG-558 and CG-600	16.0		3.2	4.5	12.8	3	2	2	2	2	2	--	12.8
4-X Program	27.2		3.0	4.2	24.2	3	2	1	1	1	1	15.2	24.2
Reactor Design Develop.	67.6	-7.0	30.0	42.4	30.6	30	30	29	28	27	27	171***	342.0
Sep. Design Development	33.5	+7.0	20.4	28.8	20.1	21	21	20	20	20	20	139***	261.0
Met. Design Development	2.1	+2.0	2.1	3.0	2.0	2	2	2	2	2	2	20***	32.0
234-5 Design Development	9.3	-2.0	1.0	1.4	6.3	1	1	1	1	1	1	13***	19.
Weapons Design Development	3.9		1.0	1.4	2.9	1	1	1	1	1	1	7***	13.
Other Proj. & Miscl.	7.6		2.9	4.1	4.7	4	4	5	5	5	5	35**	63
Ant. Future Work							3	4	6	7	7	79	106
Totals	220.5	0	70.8	100	149.7	71	71	70	70	69	69	499.3	919

DESIGN ENGINEERING SUB-SECTION

1952 Exp. Program*	65.5		11.9	15.2	53.6	10	8	6	5	4	4	16.6	53.6
CG-558 and CG-600	191.1		13.5	17.2	177.6	14	14	14	14	13	12	96.6	177.6
CG-578 and CG-579	6.8		1.2	1.5	5.6	1	1					3.6	5.6
CG-586	14.6		1.5	1.9	13.1	2	2	2	2	1	1	3.1	13.1
CG-598	16.5		3.4	4.3	13.1	3	3	2	1	1	1	2.1	13.1
CG-621	13.5		1.6	2.0	11.9	2	2	1	1			5.9	11.9
CG-624	--	2.0			2.0	-	1	1					2.0
CA-625	46.1		3.2	4.1	42.9	4	4	4	4	4	3	19.9	42.9
CG-626	--	5.0			5.0	1	2	1	1				5.0
4-X Program	52.1		15.5	19.8	36.6	14	10	6	3	2	1	.6	36.6
Design Develop. Program	27.5		11.3	14.4	16.2	12	13	14	14	14	14	99***	180
Other Maj.Minor, Misc.	73.7	8.0	15.4	19.6	66.3	14	14	13	12	11	10	70**	144
Ant. Future Work						2	5	14	19	25	29	289	383
Totals	507.4	15	78.5	100	443.9	79	79	78	76	75	75	606.4	1068

Present Total Backlog is distributed over the five engineering branches in terms of man months as follows:

	Authorized Projects FY 55 & FY 56	Anticipated Future FY 55 & FY 56	Totals Totals
Architectural & Civil	98	107	205
Mechanical	126	219	345
Electrical	68	101	169
Instrument	114	145	259
Standards	33	57	90
Totals	339	629****	1068

*Includes 1706-KER Recirculation Facilities

**Includes Minor and Miscellaneous ... budgeted for FY 1956

***Includes Project and Process ...

MONTHLY NARRATIVE REPORT, MAY 1955
PROJECT SECTION

I. SUMMARY

A. Organization and Personnel

Effective May 15, 1955, the functions and remaining personnel of Reactor Projects Sub-Section were transferred to Project Engineering Sub-Section as the Reactor Construction Unit; and J. R. Kelly, Manager, Reactor Projects, was transferred to the Purchasing and Stores Section, Manufacturing Department. On the same date G. C. Gabler, Manager, Separations Projects, was transferred to General Electric Real Estate and Construction Services Division for the Ontario, California, area; and W. B. Webster was appointed Acting Manager, Separations Projects.

Following is a summary of personnel changes in Project Section during the month:

	April 30, 1955	May 31, 1955	Net Change
Employees on payroll	356	347	-9
Technical Graduates, Rotational	1	1	0

The end-of-month status involved these changes:

	Project Section	Technical Graduates Rotational
Payroll additions	0	0
Payroll removals	7	0
Transfers into Section	3	1
Transfers from Section	5	1
Transfers within Section	15	0

B. Scope of Activities

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

Project No.	Title	Completion Scheduled	Completion Actual
CA-512	100-K Area Facilities (excluding 1706 KER construction which has not been scheduled)	100%	99.9%
CA-513-A	Purex Facilities, Part A	100%	99.6%
CA-514	300 Area Expansion	94%	94%
CA-539	Additional Waste Storage Facilities, Redox	67%	68%
CA-546	Fuel Element Pilot Plant	50%*	50%*
CG-558	Reactor Plant Modifications	12%	9%
CG-603	Hanford 4X, Bismuth Phosphate Plants	32%	57%

* In accordance with schedules submitted on May 10, 1955, for AEC approval.

1193176

C. Craft Labor

A work stoppage by 78 operating engineers in Minor Construction began about 10:00 a.m., May 24, 1955, and continued to the end of the month. The walkout followed a work determination made by the J. A. Jones Company concerning air compressors. Negotiations have been conducted, but no settlement has been made. Interference with Minor Construction work has resulted in furloughing of about 30 men. Plans were being made for extensive furloughs if the strike continues.

D. Safety and Security

Nine regular meetings for discussions of safety, security, and health topics were attended by about 215 Project Section employees. Four Monday-morning tool box and five mass safety meetings were conducted in the field for service contractor personnel. Six Special Hazards orientations were given to 73 new and re-hired employees. The new Minor Construction sequence of safe man-hours was broken at 300,000 on May 20 when a rigger foreman suffered a fractured heel.

E. Highlights

Project Auxiliaries Sub-Section

The workload for Reproduction and Engineering Files Units decreased during the month. Reproduction output was 381,707 square feet; Engineering Files distributed 162,881 prints during the month, including about 8,000 classified items. The greatest orders were for the Reactor Plant Modification. Estimating completed 25 estimates during the month, and also prepared a final rough draft of the detailed estimating procedure. The Section was preparing five proposals for new projects and one revision of an existing project. Evaluations work was continued on Recuplex, 300 Area Expansion, Redox Capacity Increase, and TBP Waste Scavenging. Field Surveys continued with assistance on the re-survey of Richland, and also provided survey work for Reactor Plant Modification, UO_3 Expansion, electrical transmission lines, test wells, and the "U" Swamp Drainage Facility.

Inspection Sub-Section

Principal emphasis for vendor inspection has been on Purex equipment and major components for the Reactor Plant Modification, including process pumps, pump drives, and aluminum nozzles. Production castings are now being poured for the process pumps. The number of assigned orders requiring inspection increased to about 480, representing a total value of about $9,400,000. Four large orders are being placed for concentrators, acid fractionators, calciners, and nozzles; and they represent an additional total of about $1,400,000. The Sub-Section is reviewing workload potentials for the next fiscal year to determine manpower requirements. Study was continued on off-site inspection to determine what portion could be accomplished by other government agencies, and preliminary findings indicate 10% to 15% of the workload might be so inspected. An on-site vendor inspection service has been approved and is being established.

Minor Construction Sub-Section

Repairs to the 105-KE effluent line were closed out with expenditure of about $100,000 and 1,550 man-hours. The Sub-Section completed nine work orders and assigned work on

CG-543, Tile Fields, 200-U and Administration Areas. New work was accepted on four projects and 18 work orders. At the end of the month, total authorized funds were $15,040,000, of which $6,508,000 had been expended or committed. Work on all assignments was generally satisfactory, although the strike by the operating engineers was beginning to interfere. Operability testing at Purex was continued in cooperation with Manufacturing Department. The average contract work force during the month was 970 to 980.

Project Engineering Sub-Section

Work was done on 39 projects, two informal requests, and miscellaneous engineering requests. The Sub-Section completed assigned work on Redox Metal Production Facility, Part II; Sanitary Tile Fields, 200-U and Administration Areas; Activate Task I, RMA Line, Building 234-5; Waste Metal Recovery Plant Modifications; and four engineering requests. Remaining work on 100-K Area was accepted from Reactor Projects Sub-Section; also initial work was done on CG-624, Redox Railroad Tunnel Ventilation Barrier, and two engineering requests. Plans were made for close out of 300 Area Expansion Program on June 15, 1955. Other important projects in progress include Additional Waste Storage for Redox; Fuel Element Pilot Plant; Reactor Plant Modifications; Effluent Water Monitoring; Hanford 4X Program, Bismuth Phosphate Plants; and Hanford 4X Program, Metal Conversion Plant.

Separations Projects Sub-Section

The Purex Facility, as originally designed, was essentially completed during the month, including the original punch list items. Present work is directed toward accomplishment of design changes and the 2.75 factor capacity increase. Operability testing was continued in cooperation with Manufacturing Department. The AEC has been requested to increase its allocation of funds. A bid package for the spare concentrators was transmitted for procurement. Estimates are being made for construction of the Purex tunnel. Negotiations for the Purex acid fractionator were continued with the Lummus Company. Tentative agreement was reached on the fabrication of equipment at a cost of about $226,800. Construction work for the acid fractionator was started in the field on May 16, 1955, with the release of $75,000 to Minor Construction for procurement and construction.

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.

Inventor	Subject	Report of Invention (date)
H. E. Hanthorn	Improvements in Power Reactors	May 25, 1955

W. S. McMahon, Manager, Projects

1193178

II. STATISTICAL AND GENERAL

A. Significant Assignments

1. Initial Reporting

CG-624, Redox Railroad Tunnel Ventilation Barrier

This project has been authorized $57,000, and design is being managed by the Design Section. No work on this project was performed by Project Section during May 1955.

ER A-2762, Multi-purpose Wind Tunnel

This engineering request was established with $100 authorized for assistance to Design Section.

ER A-3121, Surfacing Roads and Parking Areas, Minor Construction, White Bluffs

The letter of informal request is being routed for approvals within General Electric Company.

Job 0048, Increase Cribbing Capacity, "U" Swamp

This work was authorized to provide emergency cribbing facilities to take care of a probable overflow of the "U" swamp. The work is being performed on a work order from Manufacturing Department. Minor Construction is performing the work within the 200-Area fence, and a contractor is performing the ditch excavation and directing work outside the 200-Area fence.

2. Final Reporting

CG-187-D-II, Redox Production Plant

The project was closed out with exceptions as of May 31, 1955.

CG-543, Replace Sanitary Tile Field, 200 West Administration Area

The facilities were accepted on May 12, 1955. Information for the Physical Completion Notice is being assembled.

CG-549, Activate Task I, RMA Line, Building 234-5

The project was completed with exceptions as of May 2, 1955, and information for the Physical Completion Notice has been issued.

CG-562, Waste Metal Recovery Plant Modifications

Project was accepted as of May 17, 1955, and the Physical Completion Notice is being prepared.

ER A-1223, Irradiation Facility for HTRE Fuel Testing Program

A study report has been issued, and the engineering request is being closed out.

ER A-2760, "T" Plant Second Cycle Waste Facilities

The project proposal is being prepared by the Design Section. The data required by Design Section has been forwarded, and the engineering request has been closed out.

ER A-2761, Redox Replacement Cribs, 216-S, 1 and 2

Scoping and detailed design are being managed by Design Section. The data requested by Design Section has been forwarded, and the engineering request has been closed out.

ER A-3113, Development of Independent Water Supply Source, 300 Area

The engineering request has been closed out with all charges to be absorbed by the Manufacturing Department.

3. Current Projects

CA-512, 100-K Reactor Facilities

Completion status remained at design 100%, construction 99.9%. Designs were completed for the emergency repairs for the 100-KE effluent line, and data was collected for preparation of the as-built drawings. Repairs to the dislodged effluent line were completed under the AEC work order for about $100,000 and the expenditure of 1,550 man-hours. A definitive report is being written in collaboration with the Design Section for issue in early June 1955.

The KW effluent line was examined, and a break was discovered at Station 11 / 66. Additional anchors made of concrete were placed on the line to hold it during high water. Work may be required later in the year after the flood stage has passed.

At the reactor plants, work was continued on clearing exceptions and punch list items. Instruments and switches are being replaced as necessary.

As-builts for 1706 KE were about 75% complete. All field prints have been submitted to Drafting.

For 1706-KER Facility Minor Construction has started material take-off. Drawings, specifications, acceptance test procedures, requisitions, and purchase orders are being revised as they are issued by Design Section. Design was 99% complete, and the design estimate was increased from $144,000 to $160,000 because of the increase in electrical drawings.

The test loop for testing KER components has been fabricated and is now being installed in the 189-D Building.

CA-513-A, Purex Facility

Detailed design had been completed previously. Construction of the facility, as originally designed, was essentially completed, including original punch list items. Activity by Minor Construction was continued on design changes necessary to the 2.75 factor capacity increase. Operability testing was continued in cooperation with Manufacturing Department, and this phase was about 23% complete. Calibration of

tanks in the main process building was 70% complete. Procurement and engineering have been initiated for the capacity increase, and the AEC was requested to increase its allocation of funds. Estimates are being prepared for construction of the Purex tunnel, and a bid package for the spare concentrators was transmitted for procurement.

Remaining work consists of the following features: main crane; auxiliary crane; roads, walks, paved areas, and site grading; sanitary water system; finished coating of cover blocks; ventilation balancing; and contact condenser system for 241-A.

CA-514, 300 Area Expansion Program, Production Facilities

Design had been completed previously; construction progressed 7% to a total of 94%. Close-out of the project was scheduled for June 15, 1955. Minor Construction forces continued clean-up on major portions of equipment installation and testing. Acceptance tests have been scheduled for early June 1955.

The 313 Building structure and utilities were 96% complete. The radiograph equipment has been in service since early May with minor interruptions for alterations to the equipment. The sleeve-cleaning machines were turned over to Manufacturing on May 16, and the slug pickling equipment was placed in service on May 23. The old equipment was removed from service the last week of May. Work was continued on the slug recovery facilities and the conveyor system. The monorail, pumps, and tanks have been installed except for the new pressure feed tank and old filter press. These two items will replace the centrifuge which would not meet production requirements. Completion of the new doorway into the 3703 Building and removal of the 3741 Building are to be accepted after June 15, 1955.

CA-539, Additional Waste Storage Facilities for Redox

Design progressed 2% to completion; construction was 68% complete and approximately on the new schedule. The contractor continued with installation of the 24-inch piping which was about 25% complete. Backfilling was about 50% complete. Because of an error in the drawings, the condenser building was relocated 16 feet to the north. Minor Construction has provided temporary power facilities for use by the contractor, and preparations were made to place foundations for the two tanks at the Emergency Water Facility. Purchase orders have been placed for the pump and prefabricated steel building for Part B.

CA-546, Fuel Element Pilot Plant

Overall design was 65% complete; the construction completion status was revised downward to 50% in conformance with the new schedule. A revised project proposal requesting total funds of $1,600,000 was being routed for General Electric approvals. Minor Construction has scheduled clean-up of exceptions in the Fixed Development Area.

CG-558, Reactor Plant Modification for Increased Production

Design progressed 6% to a total of 78%; construction progressed 2% to a total of 9%. Design was complete on the 183 Building modifications and the 181 Buildings, except for 181-H Building which has not been started. Design work was also done on the downcomers, "C" elevators, solids feed pumps, raw water lines, and effluent systems.

Completion of the process water pumps has become a critical problem. Production castings are now being produced, and plans are being made for testing the first pump during June 1955.

In 100-B Area piping for the 4,000 gpm pump is being fabricated, and some installation has been accomplished for process water and effluent system. Instruments and service piping systems are being relocated. The lump sum contractor has completed excavation for the 190-B Annex. The temporary construction facilities are now functioning. Excavation was continued for the effluent lines, junction boxes, and connecting lines. Some backfilling was accomplished. Installation of cable trays in 181-B was completed on May 9, 1955.

In 100-D Area site clearance work has been completed, and the process sewer was completed on May 18, 1955. Ventilation units and service piping are being relocated. Electricians are installing transite ducts to 190-DR Building, and new exhaust fans in 181-D.

In 190-DR Building existing concrete is being removed, and ventilation units in the south room will be installed. Installations of the 42-inch suction piping, partition walls, and toilet facilities were started May 9, 1955. Replacement of horizontal rods was completed May 3, 1955.

Preparatory work for the rod shutdown was continued in the 100-H Area.

CG-603, Hanford 4X Program, Bismuth Phosphate Plants

Design completion was revised downward to 96% complete. Construction progressed 12% to a total of 57%. Addendum No. 3 to the AEC Directive HW-338 was issued May 13, 1955, and authorized General Electric to include Phase II items in the scope of the work. Addendum No. 3 of the Minor Construction Field Release was issued May 19, 1955, and increased Minor Construction funds by $151,300 for commencement of Phase II work. Advance ordering of materials for Phase II components was continued.

The lump sum contract for construction and installation of the cross-country line and cribs was awarded on May 17, 1955. Layout for this contract was started May 21, 1955.

The overall repair program for valves, lines, gaskets, and equipment was continued. Progress of this Phase I work depends on receipt of about ten items of engineered equipment. Rehabilitation of "B" Plant by Minor Construction was about 60% complete. A target date of July 1, 1955, has been established for performing functional tests of the equipment in 221-B, 224-B, and 271-B.

CG-613, Hanford 4X Program, Metal Conversion Plant

Scoping and design are being managed by Design Section. Design work progressed 15% to a total of 53%. Design was completed on the 2714-A Warehouse, and the package was prepared for a lump sum contract. Detailed specifications and pertinent drawings were released to the major equipment vendor for purchase of corrosion-tested stainless steel. The vendor also was authorized to start shop drawings.

Preliminary work was proceeding on an additional $50,000 to the interim authorization. Purchase orders for major equipment are out for bidding, and the vendor has placed orders for stainless steel and all major components. Site preparation was scheduled to begin in early June, and excavation is to begin about June 20, 1955.

CA-533, Hanford Works Official Telephone Exchange

Design had been completed previously. Construction progressed 5% to a total of 98%. The Telephone Unit occupied the new exchange building on May 16 to start the testing and training program. Three telephone operators are being instructed in operation of the new switch board. A complete information directory and a new plant telephone book are being published. Plant forces are installing composite sets with associated polar duplex signalling equipment. A work order for $600 has been issued to 700 Area Maintenance to perform start-up functions for the 702 Building.

CA-548, Reactivated Project Proposal for New VSR Test Tower

With preliminary design completed the project proposal is being routed for General Electric approval.

CA-555, Graphite Hot Shop and Storage Building

Design progressed 3% to a total of 93%. A Work Release for $12,790 was issued to Minor Construction for site decontamination, demolition, removal, and structural additions. The start of construction was scheduled for June 7, 1955.

CG-572, Particle Problem Animal Exposure Equipment

Completion status remained at design 100%, construction 32%. Procurement activities are being continued. Construction work on Phase II was scheduled to start in early July 1955.

CG-574, Irradiation

Design had been completed previously; construction progressed .2% to a total of 99%. The "N" casks from the Savannah River plant are scheduled to arrive during early July 1955.

CG-576, General Improvements to Laboratory Area, 300 Area

Design progressed 15% to a total of 75%; construction progressed 11% to a total of 56%. Plant forces are preparing to start installation of portable emergency lights, supplementary fire alarm system for 329 Building, and installation of cell exhaust system flow indicators and alarms in 327 Building.

Minor Construction is working on alterations to ventilation systems for 328 Building. A revised Work Release is being prepared to include funds for construction of the emergency exit for 327 Building and for alterations to 328 Building.

CG-578, Effluent Water Monitoring Improvements, 100-B, D, F, DR, and H Areas

Design was completed by Design Section with the exception of acceptance test procedures. Construction progressed 2% to a total of 11%. Performance of construction

and installation work is being closely coordinated with the shutdowns for rod replacements and Panellit installations. Work at 105-H consisted of installation of instrument panels and therm-ohm pots. Rotometer racks have been fabricated for 105-DR, and turrets and cooling ducts have been installed in the sample rooms.

Work orders issued to the field have been revised to agree with the latest control estimate.

CG-579, Effluent Water Monitoring Improvements, 100-C Area

Scoping and design services in the field are being managed by the Design Section. Initial drawings and a work order to cover the mechanical phases have been issued to the field. This project is being integrated with CG-578, if any slack periods should occur because of widely-spaced shutdowns.

CA-586, First Capacity Increase, 230-KV System

Design progressed 15% to a total of 57%. Bids for the twenty-six transmission towers were received, reviewed, and returned to AEC. The contract was awarded to American Bridge Company on a bid of $52,635 with delivery on September 20, 1955.

CG-587, TBP Waste Scavenging

Design had been completed previously; construction had progressed 1% to a total of 98%. With the exception of one well, the U. S. Geological Survey has completed its portion of the project. Design Section revised the project proposal to request authorization for installation of chemical make-up facilities for a third scavenging chemical.

CG-589, Dejacketing and Ultrasonic Equipment, 105-C Building

Design had been completed previously; construction had progressed 5% to a total of 15%. Minor Construction began work during the month; however, this work was delayed beyond the scheduled date to await delivery of materials. The major items of material have either been delivered, shipped, or scheduled for shipment during early June 1955.

CA-590, Fly Ash Collection Equipment, Building 384

The revised project proposal was transmitted to AEC on May 3, 1955, and was returned unapproved on May 6, 1955.

CA-595, Car Pullers, 184 Building Coal Yard, 100-B, D, F, and H Areas

Design had been completed previously; overall construction progressed 15% to completion. It was determined that minor modifications could not be accomplished without additional funds. The AEC is revising the project proposal to cover an over-run for the modifications.

CA-596, Central Mask Washing Station, Building 2723-W

Design had been completed previously. The low bid for the lump sum portion exceeded the authorized funds available. The AEC is acting to increase authorized funds to allow the lump sum contract to be placed. The proposed increase also will include additional funds for performance of Title III work by General Electric.

CG-598, Purex Acid Fractionator

The design work to be performed by Design Section was 84% complete. Minor Construction work started in the field on May 16, 1955, with release of $75,000 for procurement and construction. A tentative agreement has been reached with Lummus Company for fabrication of equipment at a cost of $226,799. Information is being gathered for Revision No. 2 to the project proposal.

CG-599, Hanford 4X Program, 100 Area

Scoping and design are being managed by Design Section. To date 600 stainless steel buckets have been obtained, and this represents completion of present work by Project Section.

CG-600, 100-C Alterations

Scoping and design are being managed by Design Section, and design was 87% complete. Construction remained at .3% complete, and installation work is to be resumed in November 1955.

CA-601, 300 Area General Improvement Program

With preliminary design 85% complete, the project proposal is still awaiting authorization by AEC.

CG-608, Redox Crane Viewing Room

Design had been completed previously; construction progressed 25% to a total of 65%. Painting of concrete walls was completed. Revision No. 2 of the project proposal was transmitted to the AEC on May 16, 1955. The AEC authorized $28,500 for the project, and recent developments indicate that work can be completed within this amount.

CG-610, Replacement of 313 Building Roof

Design progressed 25% to completion. On the basis of completed design, a re-estimate has been requested. A Work Release, drawings, and specifications have been issued by Minor Construction. Material take-off was started, and requisitions for construction materials have been issued.

CG-611, Mobile Laboratory

With preliminary design completed, the project proposal is still 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 progressed to about 85% complete. All equipment furnished by General Electric had been received and turned over to the contractor. Arrangements are being made for the factory representatives to assist in the start-up of ventilation units. The revised project proposal is being routed for General Electric approvals.

CG-614, Hanford 4X Program, 300 Area

Scoping and design are being managed by Design Section. The project proposal was reviewed by the local AEC Review Board on May 12, 1955, and approval has been requested of the Washington AEC office.

CA-615, Mechanical Maintenance Shop Centralization, 100 Areas

With preliminary design completed work was continued on assembling data to present to AEC. Present indications are that the White Bluffs shop is inadequate.

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. The project proposal to request design and construction funds was submitted to AEC May 23, 1955.

CG-617, Additional Air-drying Facilities, Building 234-5

Scoping and design are being managed by Design Section. The final drawings have been approved for construction. A final construction estimate has been requested before issuing a Work Release to Minor Construction.

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 progressed 37% to a total of 55%. A new schedule is to be submitted when results are available from the prototype "Hot-top."

CG-621, Redox Contamination Control Facilities

Scoping and design are being managed by Design Section. Plant forces are installing cold side work, and Minor Construction forces are modifying the ozone contacting and reflux tower.

CA-625, Additional Waste Disposal Facilities, 200 Area

The design schedule for Phase I is to be revised by Design Section. Instrumentation requirements have been established, and specifications are 40% complete.

CA-627, Replacement of 300 Area Fence

With preliminary design completed the project was approved by the AEC and is awaiting formal directive approval.

IR-183, Study of Classified Scrap Disposal Problem, 300 Area Library

Detailed design was 65% completed. Comments on the design drawings are being formulated. An estimate has been obtained from Minor Construction for installation of the scrap disposal machine.

IR-184, Tocco Induction Heating Unit, 314 Building, 300 Area

Design had been completed previously; construction was 97% complete. Both work coils had been received and installed. Work was started on final cooling water supply lines and drains. Preliminary testing of the electrical connections was complete.

* * * * * * * *

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

Information concerning the decontamination equipment for the 300 Area First Aid Station has been sent to the Industrial Medical Sub-Section.

ER A-765, Painting Water Plant Structures, 100-DR Area

With scoping complete the rough draft of the project proposal is being circulated for comments. The final draft of the proposal is being prepared for approvals during early June 1955.

ER A-1219, 105-KW Laboratory

The rough draft of the project proposal has been completed, and a copy was transmitted to Pile Technology for comment and additional justification.

ER A-1220, Minor Construction Fabrication Shops Modifications

The project proposal is being circulated for General Electric approvals.

ER A-1221, Modifications to 105 Transfer Areas

A letter was written to AEC by the Manager, Engineering, recommending that no modification of the transfer area be performed. Instead, it was recommended that two replacement cask cars be procured.

ER A-1224, Westinghouse Atomic Power Division, Feasibility Study

The AEC has requested preparation of an addendum to the feasibility report. The study of a three-loop installation is being made.

ER A-1225, Continuous Charge-discharge Facility at 105-C

A proposal is being prepared by the Design Section. A project completion schedule and force curve to be used in preparing a project cost estimate were forwarded to Design Section on May 18, 1955. These items are subject to review after the project estimate is complete.

ER A-1227, Provide Additional Storage and Shop Space in the 105-B, D, and F Buildings

Work was postponed to await additional justification from Manufacturing Department.

ER A-1229, Installation of Raw Water Cross-tie, 105-C

The estimate for this project is being prepared, and construction costs appear to be about $17,000.

ER A-2756, FY-1955 Water Tank Replacements, 100-200 Areas

The project proposal is being circulated for General Electric approvals, and the project proposal is to be transmitted to the AEC during early June 1955.

ER A-3114, Relocate Oxide Burner North of Building 314

The Engineering Department has requested that the preparation of an informal request be postponed until further notice.

ER A-3117, 321 Building Fire Protection and Staging Study

The informal request was transmitted to AEC on May 10, 1955, and the AEC has requested an estimate to include additional scope of work.

ER A-3120, Remodeling of Facilities, Kadlec Hospital

A rough draft of the proposal is being routed for comments. The Industrial Medical Sub-Section has requested deletion of the fire sprinkler system and the reception room alteration.

A new estimate is being prepared based on the revision.

ER A-3122, Replacement of Steam Plant Deaerator, 384 Building

A design estimate has been received, and a request has been made for dimensions and other information for deaerators having the required capacity.

C. Related Functions

The slight increase in number of orders requiring inspection continued for the third consecutive month, and the monetary value remained high. The major work was concerned with Purex equipment and major components for the Reactor Plant Modification Program. Four large orders for concentrators, acid fractionators, calciners, and aluminum nozzles will be added to the workload; and they represent a total value of about $1,400,000.

Workload for the Corrosion Testing Program remained about the same with 132 corrosion tests and 17 chemical determinations.

Following is a resumé of inspection activities during the month:

Items	Number	Value
New orders received during the month	137	
Total orders for items requiring inspection	493	
Cumulative orders assigned to inspectors	480	$ 9,403,669
Orders assigned to inspectors this month	133	476,612
Orders completed during the month	138	1,413,413

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Reproduction output dropped to 381,707 square feet, primarily because of decreasing orders from the AEC. The major work was done on Reactor Plant Modification Program. Engineering Files distributed about 163,000 prints, of which about 8,000 were classified. The largest single order was 10,334 prints for the Reactor Plant Modification Program. Work was continued by both Units on the rehabilitation of prints and drawings.

Estimating completed 25 estimates during the month. The completed estimates comprised the following: project proposal, 2; study, 15; construction, 4; informal requests, 1; and fair cost, 3.

Field Surveys continued with assistance on the re-survey of Richland, Washington. This Unit continued with assistance on survey work throughout the areas, including transmission lines, test wells, and the "U" swamp area.

Property evaluation work was continued on recuplex, 300 Area expansion, redox capacity increase, and TBP waste scavenging. At the end of the month the Section was preparing five proposals for new projects and one revision of an existing proposal.

D. Craft Labor

See Summary above.

III. REPORT OF VISITORS

A. To Hanford, May 1955

S. J. Talian of Metalwash Corporation, Elizabeth, New Jersey, visited P. J. O'Neil from May 2 through May 20 to assist with start-up of slug pickle machine.

N. A. Rasmussen of Fryer-Knowles, Seattle, Washington, visited R. M. Griffith on May 11 to assist with start-up of furnace area conveyor system.

B. To Other Installations, May 1955

L. C. Roos visited Savannah River Works, Aiken, South Carolina, on May 5 and 6 to attend Annual Safety and Fire Protection Meeting.

H. E. Hanthorn visited Seattle, Washington, on May 13 to attend an executive meeting of the Columbia Valley Section of the American Institute of Chemical Engineers.

J. W. Clinehens visited Pacific-Oerlikon Company, Tacoma, Washington, on May 17 to discuss the production of nozzle castings.

D. L. Hovorka visited the following companies between May 9 and 20 to discuss mill practices, production testing, and technology: Argonne National Laboratory, Chicago, Illinois; Allegheny Ludlum, Brachenridge, Pennsylvania; Babcock and Wilcox, Beaver Falls, Pennsylvania; Western Electric, Pittsburgh, Pennsylvania; U. S. Steel, Pittsburgh, Pennsylvania; Carpenter Steel, Union, New Jersey; Armco Steel, Baltimore, Maryland; Allegheny-Ludlum, Wallingford, Connecticut; Nuclear Metals, Cambridge, Massachusetts; Allegheny-Ludlum, Watervliet, New York.

D. E. Newby visited the following locations between May 23 and 27 to conduct training programs and to discuss stainless steel specifications: Chicago, Illinois; AISI Stainless Committee Conference, New York, New York; Lukens Laboratory, Coattesville, Pennsylvania; Newark, New Jersey.

W. W. Walker visited the following locations between May 23 to 27 to conduct training programs and to attend a conference of the American Society for Quality Control: New York, New York; Pittsburgh, Pennsylvania; Chicago, Illinois.

ADVANCE ENGINEERING SECTION

MONTHLY REPORT

MAY, 1955

Studies indicate that the "free" gamma radiation from irradiated slugs being cooled before chemical processing would be worth millions of dollars per year if used for purposes such as low temperature sterilization of agricultural products. A substantial market appears to exist, and the irradiation service would be in the public interest.

W K Woods

Manager, Advance Engineering
ENGINEERING DEPARTMENT

[redacted]
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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

MONTHLY REPORT SUMMARY - MAY, 1955

PERSONNEL PRACTICES SECTION

Through the combined and commendable efforts of Procedures and Computing, Statistics Unit, Employee Communications and Public Relations, Printing, and Personnel Practices, results of the 1955 Attitude Survey were compiled, analyzed, and reported to management and to employees within two months from the date questionnaires were administered.

The number of applicants interviewed in May was 1,526 as compared with 1,971 for April. In addition, 104 new applicants applied by mail. Open, non-exempt, non-technical requisitions decreased from 208 at the beginning of the month to 194 at month end. One hundred and twenty-one employees were added to the roll and 73 removed during the month. The separation rate for fiscal month of May was .71% and for fiscal month of April 1.00%. These rates when converted to annual rates are 9.26% and 13.04% respectively During May 55 new requests for transfer to other type work were received by Employment, and 55 transfers were effected. Attendance recognition awards were distributed to 206 employees in May, including 23 who qualified for five-year awards.

One employee died during the month of May. Ninety-three visits were made to employees confined to Kadlec Hospital, and 27 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98.5%, in the Insurance Plan 99.4%, and the Employee Savings and Stock Bonus Plan 54%. At month end there were 564 non-veterans registered under Selective Service and 665 military reservists were on the roll. Since August 1, 1950, 406 employees have terminated to enter military service, of which 154 have returned, 37 have not claimed re-employment rights, leaving 219 still in military-leave status.

Seventy-two adopted suggestions were approved for awards in May, resulting in cash awards totaling $1,945 with a total net savings of $15,412.35.

One hundred and ninety-one offers have been extended to BS/MS graduates for the R.T.P. and there have been 60 offers accepted to date and 107 rejections. Acceptances have been received from 14 experienced candidates yet to report; there are 9 open offers and 6 other candidates are under active consideration. A total of 9 PhD candidates have accepted offers since October 1, 1954 and 121 candidates have accepted invitations to visit HAPO during the current season.

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS SECTION

The News Bureau issued 41 releases during the month, 8 of which were especially planned for national publicity purposes and were sent to the Schenectady News Bureau. Thirteen manuscripts were approved for publication and 3 technical papers received all required approvals. Arrangements were made for one speech to be delivered before a public group. The Community Newsletter was written and distributed to community leaders in Pasco, Kennewick and Richland. Two Management News Bulletins were developed and distributed to all exempt personnel during the month.

Two requests were received as a result of the LIFE burial story, one from a representative of a syndicate in Australia, and the other from Authenticated News, an American syndicate. Each of these requests was answered by furnishing several photographs and a brief write-up.

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS SECTION (Continued)

A request was received by the local Atomic Energy Commission Information Office from a writer in London, England for a picture and information on the toy train laboratory set-up pictured in LIFE magazine in March. The AEC referred the request to us, and we furnished a picture and brief write-up.

Two ideas were offered to the syndicated feature, "Strange as it Seems." They were pictures and information on the electric typewriter, modified to automatically type reactor temperature, and maps and periscopes used for underwater examination.

A total of 307 photographic assignments were completed for the month, and 14,942 prints were produced.

SALARY & WAGE ADMINISTRATION SECTION

The results of the 1955 Northwest Area Wage Survey are being analyzed. Also, information has been received and is being analyzed concerning wage comparison studies among architectural, engineering and chemical companies in the San Francisco and Los Angeles area.

Preliminary procedural planning is being accomplished to achieve optimum realization in the processing of salary data on the proposed 702 Electronic Data Processing equipment.

A position reconciliation meeting was attended in Cincinnati during the week of May 9, with joint participation by HAPO, KAPL and ANP.

UNION RELATIONS SECTION

Agreements have been executed with all four HAPO bargaining units incorporating the $25 deductible feature in our dependent insurance plan. Agreement was also reached on an extension of our employee pension and insurance plan from May 16, 1955 (anniversary date) to September 30, 1955.

One negotiating meeting was held during May with the Material Expediters and Take-Off Men and, while there have been few concessions the Company could appropriately make to this group, they have renewed their demands for wage improvements. A further meeting is contemplated early in June.

We met with the Hanford Guards Union at their request on May 24 to discuss their classification grade. While the information they presented is not considered to be particularly pertinent, we nevertheless have agreed to review the matter on the basis of their presentation.

On May 25 we requested and received clearance for the business agent of the Hanford Atomic Metal Trades Council to enter the 300 Area and the 313 Building in connection with a series of grievances originating from that location.

Some 80 Operating Engineers employed by the J. A. Jones Company on minor construction walked off the job on May 24 protesting the employer's decision to remove members of their craft from job assignments involving the operation of certain air compressors. The J. A. Jones Company has filed an unfair labor practice charge with the National Labor Relations Board and, unless the work stoppage is terminated by June 30, it is expected that the minor construction operation will be forced to shut down.

EDUCATION & TRAINING SECTION

Atomic Energy Commission approval has been received on the proposed Technician Training Program.

In the School of Nuclear Engineering 4 students are receiving master's degrees this spring based on work done in large part here at Richland. This brings to 19 the total of students who have earned MS degrees through study here.

In the Personal Development Training Programs participation for the year to date is at substantially higher rate than for the same period last year.

HEALTH & SAFETY SECTION

There were no major injuries during the month and this brings the total hours for operations since the last major injury to 5,830,000.

Effective May 1, concurrent with the closing of North Richland Industrial Medical Services, we began to supply industrial medical services for AEC contractors engaged in work in the operating areas.

The average daily census at Kadlec Hospital continued low. The Seventh Annual Kadlec Hospital Open House was the largest in attendance to date. There were 600 visitors.

The Public Health Section organized and proceeded with the administration of the Salk anti-poliomyelitis vaccine for first and second graders. Approximately one-third of the children eligible for the vaccine were given the first innoculation in the schools.

AUXILIARY OPERATIONS & PLANT PROTECTION SECTION

Moving of North Richland office personnel from Buildings 101 and 87 to Dormitories W-17, W-21 and W-20 has been scheduled for June 18. Moving of Administration Area Maintenance Shops from 722 Hangar to 716 Building has been completed. It is expected that Community Public Works personnel will occupy the vacant space in the Hangar by the end of June; following this, the Knight Street temporary hutments will be sold and removed.

General Electric was given custody of the new 700 Area plant telephone exchange on May 16. Acceptance testing and necessary tie-in work is now being performed by General Electric forces. An unusually high ratio of installation errors is being found and it has been necessary to have the contractor, Stromberg-Carlson, return their installation foreman to Richland to clear up the difficulties.

The number of outstanding documents unaccounted for was reduced from 223 to 221 through the declassification of two documents.

COMMUNITY SECTION

Effective May 2, a new rotating shift schedule became operative in the Richland Police Unit, which provides that each shift will begin two hours earlier. As a result, the three rotating shifts will start at 10:00 PM, 6:00 AM, and 2:00 PM. This new shift is designed to provide better coverage during peak traffic periods.

Employee and Public Relations

PERSONNEL PRACTICES

General

Through the combined and commendable efforts of Procedures and Computing, Statistics Unit, Employee Communications and Public Relations, Printing and Personnel Practices, results of the 1955 Attitude Survey were compiled, analyzed, and reported to management and to employees within two months from the date questionnaires were administered.

The management report was distributed to all department, section, and sub-section heads May 24 and an advance copy of the employee report was distributed to all exempt people May 24, and the employee report was distributed with pay checks May 27. The over-all attitude is good, but there are some areas of employee dissatisfaction which will be pinpointed through detailed analyses which have been requested by all departments. Work on these latter reports will commence early next month. The 1953 and 1955 surveys included 31 comparable items. Of the 31 items, 19 reflected a higher level of employee satisfaction in 1955, ranging from 1 to 12 percent, 5 reflected a lower level of employee satisfaction ranging from 1 to 4 percent, and 7 disclosed no change in attitude.

Employment	April, 1955	May, 1955
Applicants interviewed	1,971	1,526

293 of the applicants interviewed during May were individuals who applied for employment with the Company for the first time. In addition, 104 applications were received through the mail.

	April, 1955	May, 1955
Open Requisitions		
Exempt	1	1
Nonexempt	208	194

Of the 208 open, nonexempt, nontechnical requisitions at the beginning of the month, 147 were covered by interim commitments. Of the 194 open, nonexempt, nontechnical requisitions at month end, 151 were covered by interim commitments. During May, 104 new requisitions were received requesting the employment of 120 nonexempt, nontechnical employees.

	April, 1955	May, 1955
Employees added to the rolls	162	121
Employees removed from the rolls	112	73
NET GAIN OR LOSS	+ 50	+ 48

Separation Rate:

	Fiscal Month April, 1955		Fiscal Month May, 1955	
	Male	Female	Male	Female
	.69%	2.42%	.42%	2.02%

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Employee and Public Relations

PERSONNEL PRACTICES

Over-all Separation Rate:

Fiscal Month April, 1955	Fiscal Month May, 1955
1.00%	.71%

During May, 7 employees left voluntarily to accept other employment, 1 left for business for self, and 4 left to enter military service.

Transfer Data

Accumulative total of requests for transfer received since 1-1-55	382
Number of requests for transfer received during May	76
Number interviewed in May, including promotional transfers	94
Transfers effected in May, including promotional transfers	55
Transfers effected since 1-1-55, including promotional transfers	230
Transfers effected in May for employees being laid off	2
Number of stenographers transferred out of steno pool in May	4
Transfer requests active at month end	303

ADDITIONS TO THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
New Hires	2	94	2	98
Re-engaged	-	--	-	--
Reactivates	3	17	-	20
Transfers	3	--	--	3
TOTAL ADDITIONS	8	111	2	121

TERMINATIONS FROM THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
Actual Terminations	14	28	--	42
Removals from rolls(deactivates)	1	27	--	28
Transfers	2	1	--	3
TOTAL TERMINATIONS	17	56	--	73

GENERAL

	4-1955	5-1955
Photographs taken	213	163
Fingerprint impressions	177	109

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	4-1955	5-1955
General Electric cases	224	135
Facility cases	40	17
Total	264	152

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Employee and Public Relations

PERSONNEL PRACTICES

An advertisement was placed in the May issue of INSTRUMENTS AND AUTOMATION magazine for Instrument Technicians and to date nine replies have been received. Instrument advertising so far has netted a total of 46 replies. Thirty-four from the INSTRUMENTS AND AUTOMATION and the remainder from advertisements in the Houston and Birmingham newspapers.

In connection with the Technician Training Program, the following high schools have been contacted: Richland, Pasco, Kennewick, Sunnyside, Walla Walla, Prosser, Edison Technical - Seattle, Benson Polytechnic - Portland, and the five public high schools in Spokane. We have received 10 applications from students who are interested in the program.

Personnel Records and Investigations

INVESTIGATION STATISTICS	4-1955	5-1955
Cases received during the month	209	138
Cases closed	174	172
Cases found satisfactory for employment	183	138
Cases found unsatisfactory for employment	18	53
Cases closed before investigation completed	24	35
Special investigation conducted	17	10

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	5174
One-year awards made in May for those qualifying in April	40
Total two-year awards to date since January 1, 1950	2886
Two-year awards made in May for those qualifying in April	50
Total three-year awards to date	1636
Three-year awards made in May for those qualifying in April	52
Total four-year awards to date	726
Four-year awards made in May for those qualifying in April	43
Total five-year awards to date	174
Five-year awards made in May for those qualifying in April	21

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	5141
Five-year Service Recognition Pins presented during May to Exempt personnel	17
Five-year Service Recognition Pins presented during May to Nonexempt personnel	33

During May, 8 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	93
Salary checks delivered to employees at Kadlec Hospital	19
Salary checks delivered to employees at home	8

At the end of the month, participation in the Benefit Plans was as follows as compared with last month's participation:

	APRIL	MAY
Pension Plan	98.4%	98.5 %
Insurance Plan	99.4%	99.4 %
Savings and Stock Bonus Plan	51.0%	54.0%

One employee died (accidental death) during the month of May, namely:

Richards, Eugene P. W 1629 5/14/55 Manufacturing Department

Since September 1, 1946, 166 life insurance claims have been paid totaling $1,093,513.0

Fifteen letters were written concerning deceased employees and their families during May, regarding payment of monies from the Company and answering questions.

One optional retired employee died during the month of May:

Haugan, Oscar 5/30/55 Optional Retirement

All necessary arrangements have been made to settle all matters of business in connection with this deceased retired employee at an early date.

During May, 60 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 175 are continuing their residence in this vicinity, 150 are living elsewhere, and there are 17 deceased retired employees.

A total of 102 new employees attended Orientation Programs given by members of this group during the month of May. Of this number, 100% have signed to participate in the Pension Plan, 100% have signed up to participate in the Insurance Plan, and 97% 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. 564

Number Classified 1A	102
Number Classified 2A	108
Number Classified 3A	223
Number Classified 4F	79
Number Classified 1D	49
Number Classified 4A	3
Total	564

Number of Technically Trained & Engineering Personnel for whom deferments are currently being requested 104

Number of Non-Technically Trained & Engineering Personnel for whom deferments are being requested 4

Total 108

Accumulated total of deferments requested 1473

Accumulated total of deferments granted 1193

Current number of deferment requests pending 28

Current number of deferment requests denied 2

Current number of deferment requests granted 16

During Month of May

Number of deferment requests pending at Local Board Level 22

Number of deferment requests pending at Appeal Board Level 5

Number of deferment requests pending at Presidential Appeal Level 1

Total 28

Number of deferment requests denied by Local Boards 1

Number of deferment requests denied by State Appeal Boards 1

Number of deferment requests denied by Presidential Appeal Board 0

Total 2

Number of deferments granted by Local Boards 12

Number of deferments granted by State Appeal Boards 3

Number of deferments granted by Presidential Appeal Board 1

Total 16

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Services

Number of Technically Trained & Engineering Personnel denied, or requesting no further appeal, now pending induction		19
Number of Technical Graduates with over two years of deferments		77
Number of Selective Service vulnerable Technical Graduates Enlisted		1
Number of Selective Service vulnerable Technical Graduates Drafted		1
	Total	2

Reservists Data - Total Number of Reservists on Roll

Number of Active Reservists		164
Number of Inactive Reservists		482
Number of employees in the National Guard		19
	Total	665
Reservists and National Guard members subject to drills, tours of Duty, Cruises, Summer Camp and/ or Weekly or Monthly meetings		252

Military Service Leaves of Absence - August 1, 1950 through May 30, 1955

Reservists		125
Selective Service System		274
Female Employees Enlisted		7
	Total	406
Total number returned to roll		154
Reservists	71	
Sel.Serv.System	83	
Known number not claiming reemployment rights		37
Number of employees still on military leaves		219

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Suggestion Plan	April	May	Total Since 7-15-47
Suggestions Received	255	235	16911
Acknowledgements to Suggesters	234	251	
Suggestions Pending Acknowledgement	62	46	
Suggestions Referred to Depts. For Investigation	324	340	
Suggestions Pending Referral to Departments	100	68	
Investigations Completed and Suggestions Closed	424	288	
Suggestions Adopted - No Award	7	4	
Adopted Suggestions Approved by Board for Award	121	72	
Total Net Cash Savings	$12,904.89	$15,412.35	
Total Cash Awards	$1,809.00	$1,945.00	
Total Number Suggestions Outstanding to Departments	662	638	

A total of 1055 suggestions have been received in the first four months of 1955. This is the greatest number of suggestions received for the same period in any year since the Suggestion Plan has been in operation.

Life Insurance

Fifty-two requests for code information were received from insurance companies and investigation agencies and furnished during the month of May, 1955. The code information is supplied in accordance with a prearranged plan whereby employees of this project may be insured on the same basis as those working elsewhere.

Insurance Statistics

Claims reported to Department of Labor	April, 1955	
	Long Forms	Short Forms
	49	581
	May, 1955	
	Long Forms	Short Forms
	66	486

Total Since September, 1946 - 26,453

Claims reported to Travelers Insurance Co.	April, 1955	May, 1955
	12	* 11

*Of the claims reported to Travelers Insurance Company during the month of May nine were property damage, and two were bodily injury claims.

Total Since September, 1946 - 987

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Workmen's Compensation

a. - Date of Injury: 9-15-48; Employer: ; Nature of Injury: Carbon Tetrachloride Inhalation.

The Department of Labor and Industries closed Mr. claim for inhalation of carbon tetrachloride fumes without a permanent partial disability award. He later appealed to the Board of Industrial Insurance Appeals from a denial of his request for reopening. The Board held in favor of the employer and the Department and the claimant then filed a Notice of Appeal to the Superior Court for Benton County. In February 1955, a motion was made to dismiss the case for failure to make a prima facie case. On May 16, 1955 Judge Orris Hamilton granted the motion to dismiss. The plaintiff's attorney has indicated that they do not plan to pursue the case any further.

Liability Insurance

a. vs. General Electric Company and

A jury trial in the Franklin County Superior Court in March resulted in a verdict of $330 to the plaintiff. Motions were subsequently argued before Judge Hamilton resulting in an increase of $350 to the plaintiff making a grand total of $680 to him. The appeal period has since run and we have also been advised by Mr. attorney that no appeal is to be taken. Accordingly, the litigation on the case has been concluded.

b. vs. General Electric Company,

A Summons and Complaint was served upon the General Electric Company on 2-24-55. The action was brought as a result of alleged injuries sustained by Mr. in a traffic accident in Richland when a private sedan was hit in the rear by a General Electric bus driven by Mr. On 5-31-55 depositions were taken from

May 31, 1955

Employee and Public Relations
PERSONNEL PRACTICES

Technical Recruitment

Campus recruiting of 1955 BS/MS engineering and physical-science candidates for the Rotational Training Program may be summarized as follows:

Field	Offers Extended	Offers Accepted	Offers Rejected	Estimated Requirements
Engineering:				
Chemical	58	15	36	27
Mechanical	41	11	26	28
Electrical	28	10	15	17
Chemistry	27	14	11	36
Physics	20	5	13	21
Metallurgy	12	3	5	15
Other	5	2	1	
Totals	191	60	107	144

Telephone explorations with the campuses of Washington and Oregon colleges did not develop additional candidates.

To date twenty offers have been extended to business graduates and these have resulted in seven acceptances and ten rejections. A significant fraction of the rejections is attributed to a strong desire on the part of accounting majors to enter the field of public accounting with a view to ultimate certification.

Return visits were made to seven California and Colorado schools during the latter part of the month. Twenty business-graduate contacts were made, and out of these approximately 9 have been selected to receive offers. Business graduate requirements remain at 20.

Experienced drop-in candidates interviewing in the office totaled 15 during May. Other experienced activities during the month of May may be summarized as follows:

Field	Open Invitations	To Visit	Open Offers	Acceptances, but not OTR	Offers to be extended	On the Roll
Engineering:						
Electrical			1	1		
Mechanical	2		1	2	1	
Chemical				3		
Industrial				1		1
Metallurgical			1	1	1	
Geological				1		
Civil			1			

Employee and Public Relations
PERSONNEL PRACTICES

May 31, 1955

Field	Open Invitations	To Visit	Open Offers	Acceptances, but not OTR	Offers to be extended	On the Roll
Science:						
Chemistry			3	2		1
Physics			1	1		
Math			1			
Metallurgy						
Biophysics						1
Zoology-Physiology					1	
Agriculture					1	
Other:						
Library Science				1		
Public Relations						1
Industrial Mgmt.						1
Machinist						1
Auditor				1		
Totals	2		9	14	4	6

Summer Employment

	Acceptances	Open Offers	Authorizations
Professors	8 *	0	8
Graduate Students	5	0	5
Juniors	9	0	11

*Includes J. P. Frankl, Professor of Metallurgy, Northwestern University, on a one week/month consulting arrangement.

PhD Recruiting

The following table summarizes the '54 - '55 recruiting activities to date. For comparison the totals are included for the 1951 - 52 season (as of June 21, 1952), which was the last previous year of large-scale PhD effort. (Severe cutbacks in goals were experienced during 1952-53, and the 1953 - 54 season started out with a goal of only 60 invitations.)

	Cases Considered	-Invitations- Invited	Open	Accepted	Visited to date	-Offers- Made	Open	Accepted	OTR
New PhD's	497	200	15	121	87	33	9	9	5
Experienced	53	12	3	8	8	6	1	4	3
Totals	550	212	18	129	95	39	10	13	8
'51-'52 Totals (as of 6/21/52)	400	201		106 (approx.)	81	44	17	10	

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PhD Recruiting - continued May 31, 1955

During May there were 10 candidates who visited, 10 offers were extended, and 4 offer acceptances were received. As of June 1 there are about 50 cases active with respect to open invitations and offers, as well as invitations to be extended. A considerable number of new cases are also still being encountered although the direct campus PhD recruiting effort is drawing to a close.

Terminations

During May there were 20 terminations of technical or major exempt employees; 4 entered military service, 3 transferred to other GE sites, 7 entered other employment, 1 entered business for himself, 5 terminated for personal reasons including illness.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

During the month of May the News Bureau issued 41 releases. The breakdown by category, distribution and content was as follows:

Subject		Distribution	
Pay and Benefits	5	Hanford Area	27
Employment Services	13	West Coast Area	6
Good Will	7	National	8
Technology and Research	4		
Richland-Hanford Protection	1	Content	
Education and Library	4		
Health and Medicine	3	Information	3
Plant Services	2	Pictures	5
Organization Changes	1	Short	25
Richland	1	Long	4
		Feature	4

The following three releases were sent to the Schenectady News Bureau with carbon copies to N. P. Jackson for use for national publicity: a long feature on the production of radioisotopes at Hanford; a feature story, with pictures, on a woman who works in the Radiological Sciences department at Hanford as a physical-chemist; and a long story, with pictures, on the design and construction of a hydraulic lift to enable a polio victim at Hanford to enter his automobile.

A group of pictures and approximately 200 words of text were printed in the May 9 issue of LIFE magazine on the burial of radioactive junk at Hanford.

Two requests were received as a result of the LIFE burial story, one from a representative of a syndicate in Australia, and the other from Authenticated News, an American syndicate. Each of these requests was answered by furnishing several photographs and a brief write-up.

A request was received by the local Atomic Energy Commission Information Office from a writer in London, England for a picture and information on the toy train laboratory set-up pictured in LIFE magazine in March. The AEC referred the request to us, and we furnished a picture and brief write-up.

A picture circulated by wire services early in the year showing a deep bed fibrous glass filter inspired a query from the Coordinator of Plant Publications of the Owens-Corning Fiberglas Corporation. He had received a copy of the picture from the Schenectady News Bureau and wanted to know if the fibrous glass was an Owens-Corning product. We informed him it was.

Two ideas were offered to the syndicated feature, "Strange as it Seems." They were pictures and information on the electric typewriter, modified to automatically type reactor temperature, and maps and periscopes used for underwater examination.

A picture and a story were furnished, at their request, to the local paper in Hartford, Conn. on a former student of the Ward School of Electronics, now employed at Hanford.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS

A TRI-CITY HERALD interview with W. E. Johnson was summarized in a story sent to New York for syndication to GE Plant newspapers.

Three stories were sent to both our local and regional lists. They were an announcement of the arrival of Capt. Leslie J. Seigneur, an Air Force veteran, assigned to work with the Hanford biology section; an announcement of the election of Dr. W. D Norwood to the Industrial Medical Association Board; a story describing the results of the 1955 Employee Attitude Survey at Hanford.

Pictures were circulated to local papers and mailed to the University of Idaho News Bureau, with a story describing the visit to Hanford of a group of engineering students from the University.

The decision to administer Salk anti-polio vaccine through Richland schools was announced, and a follow-up story gave the schedules for vaccination in the various schools.

The placement of portions of an "Inside Hanford" broadcast over the CBS radio network was announced in a story intended to boost listenership.

Eleven requests for information concerning Hanford were received from students. Fact sheets, a clipping booklet, and a cartoon booklet were sent to each requester.

The editor of NUCLEONICS magazine visited Hanford on May 2, 3 and 4. During his stay, he interviewed 18 General Electric people. He also reviewed a number of manuscripts for possible future publication in NUCLEONICS.

The following five signed articles were submitted to the editor of NUCLEONICS:

"Automatic Uranium Slug Washer Works Underwater," by J. L. Spencer.

"Underwater De-Jacketing of Uranium Slugs," by R. S. Peterson.

"Primary Inspection Station," by H. J. Bellarts.

"Coolant Distribution Problems in Large Nuclear Reactors," by J. E. Robb.

"A Reactor Control System Utilizing Boron Trifluoride Gas," by W. E. Cawley.

The following manuscripts received all required approvals during the month:

"Radiation Shielding Windows," by L. T. Pedersen, for publication.

"A Decade of Progress in the Chemical Separation of Plutonium," by W. N. Mobley, was submitted to the GE REVIEW for publication in the September atomic power issue.

An entry for POWER magazine's Modernization Contest by F. J. Cox, received all required approvals and was submitted by the author.

"Zero-Sequence Current Density in the Earth," by Marion E. Forsman, was sent to Schenectady for submission to ELECTRICAL ENGINEERING.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Permission for the use of Mr. W. E. Johnson's speech, "Long Range Electric Power Loutlook," and slides was given to M. O. Christman, Manager, Advertising and Sales Promotion of the Seattle office.

At the request of the Education and Training Section, the Speakers Bureau contacted the Washington State Advertising Commission in an effort to obtain a speaker for a group of 100 technical graduates who will report to Hanford on June 27. A speaker was not available, but the Commission will provide a film, tourist packets for each man, and a greeting from the Governor.

Final approval was obtained from Schenectady on all of the 18 papers by Hanford authors for the Geneva Conference.

Approval was obtained from AEC for our Graphite Development Unit to send two prints of the graphite block and the 300 Area test reactor tube to Battelle Memorial Institute for reproduction in a report.

Thirteen manuscripts and three abstracts were cleared during the month.

The film strip, "Hometown - Richland," a projector and screen, were furnished to a local church organization for a program during the week.

A Community Newsletter was written and mailed to community leaders in Richland, Kennewick and Pasco.

At the request of the Richland Assistant Postmaster, Public Communications provided a complete set of protective clothing, the picture tour of Hanford, and 200 copies each of "Adventure Inside the Atom" and "Some Facts About Hanford" for a meeting of the Washington State Postal Supervisors in Richland.

A speech text on water treatment and waste disposal at Hanford was prepared by consolidating information contained in five technical papers, two HAPO booklets, and a recent News Bureau release. This material was requested by the Atomic Information Programs and will be presented at a meeting of the Water and Sewage Industries and Manufacturers Association in Chicago, June 12, 1955.

The State Employment Service asked that GE provide someone to represent Governor Langlie at a meeting called by AEC at Washington to consider radiation and contamination hazards that might result from the operation of power reactors in the future. We recommended that Emil C. Jensen of the State Department of Health be the Governor's representative. W. A. McAdams' name has been presented as the technical advisor. An alternate was suggested, J. M. Smith. The State Employment Service will let us know definitely regarding this proposal in the near future.

Eight semi-weekly reports of important Hanford happenings were prepared and sent to Mr. C. W. La Pierre during the month.

Production of Civil Defense notices on the Richland Evacuation Plan and new warning signals, and distribution to all Richland residences and commercial facilities, were coordinated by Employee Communications.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Visit by the Philadelphia Electric Company officials and by the Rocky Mountain Power group were assisted through preparation of name tags for both and of programs for the Philadelphia Electric group. In addition, copies of the "Here's Hanford," booklet, produced by Employee Communications, were provided. Arrangement of the North hall of the library was handled for the Philadelphia Electric visit and for a special meeting held by F. K. McCune on May 25.

Statement concerning communications was developed for publication in the Union Relations Information bulletin at the request of the Manager-Union Relations. A general statement for inclusion in each week's issue has been requested.

The May health bulletin, "A Little Goes a Long Way" and the May safety bulletin, "The Reasons Why" were distributed during the month.

Two Management NEWS Bulletins were produced and distributed to all exempt personnel.

Six news features of high employee interest were published in the GENERAL ELECTRIC NEWS during the month: Suggestion plan award winners, employees who won engineering awards, use of color TV in Hanford production areas, HAPO test reactor, test evacuation of school children by transportation personnel, and reactions of employees upon receiving his five year service award pin.

Commercial artwork provided during the month included: one full-page photo layout; revised editorial cartoons; a bus lot diagram; photo retouching; seven page layouts and six cartoons for Attitude Survey; layout and final artwork for the June health bulletin and the June safety topic; two visualizer cartoons for Training; photo retouching for Audio Visual Communications' construction movie; final artwork on two radiation protection posters; and layouts for two additional radiation posters.

Fifty-six film projection engagements were met, with showings to 983 employees.

During the month, the Audio-Visual Communications Unit presented a total of eight radio programs...four on the weekly "Hanford Science Forum" series, and four on the popular "Inside Hanford" series. Unusual and noteworthy is the fact that two of the "Inside Hanford" features were condensed and were presented as the feature on CBS' "Sunday Desk" May 29, at the request of this major network. The recordings presented were on the subject of Hanford's defense by the Fifth AAA Group whose job it is to protect Hanford against enemy bombing attack. Included are the voices of GE's "Inside Hanford" reporter, the Helicopter Pilot and the Commanding Officer of the Anti-Aircraft Group who describe, during an actual flight over the Hanford Project, the role the Army plays in their 24-hour-a-day watch over this atomic project. Outstanding is the fact HAPO's total of 45 minutes per week radio time and 30 minutes per month of television time is granted without cost to the Company. Also, this is the second CBS "Sunday Desk" publicity that Hanford has enjoyed, the first being a condensation of the "Hanford Vignettes" feature presented on the 10th anniversary of the start-up of the first reactor.

A week was spent at the California studio of the film Contractor by the producer and the writer, completing final editing and film assembly of a new documentary motion picture being produced by GE's Audio-Visual Communications Unit for the AEC. The film, titled "Building a Chemical Separations Facility," covers the complete construc-

tion of this unique new chemical process plant. The composite film, including sound, will be reviewed about June 1, by GE and AEC officials.

At the request of the New York Office who had previously viewed the film, the HAPO-produced color, public relations version of the Orientation film, "Here's Hanford," was sent to Dean Drelis of CBS Television News. CBS is planning a special network release on the subject of atomic power and specifically asked for excerpts from "Here's Hanford," to point up the potential of this new power source. The national network feature will be telecast sometime in June and we will be notified well in advance so that appropriate publicity can be given the feature.

A new film production on thePurex Operations and facilities is underway following a request from Manufacturing Department for Audio-Visual Communications to do two new feature-length motion pictures. The films will cover the subjects of "Remote Handling of Canyon Equipment," and "The Purex Process and Related Equipment," to augment an audio-visual training program for Purex Operators. 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, and decontaminating chemical equipment.

An estimated 66,000 feet of 16mm motion picture film produced for the Company and the AEC on the entire construction program of 100-K reactor area is being rough-edited and cataloged by subject. This operation will take about one month to complete and will provide a complete chronological index of all film on this feature by subject, thereby simplifying the work necessary for producing films on this construction program. The second of a series of films being produced for AEC will be put together from this footage during the month of June.

Graphics May assignments were distributed as follows:

	Precent
General Administrative (Includes Operations Research)	2
Employee and Public Relations	18
Engineering	42
Manufacturing	8
Financial	8
Radiological Sciences	20
Atomic Energy Commission	2
	100

	April	May
Total assignments completed	56	62
Total assignments backlog	42	39

Graphics work for technical publications included preparation of ten mathematical models and binding of Production Planning Manual, HW-36079; Redox Plant Efficiency Chart, HW-36733; nine figures on "1954 Slug Rupture Experience at Hanford, HW-35221; eight graphs for "Power Exposure" report, HW-36128, eight graphs for "The Corrosion of Hanford Fuel Elements", HW-34196; nine graphs on "Corrosion Limits of Hanford Piles", HW-36191; two charts for report "Evaluation - Sodium Graphite Reactor", HW - 36274; one graph for report on "Effect of Sound on Ears", HW-36220; two graphs for Plant Nutrition report HW-33681 and one graph for report on "Uranium-Silicon Alloy Elements".

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Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS

There were four major assignments this month which were developed on a rush basis. Although the priority work interrupted routine plant service, all deadline dates were met.

During the latter part of the month fourteen orders, resulting in approximately sixty units (charts, illustrations and displays), were developed primarily for presentation purposes during the recent visit of G.E. officials. Thrity-two charts were prepared for Department and Section Manager use and twenty-eight illustrations and displays were developed for use throughout the Areas. Illustration work included development of a detailed persnective cut-a-way of the 105-K Area Reactor, a perspective of the 105-K Area with a process water flow overlay, flow diagrams of the Z Plant, 1706-KE and KER water studies process and the Metal Preparation process, and fifteen illustrations and posters for display in the Radio-Metallurgy Building. Other work included fuel element display units and completion of repair work on the Purex Section Model.

During the first two weeks of May approximately one hundred charts, graphs and schematic drawings were completed for authors preparing papers in connection with the Geneva Convention. Assignments from the Engineering Department included graphics work on schematic drawing and charts for a report on "Graphite as a Moderator" and schematic flow diagrams of separation and recovery processes. Work for the Radiological Sciences Department included maps and charts on "Environmental Contamination from Nuclear Plants During Peace Time Production", and Plant Nutrition and Microbiology, Aquatic Biology and Biology Control Studies. Of the one hundred plates prepared, forty-four charts had to be revised or completely redrawn due to the author's changes in copy.

Rush work prepared for the Philadelphia Electric Meeting of May 5 included development of visual aids on reactor and power recovery systems, floor plan layout, process flow and a cross section cut-a-way illustration of a sphere type dual purpose reactor.

A special rush request was received from Civil Defense for evacuation maps and direction cards. This work included preparation of a zone map of Richland with four color overlays, a map of the surrounding area and roads with directional line overlays showing routes to be taken by specified zones, and individual zone cards showing road directions in corresponding colors together with pertinent instructions.

A model was prepared for Radiological Sciences showing depth and velocity of underground water movement, plan and elevation views andperspective cut-a-way through earth strata cut north of 200 Areas and to east through the river.

A total of 307 photographic assignments were covered for the month of May, 1955, 14,942 prints were produced of which 5,699 were "A" and "B" photographs; 9,243 were area and news. 1,349 negatives were exposed.

See attached statistical report for Photography Unit.

PHOTOGRAPHY UNIT MONTHLY REPORT MAY, 1955		2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	16" X 20"	N E G.	35mm Color Slides	35mm B&W Slides	3¼" X 4" Color Slides	3¼" X 4" B&W Slides	16mm M.P. Film
EMPLOYEE & PUBLIC RELATIONS	1	52													
SALARY & WAGE ADMIN.	1					10				6					
EDUCATION & TRAIN.	2		2							2					
Train. & Develop.	1					3				2					
EMP. COMM. & PUBL. RELATIONS															
Public Comm.	59		181		7	293				52					
Audio-Visual	9				13	6			10	16		15			1655
Empl. Comm.	65		47		4	145				271					
Graphics	1					2									
AUXILIARY OPER. & PLANT PROTECT.	2					9	40								
Fire Protection	1					7									
Telephone	1						6			6					
Security & Patrol		3001	2631							150					
Plant Protect.Services	1														
COMMUNITY															
Fire	1			10	8										
Police	8		210	8		7				10					
Maint.& Renovation	1					2									
Library	1					9				3					
HEALTH & SAFETY	1		3												
Industrial Med.	1					5				4					
Records															
Hospital Admin.	3									9	3				
ENGINEERING															
ADVANCE ENGR.	1						2			2					
DESIGN	3			4			14			4					
Process Engr.	8			150		2	174			3				7	
Design Engr.	7					6	301			47				12	

(Continued)

PHOTOGRAPHY UNIT MONTHLY REPORT MAY, 1955 (Con't)	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	16" X 20"	N E G.	35mm Color Slides	35mm B&W Slides	3¼" X 4" Color Slides	3¼" X 4" B&W Slides	16mm M.P. Film
PROJECT	1					2								
Project Aux.	3				44	2								
Inspection	1			48										
Project Engr.	1		9											
Minor Construction	1		124						119					
ENGR. ADMINISTRATION	1					1								
PILE TECHNOLOGY	9		42			29			21				44	
Metal. Res.	15		20	17	50	4097	4		113			5	6	
Pile Materials	8				107	543			38				16	
Pile Engr.	7					135		22						
Fuel Technology	23				27	1196	3		258			34	16	
SEPARATIONS TECH.	1					22								
Chem. Devel.	6		103		14	131			81					
Chem. Research	1					2			11					
MANUFACTURING														
Manufac. Admin.	1	12												
REACTOR														
Process	7				5	164			26					
METAL PREPARATION	10	76			27	37			44					
FINANCIAL	5	63			2				5					
RADIOLOGICAL SCIENCES														
BIOPHYSICS	2		18										6	
BIOLOGY	14		12						22	6	12	95	35	
RADIOLOGICAL ENGINEERING	1												3	
RADIOLOGICAL ADMINISTRATION & COMMUNICATIONS	2	7			8								2	

(Continued)

PHOTOGRAPHY UNIT MONTHLY REPORT MAY, 1955	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	16" X 20"	N E G.	35mm Color Slides	35mm B&W Slides	3¼" X 4" Color Slides	3¼" X 4" B&W Slides	16mm M.P. Film
A.E.C. PROPERTY MANAGEMENT	4				32									
A.E.C. SAFETY	1				4									
A.E.C. SECURITY	2	1		11					2					
TOTAIS	307	3,212	3,086	499	97	826	6,898	7	10	1,349	9	27	134	149	1,655'

	MARCH	APRIL	MAY
TOTAL ASSIGNMENTS	340	325	307
TOTAL NEGATIVES	1,914	1,414	1,349
TOTAL PRINTS	19,073	18,031	14,942

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Employee and Public Relations

UNION RELATIONS

Union Relations - Operations Personnel

No official decision has been received from the National Labor Relations Board concerning the April 19 unfair labor practice charge brought by the Hanford Atomic Metal Trades Council against the Company in connection with the closing of the Prosser barricade. Several telephone conversations have been held to clear up certain questions of the Board. On May 25 a local newspaper article informed us that the matter had been forwarded to the Washington office for consideration by the General Counsel. In a subsequent telephone discussion regarding this development, we were informed that the action was strictly routine, having been initiated by the new General Counsel since he took office. The Seattle office indicated that they were trying to expedite the matter and inferred that the charge would probably be dismissed at the Washington level.

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, the details of which were included in our April report. The matter is in the hands of the NLRB in Washington, D. C. and no official word has been received from them by months end.

No decision has been received from Judge Harold A. Seering, Seattle, arbitrator of the dispute between the Company and the Hanford Guards Union involving an alleged violation of the call-in procedure.

Agreements have been executed with all four HAPO bargaining units incorporating the $25 deductible feature into our dependent insurance plan. The new plan which will become effective October 1, 1955 and run for one year provides that a maximum of $25 will be deducted from the total charges made by a hospital for special hospital services, room and board before insurance payments begin. Agreement was also reached on an extension of our employee pension and insurance plan from May 16, 1955 (anniversary date) to September 30, 1955. It is anticipated that our union agreements covering this subject will be opened at that time to discuss any revisions in the plan that may come about through national negotiations.

Negotiations with the Material Expediters and Take-Off Men, who won bargaining rights last October 1 in a representation election, were resumed on May 20. While there have been few concessions the Company could appropriately make to this group, we have gained the impression during the last two meetings that they are resigned to the fact that there is nothing more "in the pot" and that our negotiations could be concluded. However, for some unexplained reason they have renewed with considerable vigor their demands for wage improvements. A further meeting is contemplated early in June.

We met with the Hanford Guards Union at their request on May 24 to discuss their classification grade. While they were quick to admit that wages paid to Hanford Guards were in excess of those paid at any other location they could point to, they nevertheless felt that the differential between the HAPO rates for Guards as compared to the crafts was greater than the differential to be found at many other locations. While the information they presented is not considered to be particularly pertinent, we nevertheless have agreed to review the matter on the basis of their presentation. A further meeting will be held the first week in June.

Employee and Public Relations

UNION RELATIONS

Since the organization of the plant in 1949, no non-employee representative of any local union has been granted security clearance to enter any of the production areas behind the barricade. On May 25, we requested and received clearance for the business agent of the Hanford Atomic Metal Trades Council to enter the 300 Area and the 313 Building in connection with a series of grievances originating from that location.

Grievance Statistics:

A total of forty-eight (48) grievances were received and three (3) Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

	ALL DEPARTMENTS				
	HAMTC	HGU	BSEIU	Total Unit	Total Nonunit
Received this month	44	0	0	44	4
Received this year	221	2	0	223	11
Step I					
Pending April 30	0	0	0	0	1
Settled this month*	37	0	0	37	0
Settled this year	140	2	0	142	2
Pending May 31	5	0	0	5	2
Step II					
Pending April 30	53	0	0	53	0
Settled this month**	14	0	0	14	2
Settled this year	66	1	0	67	6
Pending May 31	43	0	0	43	0
Arbitration					
Pending April 30	5	1	0	6	
Settled this month	5	0	0	5	
Settled this year	5	0	0	5	
Pending May 31	2	1	0	3	
Total Settled this Month	56	0	0	56	2
Total Settled this Year	211	3	0	214	8

*Grievances brought to Step II prior to March 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 March 1, 1955, are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION RELATIONS

BY DEPARTMENTS

	Received		Settled Step I*		Settled Step II**	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Manufacturing						
Reactor - Unit	14	104	12	64	8	32
Separations - Unit	13	59	16	46	1	13
- Nonunit	1	5	0	2	1	3
Metal Preparation - Unit	10	21	3	12	3	7
Transportation - Unit	3	15	2	10	2	7
Electrical Utilities - Unit	0	4	0	1	0	2
Stores - Unit	1	3	1	2	0	1
Employee & Public Relations						
Community - Unit	1	4	1	1	0	2
Aux. Ops. & Pl. Pro. - Unit	1	10	1	6	0	3
Radiological Sciences - Unit	1	3	1	1	0	0
- Nonunit	0	1	0	0	0	0
Engineering - Nonunit	2	3	0	0	0	1
Financial - Nonunit	1	2	0	1	1	1

*Grievances brought to Step II prior to March 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 March 1, 1955, are, for the purpose of this report, considered settled at Step II.

BY SUBJECTS

	Manufacturing		Emp. & Pub. Relations		Radiological Sciences		Engineering		Financial	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Unit										
Recognition	0	1	0	0	0	0				
Discrimination	1	3	0	0	0	0				
Jurisdiction	19	78	1	9	0	0				
Health-Safety-Sanitation	2	8	0	2	0	1				
Hours of Work	1	15	0	0	0	0				
Overtime Rates	4	28	0	0	1	1				
Sick Leave	0	1	0	0	0	0				
Vacations	0	1	0	0	0	0				
Seniority	6	11	0	0	0	0				
Wage Rates	5	13	0	1	0	0				
Miscellaneous	4	48	0	0	0	0				

Employee and Public Relations

UNION RELATIONS

BY SUBJECTS (Cont'd.)

	Manufacturing		Emp. & Pub. Relations		Radiological Sciences		Engineering		Financial	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Nonunit										
Continuity of Service	0	1	0	0	0	0	0	0	0	0
Overtime Rates	0	0	0	0	0	0	0	0	0	1
Wage Rates	0	2	0	0	0	0	0	0	0	0
Miscellaneous	0	0	0	0	0	1	0	1	0	0
Working Conditions	1	1	0	0	0	0	0	0	0	0
Work Assignment	0	0	0	0	0	0	1	1	1	1
Holidays	0	1	0	0	0	0	0	0	0	0

Construction Liaison

Some 80 Operating Engineers employed by the J. A. Jones Company on minor construction walked off the job on May 24 protesting the employer's decision to remove members of their craft from job assignments involving the operation of certain air compressors. This has long been a featherbedding assignment which actually required no one to be in constant attendance. As of this writing the men are still off the job and the J. A. Jones Company has filed an unfair labor practice charge with the NLRB alleging that the strike constitutes a violation of the Taft-Hartley Act by trying to force the employer (1) to assign work to a specific classification or craft and (2) to pay for services which are not performed. Unless the work stoppage is terminated by June 10, it is expected that the minor construction operation will be forced to shut down.

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 May:

1. The results of the 1955 Northwest Area Wage Survey are being analyzed. Also, information has been received and is being analyzed concerning wage comparison studies among architectural, engineering and chemical companies in the San Francisco and Los Angeles area.

2. Preliminary procedural planning is being accomplished to achieve optimum realization in the processing of salary data on the proposed 702 Electronic Data Processing equipment.

3. Work continues on the study of first-line supervisory differentials. It is anticipated that the analysis of the Employee and Public Relations Department will be completed during June.

4. A position reconciliation meeting was attended in Cincinnati during the week of May 9, with joint participation by HAPO, KAPL and ANP.

Employee and Public Relations Department
Education and Training Section - May 1955

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:

Department	Last Month	This Month
Engineering		
Pile Technology	4	6
Separations Technology	3	4
Design	6	3
Project	1	2
Manufacturing		
Metal Preparation	2	1
Separations	0	0
Reactor	4	4
Radiological Sciences		
Biology	0	0
Records and Standards	0	0
Bio-Physics	3	3
Financial		
Procedures and Computing	1	2
Total	24	25

Permanent Placements

There was one placement off the Program, this with Pile Technology. Two others expected during May did not materialize due to temporary budget limitations in one of the sections. Two placements are anticipated in June. Placements of the present group of trainees will be held at a minimum until new trainees gain experience to adequately fill rotational assignments.

Additions

Four new trainees reported in May, two being transferred to HAPO from the Company's eastern engineering program. Both of these men were 1954 graduates from northwest colleges. An effort is underway to procure more men with similar backgrounds for a short period of training prior to placement at Hanford.

At present, approximately 40 new graduates are expected in June and July. The breakdown by fields of training compared to the numbers presently on the Program is as follows:

	New Hires	Present Trainees	Total
Chemistry	13	3	16
Physics	4	1	5
Metallurgy	2	3	5
Chemical Engineering	8	8	16
Mechanical Engineering	8	3	11
Electrical Engineering	3	6	9
General Engineering	2	0	2
Civil Engineering	0	1	1
	40	25	65

Each section using trainees has been notified of the expected shortage of manpower since the number reporting this year is a little less than half of the anticipated requirements. Steps being taken by the sections in view of the reduced manpower are:(1) curtailment of work programs and(2) utilization of more non-technical employees where feasible. Delayed completion of construction of some new facilities has temporarily alleviated the shortage in some instances.

Previously it was indicated that a short period of training classes (two to three weeks) might be required to utilize these graduates' time until security clearances could be obtained. Further investigation has shown that most of the trainees should have security clearance by the time they report to work, therefore no full-time training program is planned.

An orientation program to acquaint new technical and business graduates with the Company's orientation, history and progress and the functions of the Hanford departments has been developed. The program is modeled after similar orientation periods used during the last four years, having been modified to include changes suggested by the trainees. This year's program is scheduled for the mornings of June 27, 28 and 29.

As part of the Introductory Program, an evening social to include the wives of all trainees is planned for June 29. Last year's program proved to be effective in assisting these new employees to become better acquainted with each other.

Selective Service

There were seven losses to Selective Service, all except one being former members of the Program. The other one was a direct hire. This makes a total of 61 men lost to Selective Service in the 21 months since the first man was drafted. The losses have been as follows:

Former Program Members	51
Direct Hires	8
Program Members	2
Total	61

The seven lost this month is higher than the expected average, which is still anticipated to be two-to-three per month.

One member of the Program was called to active duty during the month due to ROTC training commitment, making a total of 45, in this category, during 5½ years' operation of this Program.

Information Booklet

A new information booklet on the policies, procedure of operation and description of assignments on the Rotational Training Program was issued during the month. Favorable comments were received from the trainees. Copies are to be issued to responsible supervisors in the near future.

Technician Training Program

Commission approval was received on the proposed Technician Training Program. Assistance is being given to Personnel Practices Section in interviewing students who are qualified for the Program at some of the Washington high schools.

University Relations

Discussions are underway with Employee Communications and Public Relations Section to resume the program of providing qualified Hanford speakers on selected subjects to colleges and universities to promote relationship with the schools. The talks will be intended primarily for student engineering and professional societies.

Summer Programs

Seven university professors have been accepted for summer employment and also five graduate students. Plans are being formulated to orient these employees and to carry out an effective summer program for acquainting them with the Hanford management and work programs.

Assistance is being given these university people in locating suitable housing for the summer. In this connection, liaison was established with the local schools to procure public school teachers' homes for summer rental.

Employee and Public Relations Department
Education and Training Section - May 1955

SCHOOL OF NUCLEAR ENGINEERING

Spring Semester

Students currently enrolled in the School are classified by departments as follows:

Department	Graduate	College-Level		Total Students
		Have BS Degree	No Degree	
Engineering	121	21	18	160
Manufacturing	23	36	76	135
Financial	2	26	13	41
Radiological Sciences	17	7	6	30
Employee & Public Relations	*17	3	6	26
Non-GE	6	4	9	19
Totals	186	97	128	411

* Includes 16 Tech Grads on rotation

The instructors teaching the Spring 1955 classes come from the departments as follows:

Department	Instructors
Engineering	21
Financial	6
Operations Research Study	3
Radiological Sciences	2
Legal	1

In a number of courses, each of several lecturers contributes his special subjects; this is helpful in maintaining a high caliber of instruction.

Much effort has been used during the month to encourage both students and instructors to finish the work of the semester in good style. By frequent contacts with instructors the school administration has been able to keep to a minimum the number of students who feel they must withdraw from class. A questionnaire to be sent to all current students will aid in evaluating and improving the program.

Completions of Graduate Programs

Four students have completed all the requirements for a Master's Degree this spring and will receive degrees at the June commencements of their respective schools. Three men will graduate from the University of Idaho and one from Oregon State College. Two majored in Chemistry, one in Chemical Engineering and one in Mathematics. This makes a total of 19 men who have earned a Master's Degree by work done through the School of Nuclear Engineering.

Employee and Public Relations Department
Education and Training Section - May 1955

Special Requests

A course in Inspection Sampling was given especially for inspectors in the Project Section. W. W. Walker advises that the class was very helpful, and had provided new techniques immediately useful. One result which has wide approval has been the adoption of a statistical approach to all inspection work. It is expected that other groups will want to know more about statistical methods as used in this work.

Procedures Manual

A new manual outlining the operating procedures of the School of Nuclear Engineering is being prepared. Over 70% of the material has been written. It is expected that this manual will be substantially completed during June. Additions or changes may be necessary as the colleges modify their requirements.

PERSONNEL DEVELOPMENT

P.M.S. group No. 80 completed the program on Wednesday, May 18. There were 19 supervisory and exempt employees who completed the course.

Conference Leading - On April 26 this program was presented with 17 exempt personnel attending, and again on May 3 when there were 15 exempt personnel present. These were regularly scheduled programs. In addition, 10 Transportation Section supervisors were given this program on May 10, and on May 18 we presented it again for 8 exempt Project Section personnel. These latter two presentations were by request.

Your Stake in American Industry (Economics) was again presented on April 25, on a regularly scheduled basis with 20 exempt personnel attending. This program was four hours in length, and has been well received.

Effective Human Relations - The third session of Group No. 2 was presented on April 28 with 11 supervisors completing the program. The first session of Group No. 3 was started on May 5, and there were 23 exempt personnel present. By request of K. G. Grimm, Financial Department, a special schedule was arranged for 10 exempt Financial Department personnel. Meetings were conducted on May 12 and 19, and the last session will be presented on May 26.

Customer Relations was presented to two groups of Community personnel on April 25 and May 5. There were 20 exempt and non-exempt people present at the first session and 41 at the latter. The extended Customer Relations schedule for bus drivers is being met, and meetings were presented on May, 2, 3, 4, 5, 6 and the evening of May 11. On Friday, May 20, at the request of the correspondent for Metal Preparations, Customer Relations was presented to 35 non-exempt clerical people in the 300 Area.

Employee and Public Relations Department
Education and Training Section - May 1955

Pre-Supervisory Training for 11 non-exempt members of the Transportation Section was completed on May 23. This program was presented in four sessions on May 2, 9, 16 and 23. The total program took approximately eight hours, and informal comments indicate very good acceptance and effectiveness.

New Exempt and Supervisory Orientation (24-hour) began on Monday, May 23, and will be completed May 25. There is a total of 28 exempt and new supervisory personnel attending.

J. R. D. - A preview of this program was presented in the 300 Area on May 5 with approximately 20 members of higher supervision present. On May 9 the same program was presented in the 100-H Area with 12 supervisors attending and on May 12 it was given in the 200-W Area with 15 supervisors present. On May 19 it was presented to 20 Power and Maintenance Sub-Section (Separations) supervisors in the 200-W Area, and on May 24 a slightly longer presentation was given to 24 members of the Purex Sub-Section in the 200-E Area.

McGregor Program - This program (along with J.R.D.) was given to higher supervision of the 300 Area on May 5, in the 100-H Area on May 9, and in 200-W on May 12. There were a total of 47 supervisors present. As a result of the presentation made in 200-W on May 12, we had a request for presentation on May 17. This was presented to 35 members of Redox.

Labor Management Relations was presented on a scheduled basis on May 2. There were 25 exempt employees present.

Report Writing was conducted on Friday, May 6 with 17 exempt personnel attending and again on Friday, May 20 with 5 exempt personnel present.

The Supervisor's Accident Prevention program was offered in 200-W Area on May 11 and 12 supervisors attended this program.

J.M.I. - The fourth and final session of this program was completed on May 10. This was conducted in the 100-D Area and was started on April 5. Although 7 people began this course, only 4 actually completed the studies.

On Tuesday, April 26, a P.M.S. completion dinner meeting was held with 47 in attendance. W. E. Johnson was guest speaker.

V. J. Byron attended a talk by Dr. Rosenstein in Yakima, Washington, on April 27.

R. B. Shoen and D. G. Dayton attended a Work Simplification Program in 200-W Area on the mornings of April 26 and 27.

Revisions of P.M.S. script and examples have been completed.

Employee and Public Relations Department
Education and Training Section - May 1955

Our attendance record filing system has been rearranged. Summary of program attendance of five major programs for 1952 through April, 1955 has been completed. This report covers all Sections and Sub-Sections.

R. B. Shoen presented the McGregor program to Pacific Northwest Personnel Management Association members in Yakima on the night of May 10.

V. J. Byron has prepared new demonstration aids for the J.R.D. program.

V. J. Byron met with F. J. McKinnon to discuss changes and modernization of the Accident Prevention program.

Review of material is being made for a "Vendor Inspection" program to be presented in June for off-plant inspectors of the Project Section.

Personal Development forms have been revised.

On Wednesday, May 18, questionnaires were sent to supervisors of employees who had attended P.M.S. and the 24-Hour Program in recent months. We are trying to determine actual results of these programs rather than just the impression created at the end of the program. Results will be reported at a later date.

On May 25, V. J. Byron presented a talk on "The Why of Human Relations" to the Gyro Club in Yakima, Washington.

There were requests for 168 program attendance transcripts this month, indicating increasing interest on the part of supervisors. On May 5, 25 lists were furnished to correspondents covering 102 people in their groups who attended programs in April.

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
MAY 1955

General

Personnel Changes

The roll decreased from 241 to 234.

Employee Relations

Employee attendance at 39 meetings was 272.

Visits

O. E. Bakko and A. R. Adeline attended a meeting of the Washington Chapter of American Association of Hospital Accountants held in Wenatchee. A. R. Allen, M.D., of Selah, was a visitor to the Public Health Unit for the chest clinic. Irene Schwartz, medical social worker, State Department of Health, visited the Public Health Unit.

Industrial Medicine

Dispensary visits decreased from 6,502 to 5,739 and medical examinations increased from 800 to 874. Effective May 1 this section began to furnish industrial medical services at the request of the AEC for AEC contractors engaged in work in the operating areas. Sickness absenteeism was 1.50% vs. 1.78% for April, while total absenteeism was 2.29% vs. 2.56% for April. The year to date total absenteeism of 2.41% compares with 2.57% for 1954.

Safety & Fire Prevention

	Operations		Community	
	May	To Date	May	To Date
Major Injuries	0	2	0	0.
Sub-Major Injuries	0	10	0	0
Total Injuries	381	2188	34	132

As a result of several studies, a proposal to assure users of wooden ladders the best results, has been agreed upon by Purchasing and Safety. Emphasis on injury causes appears increasing as more discussion of injury occurrences is taking place at safety meetings. A demonstration of fire-retardent paint was observed and deemed to have merit in certain locations. Each will be specifically appraised.

Kadlec Hospital

The average daily adult census decreased from 56.8 to 56.4 as compared to 69.7 a year ago. The ratio of inpatient hospital employees to patients, including newborn, was 2.04. The net expense for the operation of Kadlec Hospital for April was $22,021 as compared with $25,357 for March. The seventh annual Kadlec Hospital Open House was the largest to date. There were 600 visitors.

HEALTH & SAFETY SECTION

MAY 1955

General (Continued)

Public Health

May showed the predicted decline of the usual communicable diseases. Major attention during the month was focused on organizing and proceeding with the administration of the Salk anti-polio vaccine. About one-third of the children in the first and second grades eligible for the vaccine were given the first inoculation in the schools.

Routine inspection of food handling establishments was made and grade cards were issued to 12 restaurants. Six qualified for "A" cards and six for "B" cards. Flies were found to be prevalent in some of the restaurants. Information as to effective control measures was given. Principle violation found was inadequate cleaning of equipment. Bakeries were requested to discontinue delivering of cream pies due to the warmer weather.

The mosquito control program has been closely supervised. Seven hundred gallons of DDT in oil was sprayed for larva control. Indiscriminate use of water in horse pastures continues to be a problem. A flat bottom boat has been ordered to use in areas inaccessible to mobile equipment and should be of great value during and after high water season.

Costs-April

	March	April	April Budget
Industrial Medicine	$45,420	$45,186	$47,982
Public Health (Oper.)	9,686	8,444	10,117
Kadlec Hospital (Net)	25,357	22,021	10,458
Hospital Expense Credits	1,544	1,781	2,000
Safety & Fire Prevention	12,443	12,269	13,888
Total Health and Safety	$94,450	$89,701	$84,445

The net cost of operating the Health and Safety Section before charges were assessed to various departments was $89,701, about $4,750 less than March costs, but still about $5,250 in excess of the budget. The overrun of the hospital continued in April, but at a reduced rate since a decrease was made in operating costs. Five employees were removed from the hospital rolls during April, with five more scheduled for removal during May.

All other sections were well within budgeted levels during the month. Public Health operations showed a sizeable decrease in costs due mainly to reduced administrative costs. Costs for the Safety and Fire Prevention Unit and Industrial Medical sub-section were at approximately the March level.

HEALTH & SAFETY SECTION

MAY 1955

Industrial Medical Services

The total number of dispensary visits decreased from 6,502 in April to 5,739. The May, 1954, volume was 4,725. The total number of medical examinations increased from 800 to 874. General Electric employees sustained no major and no sub-major injuries. Contractor employees sustained one sub-major injury. Nursing coverage remained the same in all areas. There were 29 nurses and one nurse aid on the non-exempt roll.

Effective May 1, concurrent with the closing of the North Richland Industrial Medical services and at the request of the AEC, we began to supply industrial medical services for AEC contractors engaged in work in the operating areas. These services will consist of dispensary visits and pre-placement medical examinations.

An Industrial Physicians Staff meeting was held on May 25th. Papers heard at the Industrial Medical Association in Buffalo, New York, in April were reviewed by Doctors Norwood and Scudder.

It has been planned to enlarge the scope of the pre-placement examination and include for selected groups a survey test with the objective of identifying such mental characteristics as delinquency, troublesome behavior, hostility toward authority, undependability, dishonest behavior, chronic tardiness, absenteeism, low efficiency and accident tendencies. The use of the test requires a contract with Dr. Gough, associated with the University of California, and AEC approval has not been obtained.

The request for the preparation of a project proposal for increasing examination space facilities has been approved.

A questionnaire for the measurement of the effectiveness of new supervisor orientation in the personal aspects of safety was sent out to approximately forty supervisors during the month. A booklet on Mental Health was also procured for distribution to all supervisors.

The Health Activities Committee met on May 19 and the health topic on "Milk" was presented. Material on this subject was prepared for distribution throughout the plant. The absenteeism for April was 2.56% for all causes. The year to date figure was 2.44% compared to 2.78% for the 1954 year to date figure. The year to date absenteeism due to sickness was down to 1.76% compared to the 1954 year to date sickness rate of 2.16%.

Net costs for April were $507 greater than March costs, however gross costs were actually $296 less. The decrease in the services rendered to the Atomic Energy Commission accounted for nearly all of the increase in net costs. A decrease in the net cost of operations may be anticipated for future months, resulting from expense credits for services performed for construction contractors. It appears that these services will result in expense credits of approximately $2,000 monthly.

Industrial Medical Services (Continued)

Costs-Operations	April	March	Increase (Decrease)
Salaries	$33,751	$34,205	$ (454)
Continuity of Service	2,531	2,565	(34)
Laundry	187	179	8
Utilities,Transportation,Maintenance	4,399	4,912	(513)
Supplies and Other	5,138	4,441	697
Total Gross Costs	46,006	46,302	(296)
Less: Revenue	820	882	(62)
Expense Credits	10,982	11,723	(741)
Net Cost of Operation	$34,204	$33,697	$ 507

The net cost of operations for the first ten months of FY 1955 amounted to $355,000 as compared with the budget of $379,000, an underrun of nearly 7%. This underrun should increase slightly during the balance of the fiscal year.

HEALTH & SAFETY SECTION

MAY 1955

Industrial-Medical Services (Continued)	April	May	Year to Date
Physical Examinations			
Operations			
Pre-employment	143	99	649
Rehire	16	16	87
Annual	128	150	763
Interim	19	25	296
A.E.C.	24	22	122
Re-examination and recheck	136	131	751
Termination	105	69	380
Sub-total	571	512	3048
Contractors			
Annual	0	0	82
Pre-employment	112	175	839
Recheck	48	47	252
Re-examinations	0	1	1
Termination and Transfer	58	75	203
Interim	11	64	75
Sub-total	229	362	1452
Total Physical Examinations	800	874	4500
Laboratory Examinations			
Clinical Laboratory			
Government	93	82	462
Pre-employment, Termination, Transfer	2428	2841	13255
Annual	703	873	4250
Recheck (Area)	103	82	1545
First Aid	5	29	71
Total	3332	3907	19583
X-Ray			
Government	18	8	74
Pre-employment, Termination, Transfer	335	418	1953
Annual	170	203	1206
First Aid	105	84	433
Total	628	713	3666
Electrocardiographs	97	71	447
Physical Therapy Cases Referred	293	205	1251

HEALTH & SAFETY SECTION

MAY 1955

Industrial Medical Services (Continued)	April	May	Year to Date
First Aid Treatments			
Operations			
New Occupational Cases	546	466	2512
Occupational Case Retreatments	1910	1846	8324
Non-occupational Treatments	3295	2834	14321
Sub-total	5751	5146	25157
Construction			
New Occupational Cases	121	112	575
Occupational Case Retreatments	435	321	1847
Non-occupational Treatments	195	160	742
Sub-total	751	593	3164
Total First Aid Treatments	6502	5739	28321
Major Injuries			
General Electric	0	0	2
Contractors	1	1	2
Total	1	1	4
Sub-Major Injuries			
General Electric	5	0	10
Contractors	0	0	1
Total	5	0	11
Nurses' Visits			
Calls made	1	3	11
Employee Personal Illness	1	3	8
No. absent due to illness in family	0	0	1
No. not at home when call was made	0	0	2

Kadlec Hospital

The average daily adult census decreased from 56.8 to 56.4 as compared to 69.7 a year ago. This represents an occupancy percentage of 51.7 broken down as follows: Mixed Service (Medical, Surgical and Pediatrics) 51.6; Obstetrical Service 52.4. A further breakdown of the Mixed Service shows an occupancy percentage of 41.9 on Medical, 62.5 on Surgical and 52.1 on Pediatrics.

The minimum and maximum daily census ranged as follows:

	Minimum	Maximum
Mixed Service	30	58
Obstetrical Service	7	19
Total Adult	40	69

The average daily newborn census decreased from 11.4 to 11.0 as compared with 8.9 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.56
Obstetrical	4.53
Newborn	3.27

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of April was 2.45. When newborn infants are included, the ratio is 2.04.

The net expense for the operation of Kadlec Hospital for April was $22,021 as compared with $25,357 for March. Summary is as follows:

Kadlec Hospital net expense $22,021
This is a decrease of approximately $3,300 from the month of March due primarily to personnel reductions made necessary by the low patient census. Gross costs decreased $8,100, revenue decreased $5,000 and expense credits increased $200.

Mr. O. E. Bakko and Mr. A. Adeline of the Financial Department, attended a meeting of the Washington Chapter of the American Association of Hospital Accountants held in Wenatchee.

Our seventh annual Open House as a part of National Hospital Week activities was the largest one we have had. Approximately 600 people toured the hospital during the afternoon and evening, including a large number of children. Many people became better acquainted with their hospital's facilities.

Kadlec Hospital (Continued)

Following is a summary of employee relations meetings held in the Health and Safety Section during the month of May.

	Meetings	Attendance
Hospital	26	174
Industrial Medicine	3	12
Public Health	6	45
Safety & Fire Prevention	1	12
General	3	18
Total	39	261

HEALTH & SAFETY SECTION

MAY 1955

Hospital Unit (Continued)	April	May	Year to Date
Kadlec Hospital			
Average Daily Adult Census	56.8	56.4	64.6
Medical	16.8	15.5	17.8
Surgical	21.0	20.0	23.8
Pediatrics	8.3	9.9	12.4
Mixed	46.1	45.4	54.0
Obstetrical	10.7	11.0	10.6
Average Daily Newborn Census	11.4	11.0	10.7
Maximum Daily Census:			
Mixed Services	59	58	83
Obstetrical	16	19	19
Total Adult Census	70	69	95
Minimum Daily Census:			
Mixed Services	32	30	30
Obstetrical Service	8	7	3
Total Adult Census	40	40	40
Admissions: Adult	445	454	2473
Discharges: Adult	450	458	2478
Medical	110	103	591
Surgical	205	183	1066
Pediatrics	62	85	428
Mixed	377	371	2085
Obstetrical	73	87	389
Newborn	71	75	354
Patient Days: Adult	1705	1748	9748
Medical	505	480	2687
Surgical	628	620	3587
Pediatrics	249	308	1879
Mixed	1382	1408	8153
Obstetrical	323	340	1595
Newborn	342	341	1609
Average Length of Stay: Adults	3.8	3.8	3.9
Medical	4.6	4.7	4.5
Surgical	3.1	3.4	3.4
Pediatrics	4.0	3.6	4.4
Mixed	3.7	3.8	3.9
Obstetrical	4.4	3.9	4.1
Newborn	4.8	4.5	4.5
Occupancy Percentage: Adults	52.1	51.7	59.3
Medical	45.4	41.9	48.1
Surgical	65.6	62.5	64.3
Pediatrics	43.7	52.1	65.3
Mixed	52.4	51.6	61.4
Obstetrical	51.0	52.4	50.5
Newborn	43.8	42.3	41.2

(Occupancy Percentage based on 109 adult beds and 26 bassinets.)

Hospital Unit (Continued)	April	May	Year to Date
Kadlec Hospital (Continued)			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	4.03	3.56	
Obstetrics	4.43	4.53	
Newborn	3.18	3.27	
Avg. No. Employees per Patient (excluding newborn)	2.45		
Operations: Major	55	74	337
Minor	70	58	386
E.E.N.T.	75	56	308
Dental	0	0	3
Births: Live	74	77	351
Still	0	2	7
Deaths	4	4	20
Hospital Net Death Rate	.38%	.19%	.28%
Net Autopsy Rate	0	75.0	30.0
Discharged Against Advice	0	2	3
One Day Cases	237	128	845
Admission Sources:			
Richland	83.8	84.4	81.2
North Richland	4.3	3.3	6.5
Other	11.9	12.3	12.3
Admissions by Employment:			
General Electric	73.1	74.2	74.0
Government	2.9	4.2	2.8
Facility	6.7	7.9	6.1
Contractors	3.6	4.0	8.1
Schools	2.5	.9	1.3
Others	11.2	8.8	7.7
Hospital Outpatients:			
First Aid	442	503	2357
Clinical Laboratory	168	133	807
Bacteriological Laboratory	35	51	272
X-Ray	174	156	791
Physical Therapy	313	322	1624
Physical Therapy Treatments			
Outpatient Treatments	330	335	1686
Hospital	107	85	435
Total	437	420	2121
Pharmacy			
No. of Prescriptions Filled	2351	2462	13002
No. of Store Orders Filled	471	499	2523

HEALTH & SAFETY SECTION

MAY 1955

Hospital Unit (Continued)	April	May	Year to Date
Kadlec Hospital (Continued)			
Clinical Laboratory Examinations			
Outpatient Examinations	410	399	2117
Hospital	3131	3370	18147
Public Health	0	0	1
Total	3541	3769	20265
X-Ray Examinations			
Outpatient Examinations	167	170	854
Hospital	174	224	1108
Public Health	24	0	56
Total	365	394	2018
Electrocardiographs			
Outpatient Examinations	1	5	10
Hospital	29	35	144
Total	30	40	154
Bacteriological Laboratory			
Treated Water Samples	183	225	976
Milk Samples (Inc.Cream & Ice Cream)	30	32	168
Other Bacteriological Tests	417	443	2571
Total	630	700	3715
Patient Meals			
Regulars	2687	2692	14537
Children under 8	497	618	4056
Specials	627	616	3851
Softs	602	523	3057
Tonsil and Adenoid	96	89	443
Liquids	147	94	670
Surgical Liquids	76	86	418
Total	4732	4718	27032
Cafeteria Meals			
Noon	1516	1462	8206
Night	264	276	1474
Total	1780	1738	9680

HEALTH & SAFETY SECTION

MAY 1955

Public Health Unit

May showed the predicted decline of the usual communicable diseases. Major attention during the month was focused on organizing and proceeding with the administration of the Salk anti-poliomyelitis vaccine. Approximately one-third of the children in the first and second grades eligible for the vaccine were given the first inoculation in the schools. The month saw the completion of chest x-rays by the Mobile Unit. Reports of suspected cases of pulmonary tuberculosis have already been received and distributed to the local doctors. In addition, the quarterly chest clinic was held.

Visitors to the unit included A. R. Allen, M.D., for the chest clinic, Waring J. Fitch, Hearing Consultant of the State Department of Health, Mrs. Irene Schwartz, Medical Social Worker, State Department of Health, in connection with the Crippled Children's program, and several teachers concerning a summer course on Public Health to be given by the staff next month.

Some of the activities of the unit were cut down by illness and vacations. Of the contemplated merger of the unit with the Benton-Franklin District Health Department, no additional progress has been noted.

Of the 247 contacts made by the social service counselors this month, 149 were focused on problems in family relationships. This included marital conflict and conflict between parents and their children.

Personality and behavior problems were the focus of 92 contacts. There were 60 direct contacts with children, 11 with adolescents and 21 with adults.

In addition 5 contacts were made in regard to problems stemming from physical and mental illness.

One contact was made regarding substitute care of children.

Routine inspection of food handling establishments was made and grade cards were issued to 12 restaurants. Six qualified for "A" cards and six for "B" cards. Flies were found to be prevalent in some of the restaurants. Information as to effective control measures was given. Principle violation found was inadequate cleaning of equipment.

Bakeries were requested to discontinue delivering of cream pies due to the warmer weather.

Bacteriological results of pasteurized milk samples continue to be satisfactory. Twenty-nine dairy farms were inspected. Two were degraded because of insanitary conditions and high bacteria counts. One dairy farm was approved for the shipping of Grade "A" milk.

Public Health Unit (Continued)

Five nuisance complaints were investigated involving cleaning of dog pens and yards. Three citations were issued for indiscriminate dumping of trash and garbage.

Bacteriological results of water and sewage samples were satisfactory.

The mosquito control program has been closely supervised. Seven hundred gallons of DDT in oil was sprayed for larva control. Indiscriminate use of water in horse pastures continues to be a problem. A flat bottom boat has been ordered to use in areas inaccessible to mobile equipment and should be of great value during and after high water season.

An increase was noted in the number of dog bites investigated over the preceding month.

HEALTH & SAFETY SECTION

MAY 1955

Public Health (Continued)	April	May	Year to Date
Education			
Pamphlets distributed	13,986	10,989	61,992
News Releases	18	18	51
Staff Meetings	2	0	4
Classes	3	9	73
Attendance	64	167	1,038
Lectures & Talks	3	2	49
Attendance	336	27	2,430
Films Shown	23	34	110
Attendance	1,384	838	4,419
Community Conferences & Meetings	13	12	66
Radio Broadcasts	8	9	33
Immunizations			
Diphtheria	48	0	226
Diphtheria Booster	9	0	649
Diptussis	0	0	15
Tetanus	0	0	1
Tetanus Booster	6	0	10
Pertussis	0	0	1
Pertussis Booster	6	0	10
Smallpox	45	0	1,379
Tuberculin Test	10	13	33
Immune Globulin	2	10	61
Other	0	0	1
Social Service			
Cases carried over	104	82	487
Cases admitted	16	11	71
Cases closed	38	20	107
Remaining case load	82	73	451
Activities:			
Home Visits	1	1	7
Office Interviews	359	246	1,597
Conferences	44	36	259
Meetings	14	9	69
Sanitation			
Inspections made	129	129	591
Conferences held	32	17	130

HEALTH & SAFETY SECTION

MAY 1955

Public Health (Continued)	April	May	Year to Date
Communicable Diseases			
Chickenpox	29	21	174
German Measles	7	7	49
Impetigo	0	3	6
Influenza (U.R.I.)	0	0	4
Infectious Mononucleosis	0	0	9
Infectious Hepatitis	0	0	10
Measles	2	4	19
Meningitis	1	1	2
Mumps	113	81	386
Pinkeye	4	1	7
Pneumonia	0	0	1
Rheumatic Fever	0	1	1
Ringworm	2	0	11
Roseola	1	6	14
Scarlet Fever	31	19	116
Strep. Infection (Throat)	1	0	1
Tuberculosis	2	2	5
Whooping Cough	4	0	9
Total	197	146	824
Total No. Nursing Field Visits	590	333	2,437
Total No. Nursing Office Visits	50	43	251

COMMUNITY SECTION

MAY 1955

ORGANIZATION AND PERSONNEL:

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Nonexempt	Exempt	Nonexempt
Community Administration	1	1	1	1
Maintenance & Renovation Unit	9	142	9	144
Police Unit	16	31	16	29
Commercial & Residential Property Unit	8	25	7	24
Fire Unit	63	0	65	0
Transfer Study	1	0	1	0
Community Operations Administration	1	1	1	1
Electrical Unit	5	15	5	16
Engineering Unit	7	4	7	4
Water & Sewerage Utilities Unit	5	21	5	22
Library Unit	4	10*	3	10*
Public Works & Recreation Unit	7	42	7	44
	127	292	127	295

	Exempt	Nonexempt
Additions to Payroll	0	8
Transfers In	0	2
Removals from Payroll	1	5
Transfers Out	1	0

Net Increase 3

*Includes two half-time employees.

MAINTENANCE AND RENOVATION UNIT

May, 1955

		Exempt	Nonexempt
Employees -	Beginning of month	9	142
	New hires	0	2
	Reactivate from illness leave	0	1
	Leave of absence - illness	0	1
Employees -	End of month	9	144

INTERIOR PAINT REPORT - FY 1955

FOREMAN: R. A. CHAMBLISS

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	110	18	110	0
B	158	14	158	0
C	9	0	9	0
D	0			
E	6	0	6	0
F	34	3	34	0
G	0			
H	66	11	66	0
K	4	2	4	0
L	1	0	1	0
M	1	0	1	0
Q	4	1	4	0
R	1	0	1	0
S	1	0	1	0
T	3	0	3	0
U	18	0	16	2
V	46	1	39	7
Y	95	0	89	6
Z	6	0	6	0
1BP	66	1	60	6
2BP	453	7	412	41
3BP	316	3	298	18
Tract	17	1	10	7
1BR Apt.	12	0	11	1
2BR Apt.	0			
W-13 Apt.	1	1	1	0
TOTAL	1428	63	1340	88

50 Units added.

Painted halls of Medical-Dental Building - 93 hours.

Est. MH B. F.	55,873	Actual MH B. F.	55,550½
Est. MH This Month	3,170	Actual MH This Month	3,256½
Total Est. MH	59,043	Total Actual MH	58,807

EXTERIOR PAINT REPORT - FY 1955

FOREMEN: D. W. Lukins
M. E. Tappan

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	264	6	204	60
B	188	2	168	20
D	3	0	0	3
E	24	0	18	6
F	68	0	58	10
G	4	0	0	4
H	95	0	90	5
L	40	0	35	5
1BP	21	2	2	19
2BP	105	17	17	88
3BP	33	11	11	22
Tract	16	0	12	4
Dormitories	23	0	0	23
TOTAL	884	38	615	269

Est. MH B. F.	31,598	Actual MH B. F.	30,389
Est. MH This Month	823	Actual MH This Month	824½
Total Est. MH	32,421	Total Actual MH	31,213½

Spray time 4-21-55 to date: 897½ manhours.

1193245

PLUMBING SHOP

FOREMAN - F. L. ELSENSOHN

JOB DESCRIPTION	NO. COMPLETED
Electric water heaters replaced	11
Laundry trays replaced	30
Shower stalls replaced	5
Miscellaneous plumbing work orders completed	33
Cleared major sewer stoppages caused by tree roots	52
Cleared major sewer stoppage in main sewer	1
Radiators completely overhauled in dormitories	30
Plumbing for floor and sink linoleum replacements	92
Worked on plumbing service orders	40.5 hours
Worked on service orders planting grass seed where trees had been removed	20 hours
Repaired blacktop walks	9
Loaned two men to Public Works one day	16 hours

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 as change houses for exterior paint program at four locations.

Excavated with backhoe machine and handwork for the cleaning out of roots in sewer lines, and to repair all leaking and broken underground piping, and backfilled.

Landscaped where sewers and other lines were dug out and trees were removed, and seeded excavated portions.

SERVICE ORDER CREW

FOREMAN - L. F. CARPENTER

A.	Service orders on hand at beginning of month	354
B.	Received during the month	1859
C.	Completed during the month	1580
D.	On hand at end of the month	633

E. A total of 158.9 hours were spent on work orders.

F. Backlog of incomplete service orders by craft:

Electrical	569
Plumbing	35
Carpentry	28
Total	633

431 incomplete service orders on fire inspection.

RENOVATION AND LABOR CREW

FOREMAN - B. C. Bain

The following services were performed during the month:

Houses renovated	41
Trash pickups	43
Minor carpenter repairs to housing units	31
Minor carpenter repairs to dormitories	9
Renovation minor paint jobs	27
Complete paint jobs	1
Redecorated following a fire	1
Houses sprayed for insect control	4

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.

Boiler rooms in all dormitories were sprayed for silver fish.

MECHANICAL SHOP

FOREMAN - Z. H. Mayberry

A. Millwright Crew:

Furnace service orders	86
Routine furnace inspections	105

Three coolers have been installed on 1116 Building, and two coolers will be removed so that better roof maintenance can be performed.

One cooler at the Dental Clinic and one at the Richland Theater had had water pan leaks welded.

B. Sheetmetal Crew:

Shower stalls installed	5
Shower stalls fabricated	16
Replaced smoke pipes	11
Installed Ranch house bathroom window flashings	120
Replaced gutters	9
Coolers repaired	5

C. Labor Crew:

Tree removal orders	47
Top soil orders	7
Blacktop sidewalk pick ups	9
Reseeded where trees had been removed	19

All Government property has been removed from 1125 Warehouse and proper disposal made of same.

LINOLEUM AND CARPENTER SHOP

FOREMAN - R. M. MARTIN

Replaced bath wall tile	12	
Repaired bath wall tile	2	
Replaced bath floor linoleum	1	
Repaired bath floor linoleum	1	
Replaced bedroom floor linoleum	4	
Repaired bedroom floor linoleum	2	
Replaced living room floor linoleum	3	
Replaced dining room floor linoleum	3	
Replaced kitchen floor linoleum	29	
Repaired kitchen floor linoleum	5	
Replaced hall linoleum	1	
Replaced utility room floor linoleum	1	
Replaced steps linoleum	16	
Replaced sink top linoleum	100	
Repaired sink top linoleum	2	
Replaced work bench linoleum	6	
Repaired porches	56	
Replaced kitchen sinks	4	
Chempoints	120	
Paint touch ups	89	
Exterior doors repaired	2	
Interior doors repaired	5	
Interior carpentry - houses	16	
Drilled weepholes	21	
Repaired siding	5	
Repaired walls - houses	7	
Sash balances	1	
Sidewalk forms	3	
Repaired floor boards	1	
Repaired roofs	57	
Ranch house screens	36	
Replaced floor linoleum - commercial property	1	
Ranch ladders	61	
Replaced screen doors	200	
2 men repaired screens - exterior paint program	21	days each
3 men repaired prefabs - exterior paint program	21	days each
Dormitories repaired - exterior paint program	3	

COMMUNITY SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
MAY 1955

ORGANIZATION

	Exempt	Non-Exempt
Employees - Beginning of Month	16	31
Transfers In	0	0
Transfers Out	0	1
New Hires	0	0
Terminations	0	1
Total - End of Month	16	29

GENERAL

Effective May 2, 1955, a new rotating shift schedule became operative in the Richland Police Unit, which provides that each shift will begin two hours earlier. As a result, the three rotating shifts will start at 10:00 P.M., 6:00 A.M., and 2:00 P.M. This new shift is designed to provide better coverage during peak traffic periods.

During the month, a bike registration campaign was conducted in all the schools and a total of 173 new registrations were received.

Detective L. M. Linkous attended Report Writing School on May 2.

The annual Teen-Age Road-E-O, sponsored by the Junior Chamber of Commerce, was held on May 1. Taking top honors was Irwin Rogers, winner of the 1953 contest, and who is still eligible to compete in next year's contest. If he wins again, he will retain the large Police Athletic League trophy. He will also participate in the State competition to be held later this summer.

TRAFFIC

RICHLAND	1955 APR.	1955 MAY	1954 APR.	1954 MAY	1955 TOTAL TO DATE	1954 TOTAL SAME PERIOD
REPORTABLE ACCIDENTS	16	17	20	20	97	111
PROPERTY DAMAGE ACCIDENTS	15	16	19	16	86	96
INJURY ACCIDENTS	3	1	1	4	11	15
TOTAL PERSONS INJURED	4	1	1	4	12	15
FATAL ACCIDENTS	0	0	0	0	0	0
ACCIDENTS-DAYLIGHT HOURS	14	14	10	16	68	73
DARKNESS HOURS	2	3	10	4	30	38
ACCIDENTS-BUSINESS DISTRICT	7	4	7	5	22	30
RESIDENTIAL "	6	10	11	11	60	64
OTHER "	3	3	2	4	16	17
ACCIDENTS INVESTIGATED	12	13	14	13	64	63
CRIMINAL COMPLAINTS FILED	8	10	14	9	33	43
VIOLATIONS CONTRIBUTING TO ACCIDENTS:						
NEGLIGENT DRIVING	1	6	6	2	12	21
FAIL. TO YIELD RIGHT OF WAY	8	3	4	8	24	26
FOLLOWING TOO CLOSELY	2	2	5	2	12	22
DRUNK DRIVING	0	0	1	1	2	2
PEDESTRIAN VIOLATION	1	1	0	3	3	3
INATTENTION TO DRIVING	0	0	0	0	2	0
RECKLESS DRIVING	1	0	1	0	1	3
SPEEDING	0	0	0	0	1	1
UNSAFE SPEED	0	0	0	1	18	20
IMPROPER PARKING	0	0	0	0	0	3
IMPROPER BACKING	0	0	1	2	5	6
DISREGARDING STOP SIGN	0	2	0	0	4	1
HIT AND RUN	0	1	0	0	2	0
IMPROPER PASSING	1	1	0	0	3	0
IMPROPER TURN	0	0	0	0	3	1
FAILURE TO SIGNAL	0	0	1	0	1	1
WIDE RIGHT TURN	0	0	1	0	0	1
BICYCLE VIOLATION	0	0	0	1	0	2
DEFECTIVE EQUIPMENT	1	1	0	0	2	0
WRONG SIDE OF ROAD	0	0	0	0	1	0
ANIMAL IN ROAD	0	0	0	0	1	0
NORTH RICHLAND						
REPORTABLE ACCIDENTS	0	1	10	8	28	42
PROPERTY DAMAGE ACCIDENTS	0	0	8	5	25	34
INJURY ACCIDENTS	0	1	2	3	3	8

RICHLAND	1955 APRIL	1955 MAY	AVE. PER ACCIDENT 1955 APRIL	AVE. PER ACCIDENT 1955 MAY	AVE. PER ACCIDENT 1954 APRIL	AVE. PER ACCIDENT 1954 MAY
ACCIDENT PROPERTY DAMAGE	$3,870.00	$3,575.00	$241.88	$210.29	$306.10	$176.00

TRAINING

THERE WAS NO RANGE ACTIVITY DURING THE MONTH OF MAY.

ACTIVITIES	APRIL		MAY	
	RICHLAND	NORTH RICHLAND	RICHLAND	NORTH RICHLAND
BANK ESCORTS AND DETAILS	11	3	4	0
BICYCLES IMPOUNDED	0	0	1	0
BICYCLE VIOLATIONS, OTHER	0	0	0	0
BICYCLES REGISTERED	35	0	175	0
CHILDREN LOST OR FOUND	19	0	34	5
COMPLAINTS INVESTIGATED	45	2	91	5
DEATHS REPORTED	0	0	0	0
DOG, CAT, LOOSE STOCK COMPLAINTS	5	0	11	3
DOGS, CATS, REPORTED LOST OR FOUND	4	0	7	1
DOORS, WINDOWS, FOUND OPEN IN FACILITIES	50	10	57	12
EMERGENCY MESSAGES DELIVERED	19	25	14	25
FIRES INVESTIGATED	4	0	7	3
GUNS REGISTERED	10	0	8	0
LAW ENFORCEMENT AGENCIES ASSISTED	4	0	8	0
LETTERS OF INQUIRY	185	0	148	0
MISCELLANEOUS ESCORTS	5	0	8	0
PERSONS INJURED BY DOGS	2	0	2	0
PLANT DEPARTMENTS ASSISTED	16	0	16	3
PRISONERS PROCESSED THROUGH JAIL	7	1	12	2
PRIVATE INDIVIDUALS ASSISTED	18	0	57	2
PROPERTY LOST OR FOUND	27	0	18	1
RECORDS INQUIRIES	60	0	50	0
REPORTS PROCESSED THROUGH RECORDS	238	43	156	16
STREET LIGHTS OUT REPORTED TO ELECTRICAL	117	0	122	0
TRAFFIC SAFETY MEETINGS (MAY ATTENDANCE 301)	5	0	11	0
TOTAL	886	84	1017	78

MONTHLY REPORT
RICHLAND POLICE DEPARTMENT
(RICHLAND-NORTH RICHLAND)
MAY 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								
a. Murder & Non-Neg. Mans.								
b. Mans. by Negligence								
2. Rape								
3. Robbery								
4. Aggravated Assault								
5. Burg.-Break. & Entry	4	-	-	-	-	-	-	-
6. Larceny Over $50.00	3	1	-	-	-	-	-	1
Under $50.00	16	-	1	-	4	-	5**	-
7. Auto Theft	-	-	-	-	-	-	-	-
TOTAL PART I CASES	23	1	1	-	4	-	5	1
PART II								
8. Other Assaults	1	-	-	-	-	-	1	-
9. Forgery & Counterfeit	3	-	-	-	-	-	3	-
10. Embezzlement & Fraud	2	-	-	-	-	-	2	-
11. Stolen Prop:Buy:Receive	-	-	-	-	-	-	-	-
12. Weapons:Carry:Possessing	-	-	-	-	-	-	-	-
13. Prostitution	-	-	-	-	-	-	-	-
14. Sex Offenses	1	-	-	-	-	-	1	-
15. Offenses Ag. Fam. & Child	-	-	-	-	-	-	-	-
16. Narcotics	-	-	-	-	-	-	-	-
17. Liquor Laws	-	-	-	-	-	-	-	-
18. Drunkenness	6	-	-	-	1	-	5	-
19. Disorderly Conduct	2	-	-	-	1	-	1	-
20. Vagrancy	-	-	-	-	-	-	-	-
21. Gambling	-	-	-	-	-	-	-	-
22. Drunk Driving	2	-	-	-	-	-	2	-
23. Viol. Road & Driving Laws:								
Failure to Stop & Identify	1	-	-	-	-	-	1	-
Speeding	25	10	-	-	13	6	12	4
Stop Sign	21	3	-	-	9	1	12	2
Reckless Driving	3	-	-	-	-	-	3	-

Case 4

1193252

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
Right of Way	5	1	-	-	2	1	3	-
Negligent Driving	13	1	-	-	1	-	12	1
Defective Equipment	52	4	-	-	47	4	5	-
Illegal Passing	2	-	-	-	2	-	-	-
24. Parking	7	2	-	-	4	2	3	-
25. All Other Traffic Viol.	19	6	-	-	10	1	9	5
26. All Other Offenses:								
Malicious Mischief	4	-	-	-	1	-	-	-
Vandalism	6	-	-	-	2	-	-	-
Impounded Bikes	1	-	-	-	1	-	-	-
Prowler	1	-	-	-	-	-	-	-
Family Disturbance	3	1	-	-	3	1	-	-
Obscene Phone Calls	5	-	-	-	-	-	-	-
Investigation	3	-	-	-	1	-	-	-
Public Nuisance	1	-	-	-	-	-	1	-
Damage to Property	1	-	-	-	1	-	-	-
27. Suspicion	-	-	-	-	-	-	-	-
TOTAL PART II CASES	190	28	-	-	99	16	76	12
PART III								
28. Missing Persons	8	2	-	-	8	2	-	-
Lost Persons	20	1	-	-	20	1	-	-
Lost Animals	5	-	-	-	1	-	-	-
Lost Property	26	-	-	-	20	-	-	-
29. Found persons	-	-	-	-	-	-	-	-
Found Property	43	-	-	-	42	-	-	-
Found Animals	1	-	-	-	-	-	-	-
TOTAL PART III CASES	103	3	-	-	91	3	-	-

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.	1	1						
32. Prop. Dam. M.V. Accid.	16	-						
33. Other Traffic Accid.	-	-						
34. Public Accidents	)							
35. Home Accidents	)	No Accurate Statistics Kept						
36. Occupational Accidents	)							
37. Firearms Accidents	-	-						
38. Dog Bites	1	-						
39. Suicides	-	-						
40. Suicide Attempts	1	-						
41. Sud. Death & Bod. Found	-	-						
42. Sick Cared For	-	-						
43. Mental Cases	-	-						
TOTAL PART IV CASES	19	1						
COMPOSITE TOTALS PART I,II,III,IV CASES	339	33	1	-	194	19	81	13

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 petit larceny cleared arrest for previous year and 3 petit larcenies cleared arrest for previous month.

Property reported stolen	Richland	$2,416.25
Property recovered	Richland	$1,638.75
Property reported stolen	No. Rich.	$ 182.00
Property recovered	No. Rich.	$ 137.00

MONTHLY REPORT — RICHLAND POLICE DEPARTMENT — JUVENILES INVOLVED — MAY

OFFENSES	NO. CASES	JUVENILES	SEX	10	12	13	14	15	16	17
RICHLAND										
Larceny	2	3	M	1	1			1		
Vandalism	2	7	M			5	1		1	
Juvenile With Beer	1	2	F							2
Illegal Shooting	1	1	M						1	
Disorderly Conduct	1	3	M				1	1	1	
TOTALS	7	16		1	1	5	2	2	3	2

RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
MAY 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.
DEFECTIVE EQUIPMENT	7	5	2							$11.00	$57.50	$12.50 (1)
IMPROPERLY DISP. VEHICLE LICENSE	1	1									3.50	
INVALID VEHICLE LICENSE	1	1									5.00	2.50 (1)
NO DRIVERS LICENSE	15	9	6						3	42.50	34.50	
NO CERT. OF REGISTRATION	3	3							1		9.50	
NEGLIGENT DRIVING	11	8	1	1	1				1	25.00	190.00	10.00 (1)
NEG DRIVING, LIQUOR INVOLVED	5	3	1	1						50.00	180.00	
RECKLESS DRIVING	2	2									67.50	
DRUNK DRIVING	3	1		1				1	1		102.50	
SPEEDING	16	8	8						1	76.50	63.50	4.00 (1)
ILLEGAL PASSING	1	1									2.50	
ILLEGAL PARKING	3	2			1				1		6.00	
STOP SIGN	17	8	9						2	90.00	48.00	
FAIL. YIELD RIGHT OF WAY	2		1		1					10.00		
FOLLOWING TOO CLOSE	2	1	1							25.00	4.50	
DRIVING WITHOUT LIGHTS	1	1										
DESERTION OF MINOR CHILD	1	1				1	1					
PETIT LARCENY	2	2				2	2					
LARCENY BY CHECK	1	1							1		17.50	
VAGRANCY	2		2							30.00		
PUBLIC INTOXICATION	7	5	2			3	1			25.00	9.00	
LEWDNESS	1										12.50	
OBSCENITY	1	1										
TOTAL	105	64	33	3	3	6	4	1	11	$385.00	$813.50	$29.00 (4)

1 DRUNK DRIVING - REQUESTED CHANGE OF VENUE
1 DRUNK DRIVING - LIC SUSP. 60 DAYS, AM. TO RECK DRVG.
1 NEGLIGENT DRIVING - LIC HELD BY JUDGE 4 WEEKS
1 RECKLESS DRIVING - LIC SUSP. 90 DAYS
1 SPEEDING - LICENSE HELD BY JUDGE 45 DAYS
1 PUBLIC INTOX - COUNTY JAIL 5 DAYS IN LIEU OF FINE
1 PUBLIC INTOX - COUNTY JAIL 18 DAYS IN LIEU OF FINE
1 PUBLIC INTOX - COUNTY JAIL 15 DAYS, 7 DAYS SUSP.
1 LEWDNESS - BOUND OVER TO SUPERIOR COURT
2 PETIT LARCENY - COUNTY JAIL 30 DAYS, 15 DAYS SUSP.

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RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
MAY 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.
DEFECTIVE EQUIPMENT	1	1								$	$ 3.50	$
INVALID VEHICLE LICENSE	3	3							1		39.50	14.50 (1)
USING FICTITIOUS DR. LIC	1								1			
ALLOW. UNAUTHORIZED PERSON TO USE DRIVERS LICENSE	1		1						1	25.00		
NO DRIVERS LICENSE	3	2	1							10.00	17.50	10.00 (1)
INATTENTION TO DRIVING	1	1										
SPEEDING	4		3	1						32.50		
NEGLIGENT DRIVING	2	1	1							25.00	42.50	
FOLLOWING TOO CLOSE	1			1								
ILLEGAL PASSING	2		1		1				1	10.00		
STOP SIGN	3	2		1					1		9.00	
NO CERT. OF REGISTRATION	1	1										
TOTALS	23	11	7	3	1				5	$102.50	$112.50	$24.50 (2)

1 USING FICTITIOUS DRIVERS LICENSE - PERPETRATOR LEFT STATE
1 NO CERTIFICATE OF REGISTRATION - NO FINE
1 INATTENTION TO DRIVING - NO FINE

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT
COMMUNITY SECTION
May, 1955

PERSONNEL - COMMERCIAL & RESIDENTIAL PROPERTY UNIT:

	Exempt	Non-Exempt
Employees beginning of Month	8	25
Transfers In	0	1
Transfers Out	1	0
New Hires	0	0
Terminations	0	1
Leave of Absence - Illness	0	1
Employees end of Month	7	24

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	Commercial		Noncommercial		Total	
	Richland	North Richland	Richland	North Richland	Richland	North Richland
April	1,653	64	120	0	1,773	64
May	1,617	27	115	0	1,732	27
Net Change	-36	-37	-5	0	-41	-37

SUMMARY OF ROUTINE ITEMS PROCESSED:

	Commercial		Non-Commercial		Total		
	Richland	North Richland	Richland	North Richland	Richland	North Richland	Total
Work Orders	42	6	4	0	46	6	52
Back Charges	1	0	0	0	1	0	1
FY Work Orders	1006	360	48	0	1054	360	1414
FY Back Charges	42	1	4	0	46	1	47

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Leases:

a. Colin Bleiler - a ground lease covering the construction and operation of an automotive service station to be located at the intersection of Lee Boulevard and Wellsian Way.

b. Continental Oil Co. - a ground lease covering the construction and operation of an automotive service station to be located at the intersection of Knight Street and Stevens Drive.

c. Bruce Johnson - to provide for the operation of a tavern in government-owned building 96-X located at 615 George Washington Way.

d. L. G. Cook - to provide for the construction and operation of an investment building located at the intersection of Wright Avenue and Van Giesen Street.

e. Parker Hanson - to provide for the construction and operation of an investment building located at the intersection of Wright Avenue and Van Giesen Street.

2. Supplemental Agreements:

a. Trailer Coach Supply - to provide for the operation of the North Richland facility until not later than April 30, 1955.

b. Herman's, Inc. - to provide for the operation of the North Richland facility until not later than April 30, 1955.

c. R. J. Whisler D.M.D. - to provide for reduced floor space and reduced rental in the Medical-Dental Building.

d. Sowell and Ethington - 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.

e. Paul's, Inc. - 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.

B. Non-Commercial:

1. Supplemental Agreement:

North Richland Lutheran Church - to provide for operation until not later than April 30, 1955.

GENERAL:

A. Commercial:

1. Continental Oil Co. started construction of a service station to be located at the intersection of Knight Street and Stevens Drive.

2. The one bid received on establishment of trailer court facilities was rejected.

3. The lease on the government-owned building located at 89 Lee Boulevard was awarded to Richland Printers.

4. The following North Richland facility leases were terminated and the respective operations ceased as of midnight May 31, 1955: North Star Theater, Thrifty Drugs, Inc., Dres-Well Cleaners, Cobley-Clynch Company, and North Richland Ice Delivery.

5. The building in North Richland formerly owned by the Phillips Petroleum Company was turned over to the U. S. Army.

6. The Associated Service Station located at the intersection of Lee Boulevard and Goethals Drive opened for business.

7. Walston and Co. opened for business in the Richland Development Company building.

8. One pasture permit was cancelled.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland:

Used Car Lot Service Station Warehouse Facility

COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION May, 1955

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

A. Commercial:	APRIL			MAY		
	Richland	North Richland	Total	Richland	North Richland	Total
1. Number of Government-owned Buildings	42	6	48	42	6	48
a. Number of Prime Lessee Businesses	37	6	43	37	0	37
b. Number of Sublessees Businesses	17	0	17	17	0	17
c. Total Businesses in Government-owned Buildings	54	6	60	54	0	50
2. Doctors and Dentists in Private Practice	35	0	35	35	0	35
3. Number of Privately-owned Buildings	74	6	80	76	5	81
a. Number of Prime Lessee Businesses	45	0	45	46	0	46
b. Number of Businesses operated by Sublessees	115	0	115	116	0	116
c. Total Businesses in Privately-owned Buildings	160	0	160	162	0	162
4. Privately-owned Buildings under Construction	8	0	8	9	0	9
5. Total Number of Businesses in Operation	214	6	220	216	1	217

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COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

May, 1955

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

B. Noncommercial:

	APRIL			MAY		
	Richland	North Richland	Total	Richland	North Richland	Total
1. Government-owned Buildings						
a. Churches	1	0	1	1	0	1
b. Clubs and Organizations	5	0	5	5	0	5
c. Government Agencies	2	0	2	2	0	2
Total	8	0	8	8	0	8
2. Privately-owned Buildings						
a. Completed and in Use	13	0	13	13	0	13
b. Under Construction	6	0	6	5	0	5
3. Church Plots and Buildings in Private Ownership	4	0	4	4	0	4
4. Pasture Land Permits	102		102	101		101

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COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of April 30, 1955	Orders issued April 30 to May 31	Total orders Incomplete as of May 31, 1955
Service orders	601	1949	707
Work orders	689	618	919
Service charges		209	

Principal work order loads

	Incomplete as of April 30, 1955	Incomplete as of May 31, 1955
Laundry tub replacement	19	4
Tileboard bathroom	24	42
Kitchen floor linoleum	98	117
Kitchen cabinet linoleum	62	175
Shower stall	14	11

---

122 alteration permits were issued, as compared to 114 issued in April.

Install fence	29	Install TV antenna	24
Install automatic washer	15	Install automatic dryer	17
Install patio	10	Install air conditioner	7
Install picture window	1	Install electric heat	3
Change coal bin	3	Sand floors	2
Install driveway	2	Install tool shed	2
Install sidewalk	1	Raise threshold	1
Change position of range	1	Convert to oil	1
Reverse range & refer	1	Remove kitchen cabinet	1
Basement excavation	1		

1212 inspections were made, as compared to 1203 in April.

Alteration permits	90	Basement	3
Bathroom	10	Ceiling	1
Doors	8	Fill	3
Floors	8	Laundry trays	12
Linoleum	280	Lot lines	198
Paint	3	Porch	4
Range & refer recall	24	Steps & walks	13
Sink	3	Toilet seat	6
Trees	20	Walls	3
Windows	6	Yard	4
Renovation rechecks	52	Dormitories	180
Miscellaneous	14	Cancellations	98
Renovations	92	Shows (new tenants)	77

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

Merchandise Issued	Total Amount
Shades	483
Reflectors	23
Ice trays	10
Hydrator glasses	6
Drip trays	6
Meat tenders	5
Furniture delivered	18
Furniture recalled	22
Range parts	8
Refer parts	5
Door stops	14
Caulking compound	1
Grass seed	6

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS -- MONTH OF MAY

	DELIVERY		RECALLED	
	REFERS	RANGES	REFERS	RANGES
A	2	0	3	4
B	1	0	1	1
C	0	0	0	1
E	0	0	1	1
F	2	0	1	0
H	1	0	1	1
K	1	1	0	0
Q	1	1	0	1
V	0	2	0	0
Y	2	0	2	1
Z	0	1	0	1
2Br.	3	0	4	0
3Br.	0	0	3	5
Apt.	1	2	2	0
Total	14	7	18	16

In Warehouse:

24 TA refers 7'
1 GM refer 7'
1 GM refer 6'
1 GE refer 8'
30 SC ranges
1 GM range
1 Hot point range
10 GE range

COMMERCIAL & RESIDENTIAL PROPERTY UNIT
RESIDENTIAL LEASES

MAY 1955

DORMITORY REPORT

Dormitories:

	Beds available	Vacant beds	Occupied beds
Men	477	45	432
Women	381*	87**	294*
Total	858*	132**	726*

*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	1	1

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		ALLOCATIONS	
Voluntary terminations	12	Houses allocated to new tenants	43
R. O. F.	1	Exchanged houses	9
Discharge	1	Moves (within Richland)	28
Transfers	5	Turnovers (divorce,death,schools)	3
Retirement	2	Wherry house move to GE house	0
Move off project	25	Total leases signed	83
Divorce	0	Total cancellations	95
Death	0	Houses assigned "As Is"	34
Move to Wherry House	2	Houses sent to "Renovation"	43
Military Service	1	Applications pending	509
TOTAL	49		

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	2218	258	10	397	862	1119	8	55	59	207	35	5228
Comm. Fac.	96	18		25	56	52		6	4	8	2	267
AEC	64	29		18	46	20		3	4	10	3	197
Other Gov't	12	2			4	3						21
Post Office	7				2	8					3	20
Schools	66	1		6	10	44			1	1		129
Comm. Activities	9			2	6	5						22
Med. Facilities	4	16			3	2				3		28
Kaiser Eng.	1	4			4							9
J. A. Jones	3	3			2							8
Blaw-Knox		2			1							3
Minor Const.					1	1					1	3
Not Certified	3				1	3					1	8
Total	2483	333	10	448	998	1257	8	64	68	229	45	5943
Ready to Rent	2					7	1		2	1		13
In Renovation	15			2	2	12	1					32
Boarded Up											1	1
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	2489	+20	-26	2483	-6
A&J Type	333	+2	-2	333	
"T" Type	10	+1	-1	10	
Precut Type	447	+7	-6	448	+1
Ranch Type	996	+9	-7	998	+2
Prefab Type	1261	+25	-29	1257	-4
Dorm Apts.	10		-2	8	-2
A&J Apts.	63	+2	-1	64	+1
2BR Apts.	70	+1	-3	68	-2
Fourth Housing	229	+3	-3	229	
Tracts	45	+1	-1	45	
Total	5953	+71	-81	5943	-10

COMMUNITY SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT

MAY 1955

Organization and Personnel	Exempt	Non-Exempt
Employees - Beginning of Month	63	0
Transfers In	0	0
Transfers Out	0	0
Terminations	0	0
New Hires	2	0
End of Month	65	0

Fire Protection		Richland	North Richland
Fire Loss (Estimated):	Government	$ 35.00	$ 0.00
	Personal	75.00	1,150.00
	May Total	$ 110.00	$1,150.00
	Year's Total	$3,983.87*	$2,630.00

*Includes $2,980.02 loss for April 30 fire at Johnny's Minute Man Service, not reported last month.

Response to Fire Alarms	23	14
Investigation of Minor Fires & Incidents	3	0
Ambulance Responses	20	0
Inside Schools or Drills	18	8
Outside Drills	3	13
Safety Meetings	8	4
Security Meetings	4	2
Fire Alarm Boxes Tested	218	96

A total of 893 residential hazard inspections were completed during May. The average of 40-per cent "not at homes" continues to prevail.

Captain Hawkins attended May 3 training session in Conference Leading. Captain Anderson and Assistant Fire Marshal Hayes attended May 6 Session in Report Writing. Captain Mitchell also attended Report Writing training class on May 20.

Richland and North Richland duty personnel participated in a simulated Civil Defense evacuation drill on May 20.

Four Boy Scouts were examined during May for their Firemanship Merit Badges.

On May 24, 21 children and 2 adults from a nursery school were conducted through the Central Fire Station. A similar group of 22 children and 2 adults toured this station on May 25.

One truck was dispatched on May 25 to assist the Kennewick Fire Department combat a fire in a Trailer sales supply building at the Richland "Y".

Fire Department personnel conducted demonstration and instruction classes in First Aid for 104 Carmichael Junior High School students on May 31.

Fire Marshal's Monthly Report

The National Board of Fire Underwriter's Fire Prevention Code was adopted for Richland by General Electric, AEC and Community Council and placed into effect on May 16.

A total of 320 Richland and 66 North Richland buildings were inspected, resulting in 60 hazard reports being submitted. A total of 693 fire extinguishers were inspected, 7 installed and 6 removed. One hundred and two fire hose standpipes were inspected. Eleven sprinkler systems were inspected and serviced.

After an investigation of the April 30 fire and explosion at Johnny's Minute Man Service Station, where a static spark ignited a drum of white gasoline, a form letter was prepared for mailing to all service stations and garages, relative to code provisions covering this phase of handling flammable liquids.

Prepared regulations for removal of underground gasoline storage tanks at the old 1131 transportation area. These regulations were incorporated in the sale of this abandoned area.

Surveyed 716 Building for needed fire protection for the multiple crafts moving into building.

Initiated a joint inspection with Electrical and Building officials of the former Cook Building at 881-885 Stevens Drive.

Investigated trash fire and pole damage at the C.A.P. Airport.

With AEC Safety, surveyed proposed addition to School maintenance shops.

Conducted follow-up inspection of a home where small arms ammunition was being hand loaded and informed tenant of code requirements.

Monthly Report Continued

Completed quarterly inspection of all local schools and found them in good condition.

Supervised a dry-pipe time test of the Kadlec Hospital "A" Wing Sprinkler System which required two minutes and twenty-four seconds to obtain effective water extinguishment.

Compiled a statistical record of residential fire inspections made to date this year.

Surveyed new CO_2 automatic fire extinguishing system being installed in 713 Building.

At request of Plant Safety, daily pressure readings of the 713 Building sprinkler system was started.

Assisted representatives of the Pittsburgh Plate Glass Company and the Albi Fire Resistive Paint Company with arrangements for a demonstration and lecture on the new Albi 99 Paint, which was attended by 31 key personnel of GE, AEC, and the School District at No. 1 Fire Station.

Assisted school maintenance with Chief Joseph School fire alarm system while an additional horn was being installed in Music Room.

Represented the Fire Department at Richland Safety Council, Richland Traffic Committee and Chamber of Commerce Meetings.

COMMUNITY OPERATIONS-SUB SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
MAY 1955

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees Beginning of Month	5	15
Transfers In		1
Transfers Out		
Terminations		
Total End of Month	5	16

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set	24
Anchors set and guys installed	6
Street lights repaired and steel mast arms installed	7
Street lights relamped - sodium vapor	1
Street lights relamped - 6000L and 4000L, 1100 Area	101
Street lights relamped - 6000L and 4000L, 700 Area	3
Flood lights relamped, 1100 Area	19
Flood lights relamped, 700 Area	8
Stack lights relamped, 700 Area	0
Primary line footage added	0
Primary line footage removed	0
Transformer KVA added	77
Transformer KVA removed	10
Net transformer KVA installed	67
New services installed - residential	0
New services installed - commercial	4
Commercial services removed	2
Temporary services installed and removed	4
Scheduled outages - primary	1
Scheduled outages - secondary	5
Unscheduled outages - primary	2
Unscheduled outages - secondary	5
Standby and escort	2
High voltage tree trimming	8
Low voltage tree trimming	35

TRAFFIC SIGNALS

Relamping	12
Operational failures	2
Installations	0
Removals	0

RICHLAND ELECTRICAL UNIT

Routine maintenance checks	65
Routine check B. R. signal at Van Giesen	4
Total signals in operation - automatic	19
Total signals in operation - manual auxiliary	5
Total signals in operation - flasher	3

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	15
Electrical motors checked and serviced - water	39
Electrical motors checked and serviced - sewage	51

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	5
Outside circuit checks	6
Inside faults repaired	2
Outside faults repaired	4
New circuits placed in operation	0
New boxes placed in operation	1

SUBSTATIONS

Main feeder and tie breaker checks - Thayer Drive	4
Main feeder and tie breaker checks - Stevens Drive	4
Secondary and pad location stations - checked jumpers, cutouts, grounds and general condition	26

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	12
Meters tested - customer's requests	2
New meters shop tested	0
Faulty meters replaced or repaired	7
Damaged meters and covers	1
Residential read-ins	165
Residential read-outs	153
Residential disconnects	17
Residential reconnects	17
Meters resealed	4
Radio interference checks	2
Overloaded meters changed out	1
Routine meter tests	30
Installed Keys metal meter covers	11

Consumption and Revenue:	No. of Meters	KWH	Revenue
Residential - Schedule 1	6983	8,652,486	$80,520.83
Commercial - Schedule 2	404	3,289,913	$26,616.17
Total	7387	11,942,381	$107,137.00

RICHLAND ELECTRICAL UNIT

COMMENTS

STREET LIGHTING:

Removed 18 high resistance twist splices in the 200 series street light circuit and replaced with a more modern type nicopress splice and installed double connectors at 26 jumper connections.
Repaired down guy and street light fixture in the new Transportation Area that were damaged by Transportation Unit's truck.
Relocated pole at intersection of Knight and Goethals to provide clearance for street improvements and installed two mercury vapor lights.
Relocated power pole and removed street light pole at Hunt and Van Giesen to provide clearance for street improvements. 6000 lumen light at this location was replaced with a mercury vapor light and remounted on the power pole.
Repaired and adjusted 3 protective relays and street light fixtures as required.
Replaced defective connection in electric eye base assembly.

TRAFFIC SIGNAL SYSTEM:

Replaced traffic light lens on signal located at Riding Academy which had been broken by vandals.
Synchronized traffic signal at Symons and George Washington Way so as to obtain better flow of traffic.
Inspected and adjusted traffic light controlling traffic to and from 1171 bus lot.
Performed weekly routine inspections and servicing of all traffic signals.
Repaired defective control cable to traffic signal at Stevens and By-pass.

FIRE PROTECTION SYSTEM:

Strung two spans of fire alarm wire and secondary wire to provide fire alarm service to new Central United Protestant Church building (box #221).
Replaced defective portion of master box No. 164.
Made routine inspection of fire alarm auxiliary circuits in all dormitories.
Relocated fire alarm box No. 142 at intersection of Knight & Goethals.
Performed routine maintenance of fire alarm boxes of Circuit 8.
Replaced defective phone jack in master fire alarm box No. 4113.
Removed boxes #271 and 272 from service in old bus lot.

WATER SYSTEM:

Dismantled, inventoried, and prepared for excess the visi code control system for the domestic water wells.
Repaired and placed in service motor controls at 1100-D Well.
Performed routine wiring of domestic pump motors in the 3000 and 1100 area well fields.
Disconnected "K" well motor so that pump maintenance could be performed.
Replaced defective bearing in No. 5 irrigation pump motor.

RICHLAND ELECTRICAL UNIT

SEWAGE TREATMENT AND DISPOSAL SYSTEM:

Disconnected motor at sewage disposal plant for routine maintenance.
Performed overhaul of recirculating pump motor for sewage treatment plant.

OUTSIDE LINES AND STATIONS:

Transferred Uptown Thrifty Drug Store service to south aerial transformer

RICHLAND ELECTRICAL UNIT

UNSCHEDULED OUTAGES: (Cont'd)

Replaced transformer fuse at well "E", N. Richland well field, which had blown due to high resistance contact.
The two service stations at intersection of Jadwin and Williams had their power interrupted for a period of 5 minutes due to improper transformer connections being made by linemen.

CALLOUTS:

One call-out was necessary during the month as follows:

May 1st 2 men called out on inspection of leaky transformer.

COMMUNITY OPERATIONS SUB-SECTION
ENGINEERING UNIT
MONTHLY REPORT
MAY 1955

PERSONNEL:	Exempt	Non-Exempt	Total
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 MAY

1. Johnny's Service Station - 294 Williams - Repair Fire Damage
2. Continental Oil Co. - Knight & Stevens - Service Station
3. E. A. Eschbach - 1510 Cottonwood Drive - Wood Frame Building
4. C. P. Hutchinson - 1501 Van Giesen - Tool Shed
5. 7 Sign Permits

NEW MUNICIPAL CONSTRUCTION STARTED IN MAY

Radii Curbs, Stevens & Williams
Radii Curbs, Mart Parking Lot

NEW PRIVATE CONSTRUCTION STARTED IN MAY

Johnny's Service Station -294 Williams - Repair Fire Damage
Continental Oil Co. - Knight & Stevens - Service Station
E. A. Eschbach - 1510 Cottonwood Drive - Wood Frame Building
C. P. Hutchinson - 1501 Van Giesen - Tool Shed

PRIVATE CONSTRUCTION COMPLETED IN MAY, OR ON WHICH FINAL INSPECTION MADE

NONE

ENGINEERING JOBS COMPLETED IN MAY

C-89698 - Legal Description for Ferry Landing Site

STATUS OF ENGINEERING UNIT PROJECTS

G-01009 - Knight Street Improvement - Plans and specifications in hands of AEC Contract Division.

G-01010 - Extension Torbett West of Perkins Avenue - Plans and specifications in hands of AEC Contract Division.

STATUS OF ENGINEERING UNIT PROJECTS (Cont.)

G-01012 - Boise Street Extension - Plans and specifications in hands of AEC Contract Division.

G-01015 - Water Service to Commercial Users (7 locations) - Construction 90% complete.

G-01016 - Water Service to Property at Lee Blvd. & Wellsian Way - Construction 90% complete. Existing grass to be restored.

G-02171 - Automatic Bar Screens Sewage Lift Station - Bid opening April 6, 1955. Notice to proceed April 28, 1955. Construction not started to date.

G-02176 - Comfort Station, Sewage Lift Station - Chlorination Station, Riverside Park - Construction started May 12, 1955.

STATUS OF ACTIVE ENGINEERING SERVICE REQUESTS

I-90914 - Utility Lines, Legal Descriptions and Diagrams for Churches - 90% complete.

I-91014 - Retirement of Separate Irrigation System - Design 80% complete.

I-91024 - Retirement of Irrigation Canal - Storm sewer design 65% complete. Design delayed temporarily for higher priority work.

C-0554 - Expansion of Riverside Park North of Lee Boulevard - Plans and specifications in hands of AEC Contract Division.

C-0559 - Park Area North of Newton - Project submitted to AEC and was only partially approved. Revised scope of work being studied.

C-0561 - Street Improvement (FY 1954) Van Giesen Street from Geo. Wash. Way, East to Hunt Avenue - Plans and specifications in hands of AEC Contract Division.

C-0568 - Installation and Relocation of Water Meters in 300 and 3000 Areas - Design 75% complete.

C-0569 - Replacement of Water Pipe - Design 99% complete. To AEC for review 5-31-55.

C-11457 - Plat and Legal Description, American Red Cross - 95% complete.

C-11460 - Plat and Legal Description Christian Science Society - 75% complete.

C-11461 - Revise Legal Description of 11 Churches - 75% complete.

C-11462 - Richland Post Office (Plat and Legal Description) - 75% complete.

STATUS OF ACTIVE ENGINEERING SERVICE REQUESTS (Cont.)

C-81020 - "As Builts" - Phase III - 57% complete. Work temporarily delayed while awaiting completion of other phases of the work by others.

C-81384 - Plot Lot Lines on Utility Drawings from Plats of Richland - 10% complete. Work temporarily delayed while awaiting completion of other phases of the work by others.

C-95389 - Grace Bacon Rollerena - "As Built" Plans - Plans received. Checking delayed temporarily for other work.

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.

Alteration Permits - an open active file.

Television Antennae - an open active file. No permits being issued.

Plans, Specs., Inspections, Church of Nazarene Addition - 97% complete. Work progressing slowly. Building now occupied.

Plans, Specs., Inspections, Christ of King Parish (Catholic) - 95% complete. Work progressing slowly. Portion of buildings now occupied.

Plans, Specs., Inspections, Thorsness Service Station and Drive In, SE Corner of Goethals and Williams - Service Station 99% complete. Final inspection to be made. Drive in being equipped for service after considerable initial delay.

Addition to Uptown Thrifty Drug Store - 95% complete. Work progressing slowly. Building occupied.

Plans, Specs., Inspections, Uptown Thrifty Drug Store Rehabilitation - 99% complete. Final inspection to be made. Building occupied.

COMMUNITY OPERATIONS SUB-SECTION
PUBLIC WORKS & RECREATION UNIT
MONTHLY REPORT
MAY 1955

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees Beginning of Month	7	42
Transfers Out	0	0
Transfers In	0	1
New Employees	0	1
Terminations	0	0
Total End of Month	7	44

ROADS AND STREETS

The drive into the Mart parking lot from Goethals was widened to provide a 24' throat and the concrete curb on the north side of this drive was removed and replaced with new curb layed on a 20' radius. This was done to facilitate entrance of south bound traffic into the parking lot and thus eliminate holding up of straight through traffic on Goethals Drive.

A 15' radius concrete curb at the southwest corner of intersection of Stevens Drive and Williams Boulevard was removed and replaced with a 30' radius curb to improve traffic movement at this point.

Work is in progress to seal joints between pavement and valley gutters throughout the Ranch House area. Bitumels and crusher fines are being used to keep water from entering through these joints.

The west gutter in the Perkins Avenue 1600 block was relaid with asphalt to improve drainage.

Gravel gutters and shoulders were graded and dressed at the following locations: 700 block on Willard and Stanton; 1300 block on Perkins; 400 block on Sanford; and 1800, 1900 and 2000 blocks on Duportail.

Sweeping and cleaning of the Uptown and Downtown parking lots was completed at request of Commercial and Residential Property Unit.

Routine seasonal maintenance was continued on streets, drainage systems, and street signs.

SANITATION

Collections were continued on schedule. May 30 was observed as a holiday and routes normally due this day were made up on the following day. Total weight of waste material collected and disposed of was 1199 tons.

PUBLIC WORKS AND RECREATION UNIT

PARKS AND PUBLIC GROUNDS

Irrigation and mowing of lawn grass and plants at parks and assigned areas, and irrigation and general maintenance of shelterbelts was continued as required.

Cemetery maintenance was carried out and 7 sunken graves were filled to grade.

"Mosquito Control" inspections discovered the first larvae on May 6 and spraying with diesel oil and DDT was commenced at that time on those pools where needed. Spraying activity has increased gradually and is now on a full-time basis.

"Weed Control" spraying of amine 2-4-D was started the first week of May when Russian Thistle appeared, and 80 per cent of the areas under control have now been sprayed.

Routine maintenance of all parks properties was continued.

RECREATION

General

The Richland finals, and Tri-City finals of a Yo-Yo contest were held at the Community House on May 6 and 7 respectively.

The "Triple-O" softball league opened its season on May 15 at Columbia Playfield. Seven teams are participating in games scheduled for each Wednesday.

The Richland Softball League opened its season at Memorial Softball Field on May 16. Three games are scheduled each evening Monday through Friday up to August 4.

Very heavy usage has been made of Riverside Park and Columbia Playfield for picnics sponsored by school groups and social clubs.

ATTENDANCE STATISTICS - May 1955

	No. of Sessions	Youth	Adults	Sub Total
A. Community House				
Altrusa Club	1		10	10
American Red Cross	1		100	100
American Red Cross Instr. Group	2	5	30	35
Atom Bowling League	1		19	19

PUBLIC WORKS AND RECREATION UNIT

Attendance Statistics - May 1955 (Cont'd.)

A. Community House (Cont'd.)	No. of Sessions	Youth	Adults	Sub Total
Boy Scouts	4	132	126	258
Boys of Woodcraft	2	41	9	50
Campfire Girls	3	248	78	326
City Council	3		92	92
Fencing	3		8	8
Games	25	1 299	254	1 553
Gardenaires	1		60	60
Gesa Federal Credit Union	1		12	12
Girl Scouts and Leaders	2		28	28
Hi-Spot	8	2 525	27	2 552
International Folk Dancers	3	2	27	29
Junior Sportsmen	1	22	1	23
Maintenance Bowling League	1		17	17
National Little League	1		10	10
Play-For-Fun League	1		10	10
Pony and Colt League	3		55	55
Rainbow Girls	8	476	190	666
Rec-A-Teers	5		384	384
Richland Rod and Gun Club	1	40	175	215
Richland Tennis Club	1		10	10
Richland Women's Club Garden Section	1		25	25
Sewing	2		20	20
Social Security	2		55	55
Stamp Clubs	2	7	22	29
Tenderfoot Bowling League	1		19	19
Triple "O" League	1		7	7
Women's Bowling Association	1	10	55	65
Y.W.C.A. Bridge Club	2		32	32
Total Community House	92	4 802	1 808	6 610

B. Parks and Playgrounds	No. of Sessions	Youth	Adults	Spectators	Sub Total
Columbia Playfield High School P.E. Classes	130	7 800			7 800
Wellsian Lake	31	1 890		375	2 265
All Playgrounds	360	10 800	500		11 300
Practice Field Bookings	226	3 800	250		4 050
Memorial Softball Field	12	360	720	1 200	2 280
Jefferson Little League	10	300	80	1 500	1 880
Scheduled Picnics	50	1 700	300		2 000
Total Parks & Playgrounds	819	26 650	1 850	3 075	31 575

PUBLIC WORKS AND RECREATION UNIT

Attendance Statistics - May 1955 (Cont'd.)

C. Summary

	No. of Sessions	Youth	Adults	Spectators	Sub Total
Community House and Parks and Playgrounds total for May 1955	911	31 452	3 658	3 075	38 185
Calendar Year to Date					110 422

COMMUNITY OPERATIONS SUB-SECTION
WATER AND SEWERAGE UTILITIES UNIT
MONTHLY REPORT
MAY 1955

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	5	21
Transfers Out	0	0
Transfers In	0	0
New Employees	0	1
Terminations	0	0
Total End of Month	5	22

DOMESTIC WATER

Normal operations continued throughout the month.

3000 Area wells J and L are out of service awaiting repairs to well pumps. 3000-J well pump repair is held up awaiting delivery of spare parts which were shipped on May 20 and are presently being held up by the truck strike. 3000-L well has been repaired and tested by Fairbanks Morse Company and is now in the process of being returned from their shops and will be installed as soon as it is received. 3000-K well was pulled for overhaul after a leak developed in the oil sealed shaft tubing. Upon inspection of the pump unit, it was found that the turbine shaft was severely worn; a 7/16" deep grove was worn at the seal gland. Spare parts for this unit were on hand and the pump is presently being overhauled and will be replaced and returned to service in the very near future.

A serious water main leak developed in the 8" steel water main east of Parcell's Service Station at Williams and Goethals. This leak was apparently dus to an electrolytic action on the pipe in this area where pipe covering had been damaged during construction. A ten foot section of pipe showing some damage was replaced.

Water meters were installed at the following locations during the month:

McGuiness Used Car Lot	Lee Blvd.
Signal Oil Service Station	Lee and Williams
Bailey Building No. 1	George Washington Way

DOMESTIC WATER DATA

	Well Production	Av. Da. Prod.	Total Consumpt.	Av. Da. Cons.
Richland	112,750,000	3,637,096	411,409,100	13,271,261
North Richland	301,010,000	9,710,000	25,592,000	825,548
Columbia Field	79,300,100	2,558,067		
300 Area			55,404,000	1,787,225
Totals	493,060,000	15,905,163	492,405,100	15,884,034

WATER AND SEWERAGE UTILITIES UNIT

Maximum daily production was 20,825,200 gallons on 5-10-55.
Maximum daily consumption was 20,575,900 gallons on 5-9-55.

SEWERAGE SYSTEM

Normal operation and routine maintenance was continued throughout the month.

Number I recirculating pump at Sewage Treatment Plant No. 1 was completely overhauled and the plant effluent ditch between the dike and Yakima River was cleaned by drag-line during the month.

SEWAGE DATA

Plant No. 1	Total Flow	32,920,000	Average Daily Flow	1,061,000
Plant No. 2		64,719,000		2,087,000
Total		97,639,000		3,148,000

IRRIGATION SYSTEM

Operation of irrigation systems has been interrupted frequently by necessary shut downs to facilitate repairs to either supply or distribution pipe lines. It has been necessary in some cases to abandon small sections of piping where conditions were such that repairs were practically impossible. At the month end, all systems are in service.

Chlorine feed into irrigation canal at the penstock for aquatic weed and bacteria control was commenced on May 26.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
MAY 1955

ORGANIZATION AND PERSONNEL	EXEMPT	NON-EXEMPT
Employees - Beginning of Month	4	9
Transfers In	0	0
Transfers Out	0	0
New Hires	0	0
Terminations	1	0
End of Month	3	9

GENERAL

Circulation

Books	10,427
Magazines	343
Pamphlets	63
Records	822
Inter-Library Loans	35
Grand Total	11,690

Current Book Stock

Books added this month	0
Books withdrawn this month	7
Grand Total	34,697
Phonograph records added	177

Registration

Adult	58
Juvenile	29
Grand Total	87
Total Registered Borrowers	19,290
Meetings in North Hall	13
Children's Story Hour Attendance	218 (Pre-school-170; Elementary-48)

Mrs. Joyce Bliss, Children's Librarian, terminated May 3 so that she and her husband could adopt a child.

Miss Doris Roberts, Librarian and Miss Helen Church, Catalog-Order Librarian, visited the schools during the weeks of May 2 through May 13 to announce and explain the Children's Summer Reading Program, "On Safari to Africa", to all children in the 2nd through 7th grades.

Ggj-1

Community Operations
Library Unit

The pre-school party on May 3, for children who have attended the pre-school story hours was attended by 170 children. In addition to seeing the Andy Panda film, "Wacky Weed", the children were entertained by Miss Twila Gay, Library Staff member, who played and sang children's folk songs. A party for elementary-school age children who have been participating in the story hour program was held May 7 and attended by 48 children. Three short films were shown at this party: Andy Panda's "Wacky Weed"; Andy Panda's "Meatless Tuesday"; "Woody Woodpecker the Matador". The last two films were obtained free of charge from the Standard Oil Company of California. Both parties were the culmination of the story hour program for the season.

Two discussion group leader training sessions under the sponsorship of the library, the Washington State Library and the American Library Association's American Heritage Project were held in North Hall on May 19 and May 20. The leader trainer for the sessions was Mr. Leonard Friedman from the A.L.A. American Heritage office in Chicago. Forty-two representatives from local organizations participated in the sessions.

The Richland Public Library was closed from May 16 through May 23 for the purpose of re-shelving the book collection and taking inventory. The library was opened for circulation of partial book stock on May 24. The loss shown through inventory is approximately 2.13 per cent.

The Allied Arts Association's spring show has been on exhibit in North Hall this month.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT - MAY 1955

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	Beginning of Month	End of Month	Increase	Decrease
Staff	2	2		
Administration Area Maintenance	104	104 (a)		
Security and Patrol	477	476		1 (b)
Fire Protection	138	136		2 (c)
Office Auxiliaries	118	118 (d)		
Telephone	80	83	3 (e)	
TOTALS	919	919	3	3

(a) - Administration Area Maintenance

3 - New Hires
1 - Transferred in
4 - Transferred out

(b) - Security and Patrol

1 - New Hire
1 - Transferred out
1 - Deactivated

(c) - Fire Protection

2 - Terminations

(d) - Office Auxiliaries

7 - New Hires
2 - Transferred in
9 - Transferred out

(e) - Telephone

3 - New Hires

FIRE PROTECTION UNIT

Fire Responses

Construction	3	Loss	0
HAPO	7	Loss	$20.00
Outer Area	2	Loss	0
TOTALS	4		$20.00

Fire Extinguishers

Inspected	1,698
Installed	35
Tested	868
Delivered to new locations	14
Seals Broken	25
Serviced	558
Weighed	763

Gas Masks

Inspected	55
Serviced	10

Drills held during May

Outside drills held	127
Inside drills held	104

45,350 feet of fire hose and 854 feet of ladders were used for drill purposes during May

One Information Meeting was held with seven members attending each meeting, exempt and non-exempt.

Eleven Round Table meetings were held with seven members attending each meeting, non-exempt.

A Fire Protection officer held one class on artificial respiration with 18 members of 105-KW personnel in attendance.

OFFICE AUXILIARIES SUB-SECTION

Plant Mail Unit

Internal mail count decreased during the past period. U.S. Postal outgoing increased slightly. Special assignments included the preparation and mailing of a Civil Defense pamphlet and letter to each home in Richland, the results of the attitude survey for all exempt employees, sixty-nine OPG's, and fifteen separate mailings which included GE Reviews, Management News Bulletins, GE Monograms and material for Union Relations.

Plant Mail Unit (Contin)

Mail service to 716, 722 and 717-A has now resumed on a full scale due to complete occupancy. A review of 700-1100 area mail stops is under way and plans are being made for the additional stops which will come as a result of the conversion of two dormitories into office space to house 3000 Area personnel.

Addressograph work increased during the past period and the telephone billing file is in the process of being completely re-graphatyped involving approximately 7,000 plates.

Types and Pieces of Mail Handled	April	May
Internal	5,021,983	4,467,528
Postal	85,254	91,409
Special	2,315	2,339
Registered	11,148	624,086
	5,120,700	5,185,362
Total postage used	$3,216.50	$3,265.06
Total teletypes handled	3,678	2,888
Total store orders handled	429	530

	April		May	
Addressograph	Number of Runs	Total Copies	Number of Runs	Total Copies
Plate name list	116	166,397	123	252,215
Housing list	17	46,534	17	45,391
Payroll list	14	48,321	9	22,102
Total new plates	2,936		3,211	
Total corrected plates	3,655		4,168	
	6,591		7,379	

Printing Unit

It has been determined that the Multilith Model 1250, S/n 455855, HW 405686, is no longer needed as a unit of the Class "B" Printing Plant equipment and accordingly disposition of this machine has been requested of the Joint Committee on Printing.

New Process camera lights were received and installed in the Print Shop on May 17, 1955. Installation was made by a representative of the Thatcher Litho Equipment Company, for the Eastman Kodak Inc., of Seattle. The new lights provide greater flexibility in adjusting the lamps to enable the operator to form any illumination pattern desired in photographing halftones and unusually large copy, such as charts and mechanical drawings.

Printing Unit (Contin)

Normal printing schedules were disrupted more than usual during the month because of priority demands created by such jobs as the Civil Defense Brochure, requiring five colors to be printed on each side of 16,000 pieces, 15,000 two color car stickers, 15,000 three color Civil Defense Signals, 10,000 Hanford Attitude Survey reports, 36,000 sheets of Surplus Sale (105) and several priority formal reports.

A considerable maount of overtime had to be scheduled in order to meet target dates on these orders. Some miscellaneous orders were also printed on scheduled overtime to keep the backlog within tolerable limits.

Work Completed	April	May
Orders Received	435	360
Orders Completed	413	379
Average Orders on Hand	71	93.3
Copies Printed	1,142,723	1,874,915
Negatives masked	569	591
Negatives Processed	628	682
Photo copy prepared	254	307
Litho plates processed	714	705

Stenographic Unit

Productive work totaling 1,855.5 hours was performed in the Stenographic Unit during the month on 106 stenographic orders. Work is current at months's end.

Training material has been reviewed and revised to some extent and additional material set up in anticipation of the annual influx of inexperienced stenographers, starting in June and lasting through the summer months.

Seven new employees were assigned to the Unit in May, one stenographer and six stenographer-typists. Six permanent transfers were effected to other plant units and eighteen temporary assignments were made.

The work load was consistently heavy throughout most of the month with a number of priority assignments which were completed within deadline dates.

Breakdown of Hours	April	May
Dictation and transcription	20.5	
Meeting Time		7
Rough Drafts	95.5	28
Machine transcription	154.5	
Letters	44.5	45.5
Dittos, duplimats and xerography	432.5	443
Miscellaneous	620	543.5
Training	275	233.5
Unassigned time	65.5	64
Total	1,708.0	1,364.5
Employees on loan to other units	792.0	795.5
Grand Total	2,500.0	2,160.0

Duplicating Unit

Additional operating space was obtained in 1704-K Building, 100-K Area, and one additional employee was assigned to this location to more effectively handle workloads on priority duplicating. This change should result in accelerated service, and should eliminate interruptions to service in the event of absences.

Duplicating personnel in 300 Area and 760 Building reproduced Geneva Convention papers for scientific and technical personnel throughout the project. A procedure for reproducing these papers was recommended to the Supervisor, Public Communications Unit, which reduced typing time and eliminated the necessity for preparing carbon copies on vellum. All papers were reproduced and delivered to the Public Communications Unit in time to meet the required deadline.

Priority jobs processed by Central Duplicating, 703 Building, during the month included the Management Report - Employee Attitude Survey, AEC Budget, Cash Control Procedures Manual for Financial Department, and programs used in connection with the visit of the General Electric Company president.

Unit costs for the Duplicating Unit presently show a cost per hundred copies of $1.50. This is 1½¢ per copy, a figure which is lower than that reached at any time during fiscal years 1954 or 1955

	April	May
Orders received	3,824	3,404
Orders completed	3,675	3,416
Orders on hand	343	263
Offset plates	17,660	17,110
Offset copies	1,093,585	1,106,567
Verifax masters	2,996	2,625
Verifax copies	8,214	8,659
Ditto masters	435	415
Ditto copies	7,535	8,356
Zerox plates	1,987	1,693
Ozalid masters	75	39
Ozalid copies	990	233
Embosograph masters		17
Embosograph copies		104
Number of copies duplicated	1,110,462	1,123,919

Office Equipment Unit

Office Furniture

The expendable office furniture inventory account 93 was valued at $12,544 on April 30th, or an average of 2.2 months' supply on hand. Activity included withdrawals of $6,081 and $4,033 received into the account for the month.

A total of 97 service orders were issued to cover cost of minor repairs of office furniture and locks.

There was a total of 761 debit and credit store orders processed during the month or an average of 36 orders per day.

Office Furniture (Contin)

The following is a detail of number of pieces of furniture handled during the month:

Item	Issued	Received	Salvage
Blackboard	5	1	0
Bookcase	21	19	0
Cabinets	107	106	33
Card File	3	17	2
Costumer	8	8	5
Chairs	188	179	72
Desk	78	59	12
Table	77	48	4
Miscellaneous	308	77	22
	795	514	145

A survey of ladies rest rooms was made to determine condition of lounge furniture replacement requirements. The final result of this survey indicates that a total of 52 lounge chairs and 58 davenos will be required for replacement and addition.

An appropriation request in the amount of $80,180 was approved for purchase of office machines and furniture replacements and additions for FY 1955.

The Supervisor, Office Equipment, visited the Portland office of the Department of Interior to observe the operation of a Macey Collating machine used by that department. Consideration for purchase and use of this type of machine at HAPO is being given in order to more efficiently handle the large volumes of hand collating and binding new performed.

Office Machines

The total number of machines in service and stock as of the 20th of May was 4,582 or a net reduction of 29 machines from last month.

The number of machines assigned to contractors was 464 on the 20th of the month. A reduction of 41 machines from previous month.

The accountability of office machines assigned to Construction Contractors after June 10th, will be transferred to G.E. This will enable AEC Financial Division to expedite closing out billings between contractors. Contractors will be responsible for physical control until machines are delivered to Office Equipment Unit.

Office Machine Repair Unit

Flexowriter maintenance has increased during the past two months. A total of eight machines are now in service.

Weekly routine inspections of Flexowriters is now provided. This was instituted at the request of the Reactor Section.

Office Machine Repair Unit (Contin)

Flexowriters are new to both the Instrument men maintaining the electronic section, as well as the office machine repair men who maintain the typewriter but good progress is being made in training. Due to the critical tie in of the Flexowriter to the Reactor operation repair will have to be made on an overtime basis during shifts and weekends.

Project Engineering requested instrument service to take over the testing and check out of all instrumentation on the air conditioning equipment for the IBM "702" machine located in the 713 Building. The instrumentation is expected to be tested for proper operation prior to June 15, 1955. After the air conditioning equipment is put into operation the instrumentation will be maintained by the Instrument mechanics of the Office Machine Repair Unit.

An additional time attendance recorder has been requested for the Stores Shipping Department, Warehouse No. 13. This recorder will be installed after June 17th, due to telephone exchange change-over on June 17th.

One instrument panel was fabricated and four test instruments were installed for the Instrument Design group.

Repair tickets processed were as follows:	April	May
	649	481

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

Work connected with conversion of Dormitories W-17 and W-21 for temporary office use is progressing on schedule.

Immediately following cutover to Plant Telephone Exchange, the following moves from North Richland are contemplated: Plant Accounting to W-17; Accounts Payable to first floor of W-21; J. A. Jones personnel offices to second floor of W-21; Inventory Accounting to a portion of second floor of W-20. One office in 700 Area will be made available to U.S. Geological Survey, and AEC personnel from North Richland will be absorbed into 700 Area space currently assigned to the Commission.

Community Public Works is now moving into 722 Hangar. Following this move it is planned to isolate the Hangar from the 700 Area by relocating a section of temporary fence.

Twelve office moves were made during the month.

Three movable partition installations were made in 700 Area and one enclosure was removed. Partitions were provided for four installations in 200 Areas and one in 100 Area.

A purchase requisition for additional movable partitioning has been returned by AEC with request for further justification.

Current indications are that the Commission is preparing data to support a new budget request for funds for an Administration Building, in event their efforts to obtain the structure under lease-purchase plan are not successful.

Two information meetings and three round table meetings were held in May.

General Maintenance

Approximately 600 square feet of asphalt tile was laid over worn wooden floors in 703 Building.

Accoustical tile was installed on approximately 1200 square feet of ceiling area in 703 Building.

Remodeling work was done in cashier's office in 703 Building lobby, to accommodate new office equipment.

Interior revisions were made to 721 Building to accommodate AEC Security personnel.

Repairs were made to leaking roofs on 700 Area Buildings.

Minor carpentry repairs were made to Buildings W-17 and W-21.

Carpentry and related work for Transportation included construction of side rails for semi-trucks, pouring concrete foundations for relocation of ice house, cutting new door opening in concrete wall, and installing bumper logs.

Exteriors of Richland Barricade check stations were repainted.

Other painting work included refinishing of four offices in 703, three in W-21, and stairwell, corridor and reception area of 761 Building.

A Photocell was installed on Meteorological Tower to automatically control turning on and off of clearance lights, and time clock was removed.

All incandescent fixtures were removed from W-17 and W-21 and placed in storage; receptacles were provided for installation of used fluorescent lights.

Other miscellaneous electrical work included: revision of wiring on printing press, repair of ozalid machine, oxygen tent mechanisms and emergency signal system, revision of circuits in Transportation Facility, repair of hot plates, repair of photostat machine, installation of exhaust fans, installation of transformers and circuits for air conditioner rotor attachments, repair of fire alarm circuits, repair of emergency generator, repair of burner controls on Transportation heating system, repair of motor circuit on lift trucks, miscellaneous buzzer system installations, receptacles and circuits.

Locksmith work included master-keying of door locks in the 1704-D Building, repair of door closers and panic hardware, and miscellaneous vault, safe and lock repairs.

Fire sprinkler system in 713 Building was extended to provide more complete coverage.

Extensions were made to air and water line systems and a four-inch exhaust line was installed at 1171 Building for equipment tests.

Revision was made to heating and air cooling ducts in O.B. wing of hospital and thermostats were relocated. Balancing of system will be completed as soon as required equipment is received.

General Maintenance (Contin)

Ozalid reproduction machine was overhauled.

Air conditioning ducts in 761 and 762 Buildings were cleaned.

Twelve drinking fountains were repaired.

Repairs were made to overhead doors in Transportation railroad shops.

Steam to 700 Area buildings was turned on and off as required, to meet fluctuating weather conditions.

Covers on ventilation openings on 700 Area buildings were removed, based on seasonal requirements.

Building Services

All first floor windows in 703 Building were washed during the month.

All windows were washed in 1171 Building and floors are being scrubbed and waxed.

As a result of tests and studies on mop usage, arrangements were made for use of a special pre-treated mop for a six-week trial period.

Inspection frequency has been stepped up for the purpose of assuring a constant standard of cleanliness in building service work.

Steam Operation

Nos. 1 and 2 boilers were in service at the beginning of the month, with Nos. 3 and 4 in reserve.

Biennial major overhaul of No. 4 boiler was started during the month.

At the close of the month, Nos. 1 and 2 boilers remained in service, No. 3 unit in reserve, and No. 4 boiler was undergoing major overhaul.

The quantity of steam generated at 784 Plant was 14.6% greater than for the same period of the previous year.

During the month, 114 truck loads of coal were received from Richland Fuel and Lumber Company. The total quantity of 585.797 tons received was all consumed during the month; none of this coal was placed in the stockpile.

Operations at the Central Stores heating plant were normal throughout the month. Time clock controlling operation of boiler was set up on May 2 to start boiler at 4:00 A.M. and shut it off at 10:00 A.M., Mondays through Fridays. Efforts are being made to use up the fuel oil in the 12,000 gallon storage tank to permit access to the tank for removal of accumulated sludge.

Coal consumed: 1,088.397 net tons.

Steam generated:	15,760.2 M. lbs.
Steam leaving plant:	13,713.6 M. lbs.
Steam delivered:	11,332.8 M. lbs.
Total water softened:	2,183,500 gallons
Total soft water sent to Kadlec Hospital:	139,230 gallons
Total soft water sent to 784 Heating Plant:	2,044,270 gallons

TELEPHONE SUB-SECTION

The first 200 lines of equipment in the new 100K dial exchange were placed in service on May 26 and all telephone lines in the 100B and C areas were transferred from the old 100B exchange to the 100K exchange. Equipment from the 100B exchange as required to complete the 100K exchange to 300-line capacity was dismantled and delivered to the 100K exchange installation contractor.

General Electric was given custody of the new 700 Area Plant exchange on May 16 for acceptance testing and tie-in work. Acceptance testing to date has revealed many more equipment and circuit difficulties than normally should be expected. Because of the unusually high number of circuit errors and ommissions in the exchange equipment, the Atomic Energy Commission representatives were requested to take effective measures with the equipment installation contractor to satisfactorily complete their work by June 7 in order that General Electric telephone forces might have ample time to complete acceptance testing and essential tie-in work prior to June 17, the scheduled cut-over date.

A training program was begun during the month to acquaint telephone operators with the attendants' switchboard in the new Plant exchange.

A new edition of the Plant telephone directory was received from the printer and it is ready for distribution on June 17 and 18.

Telephone Sub-Section personnel met with representatives of Plant Accounting and Stores Units to discuss proposed transfer of certain telephone materials from Spare Parts to other inventory accounts.

Plant Telephone Operations

Rearranged trunk terminating equipment in the BY Tandem Exchange in preparation for discontinuing temporary trunks to the 100K area manual switchboard and providing planned permanent trunks to the new 100KBC and 700 Area exchanges.

Replaced several service drop wires serving the 716 Building with a multi-pair service cable to improve service.

Located and cleared two moisture faults in the BY-to-White Bluffs trunk cable. These faults resulted from sheath openings caused by cable ring wear.

Located and cleared a moisture fault in a 16-pair cable in the White Bluffs area which serves Minor Construction and Atomic Energy Commission offices.

Repaired damage to a 26-pair cable at the Mid-Way Crossing which was caused by a motor crane attempting to cross under the cable where there was inadequate clearance.

One-hundred and sixty man-hours of routine maintenance work were performed on the PAX and PBX systems in the 202A, 202S, 234-5, 221U and 221T buildings.

Made a complete half-tap of the 100BC area cable distribution system in the vicinity of the 1720-B building and installed a new 26-pair cable terminal to serve the 1720B building.

Prepared detailed information as required to modify the 200EW exchange switching circuits so that access to the direct trunks to Richland will be from Level 6 instead of Level 9 as at present.

Plant Telephone Operations (Contin)

Prepared a procedure for resplicing the Richland-North Richland tie cable in preparation for the 700 Area exchange plant cut-over.

Completed plans for reconnecting Plant telephones, presently served from the North Richland exchange, to the new 700 area exchange.

Commercial Telephone Operations

Completed cable extension to serve residences on the west side of Wright Avenue between Raleigh and Putnam.

Conducted a spot-sheck of corrections made by the Richland TV Cable Corporation where their facilities have been installed in conflect with telephone facilities.

Made temporary repairs to aerial distribution cable No. 7 where damaged by Richland Electrical Unit personnel while installing a new section of telephone cable.

Installed end cells and end-cell switch in the telephone exchange to provide minimum required voltage during AC power outages.

Regraded Kennewick toll trunks to improve distribution of traffic among the trunks.

Installed 10 intercept adapter circuits in the North Richland exchange to handle the heavy intercept demand caused by large number of service disconnections in that exchange.

Tagged the equipment and distributing frame jumpers in the Richland exchange that will be involved in the cut-over of the new 700 Area exchange.

Commenced transferring trunk signaling equipment from the Richland exchange to the new 700 area exchange.

Established two tie trunks between the attendants' switchboards in the Richland and 700 Area plant exchanges.

The Business Office Supervisor met with the District and Local Managers of Montgomery Ward and Company to work out a change of service for Montgomery Ward's local catalog office.

The Business Office Supervisor conferred with management of Campbell's Foods Incorporated relative to new telephone service required in their general office.

Radio System Operations

Installed a mobile type public address unit in a police car to be used in conjunction with Civil Defense activities.

Installed a permanent wall-type loud speaker in the 701-B Building for use with a film editing projector.

Modified loud speaker wiring in the Chief Joseph Junior High School to enable the school speakers to be used in connection with Company public address amplifiers and microphones when the auditorium is needed for Company meetings.

Radio System Operations (Contin)

Fabricated a line amplifier for use in the new 700 Area plant telephone exchange.

Recorded Science Forum programs on May 4, 11, 18 and 25.

One radio station outage occurred during the month: KKE-624, Station No. 2 (Yakima Barricade) was out of service from 2:00 AM to 9:45 AM on May 25 due to tube failure. The outage was reported to Radio Maintenance at 8:00 A.M.

Field serviced 53 mobile transmitter-receiver sets.

Shop serviced 25 mobile receivers and 27 mobile transmitters.

Field serviced eight fixed-station transmitter-receivers.

Shop serviced eight fixed-station transmitters and eight receivers.

Shop serviced two public address systems.

Shop serviced six pack-type transmitter-receiver sets.

Field serviced six telephone inter-communicating systems.

Field serviced two radio remote control units.

Shop serviced four tape recording units.

Shop serviced one radio receiver.

Statistical Data

	At 20th of May	Change from Previous Month	Change from Year Ago
Residential Subscribers	5,882	- 59	-214
Business Subscribers	481	No Change	- 12
Paystation Telephones	64	- 3	- 4
Official Subscribers:			
Richland Exchange	976	- 9	- 15
North Richland Exchange	179	- 35	- 46
Process Area Exchanges	1,614	- 3	-221
		-109	-512

New Service Requests Received During the Month:

For Residential Service	69
For Business Service	5
Total	74

Telephone
Statistical Data (Contin)

Backlog of Service Requests:

For New Residential Telephones	222
For New Business Telephones	5
For Residential Outside Moves	31
For Business Outside Moves	0
Total	258

Service Orders Processed:

In connection with business and residential service	717
In connection with plant service	498
Total	1,215

Facilities - Installed, In Service and Available:

	Exchange Lines			Party Lines
	Installed	In Service	Available	Available
Richland	4,065	4,005	60	368
North Richland	600	294	306	113
Process Areas	2,050	1,605	445	
	6,715	5,904	811	481

Radio Stations

	At 20th of May	Change from Previous Month	Change from Year Ago
Fixed Stations	34	0	∕ 16
Mobile Stations	156	∕ 1	∕ 13
	190	∕ 1	∕ 29

SECURITY AND PATROL

Document Report

Number of classified documents and prints unaccounted for as of May 1: 327
(104 of the above 327 documents are chargeable to du Pont Company)

Number of classified documents and prints reported as unaccounted for during May: 0

Number of classified documents and prints either recovered or downgraded in classification during May: 2

Number of classified documents and prints remaining unaccounted for as of June 1, 1955: 325
(104 of the above 325 documents are chargeable to du Pont Company)

Security and Patrol (Contin)

The Non-Technical Document Review Board held three meetings during the month and reviewed a total of 106 documents. Of this number

11 had their classification retained,
1 was downgraded to "Confidential",
14 were downgraded to "Confidential-Undocumented",
55 were downgraded to "Official Use Only",
8 were declassified, and
17 were not within the scope of the Board.

Security Education

Nine security items appeared in the GE NEWS during the month.

There were 359 security meetings held and attended by 5,179 Hanford Atomic Products Operation personnel. A representative of Plant Protection Services Unit showed one of the security films at some of these meetings as indicated below:

Film Title	Number of Meetings	Average Attendance per meeting	Total
Badge of Honor	28	23	644
The Defense Rests	1	18	18
Turn Left Across the Bridge	2	14	28
On Guard	1	16	16
Signal .99	2	20	40

GE Security Bulletin No. 93 entktled "Additions to the Attorney General's List" was issued on May 12, 1955.

One set of the "Burma Shave" type signs was changed during the month and the new slogan is:

A Secret
Can Circle
the Globe
without Refueling -
SECURITY

One hundred copies of the poster furnished by the Department of Defense, Washington D.C., with the slogan "Security Is Always Important" were posted in the plant areas.

One thousand, one hundred leaflets also furnished by the Department of Defesne with the same slogan as on the posters were distributed to personnel during May.

Six hundred and fifty copies of the poster bearing the slogan "Check All Packages - Prevent Sabotage" were posted in the plant areas.

Two thousand copies of the "A-B-C" security leaflet with the slogan "Traveling This Summer?" were distributed to employees.

Security mobiles with the slogan "Only You" were hung in the Area Badge houses during May.

Security Education (Contin)

A memoramdum entitled "Request for Visit Approval" concerning the obtaining of approval for visits to other Atomic Energy Commission installations was issued on May 9, 1955.

Sixty-seven 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 May. Forty-seven employees received an "L" security orientation lecture during the same period.

Statistical Report of Security Patrol Activities

	100-B	100-D	100-F	100-H	100-K	200-E	200-W	300
Pat Searches	84	88	43	93	84	0	0	2
Escorts	15	90	0	51	83	2	11	28
Ambulance runs	1	1	3	2	2	1	3	7
Passes issued:								
One day temporary	26	15	9	5	5	11	30	50
Travel	0	0	0	0	0	0	0	110
Red Tag Pass	121	36	26	34	40	156	297	125
Telephonic	0	0	0	0	0	0	0	4
Supervisors' Post Contacts	389	204	170	65	348	347	426	301

Other Patrol Activities (Computed by Hours)

								300 & 700
File Check	153	202	208.1	427	262	250	250	2,072
Building Check	297	120.3	281.6	1048	325	250	250	672

Arrest Report

Violations	Number of Violations	Cont. Cases from April	Cases Cleared	Pending
Illegal Parking	0	4	2	2
No Driver's License	0	1	0	1
Speeding	2	1	2	1
Totals	2	6	4	4

Arrest Report (Contin)

Citation Tickets Issued:	2
Warning Tickets Issued:	27
Verbal Warnings	0

Patrol Training Activities

713 Patrolmen received classroom instruction during the reporting period. There are only 399 Patrolmen on the force and some of the men attended more than one session during May.

237 Patrolmen attended Firearms Training during the same period.

General

Nine-hundred and forty-four audits and inspections of General Electric employees, who are custodians of classified documents and prints, have been conducted since September 1, 1954, through May 31, 1955.

On May 2, 1955, discussions were held with the Hanford Operations Office Security Division relative to the propriety of the General Electric School of Nuclear Engineering conducting courses that involve classified project information. These discussons resulted in obtaining verbal approval from the Atomic Energy Commission for conducting these courses limited to General Electric and Atomic Energy Commission personnel who have been granted "Q" security clearance. Approval was granted to hold the classes in a laboratory facility in the 300 Area.

On May 9, 1955, a survey of all Hanford Atomic Products Operation positions was conducted to determine those jobs falling within the sensitive position criteria of the Atomic Energy Commission. These positions were listed and certified to the Commission, requesting a review and confirmation by its personnel.

A re-survey of all Hanford Atomic Products Operation positions which could be filled with "L" type security cleared personnel was completed on May 15, 1955. This listing was submitted to the Hanford Operations Office and approved on May 25, 1955, with the exception of the position Boilermaker-Journeyman.

Security Administration

Daily Badge Log Entries	2,709
"Q" Clearances	67
"L" clearances	47
Formal "P" clearances issued	29
"P" Approval Clearances issued	44
Category access granted	44
Category access withdrawn	67
Category access revised	62
Number of photographs for "A" badges	591
Number of photographs for "B" badges	2,777
Number of persons rephotographed	8

Security Administration (Contin)

A total of 415 photo identification passes were laminated and issued.

A total of 720 "A" badges were assembled and distributed to the areas.

A total of 431 "A" badges were received from the areas.

A total of 197 "A" badges were received from the areas for repair.

Top Secret Clearances

Clearances for 37 employees were cancelled.

41 clearances were requested by General Electric.

43 employees were granted clearance by the Commission.

DECLASSIFIED

[redacted]

HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITS FOR PERIOD ENDING MAY 31, 1955

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT							
I. Visits to other Installations							
R. C. Grant to: Aircraft Nuclear Propulsion Lockland, Ohio	Attend reconciliation meeting pertaining to exempt positions at HAPO	L. F. Hardy	5-9-55	5-13-55	X		
F. J. McKinnon to: U. S. Atomic Energy Comm. Savannah River Operations Office Augusta, Georgia	AEC meeting on safety matters	D. F. Hayes	5-4-55	5-6-55	X		
D. W. McLenegan to: Knolls Atomic Power Lab. Schenectady, New York	Engineering discussion on new techniques and methods for in-training purposes	J. D. Leslie R. E. Hunt R. Bennett	5-16-55	5-17-55	X		
R. W. Moulton(consultant) to: Argonne National Lab. Lemont, Illinois	Discuss chemical engineering aspects of nuclear technology	J. C. Boyde	5-13-55	5-14-55	X		
ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION							
I. Visitors to this Works							
R. W. Coyle Aircraft Nuclear Propulsion Lockland, Ohio	Discuss ANP sponsored irradiation facility design	R. J. Schier	5-10-55	5-11-55	X		300-L XXX 700
Z. Jeffries Research Laboratory Schenectady, New York	Consultation on technical assistance to Har-	A. B. Greninger	5-19-55	5-20-55	X		100-K 105-KW,105-KW 300-L 303; 700

DECLASSIFIED

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
ENGINEERING DEPARTMENT - ADVANCE ENGINEERING							
I. Visitors to this Works							
W. R. Kanne Knolls Atomic Power Lab. Schenectady, New York	Discuss problems and technical advancements	P. F. Gast	5-18-55	5-19-55	X		100-K 105-KE, KW 300-L 303 700
ENGINEERING DEPARTMENT - DESIGN SECTION							
I. Visitors to this Works							
R. W. Coyle Aircraft Nuclear Propulsion Lockland, Ohio	Discuss ANP sponsored irradiation facility design	A. B. Carson	5-10-55	5-13-55	X	700	
J. R. Wolcott Atomic Power Study Group General Electric Company Schenectady, New York	Discuss estimated manpower requirements for Atomic Power Study Group	R. H. Beaton A. B. Carson	5-9-55	5-10-55	X	700	
II. Visits to other Installations							
A. B. Carson to: General Electric Company Schenectady, New York	Discuss reactor technology	B. R. Prentice J. R. Wolcott B. Untermeyer	5-2-55	5-6-55	X		
A. B. Carson to: Knolls Atomic Power Lab. Schenectady, New York	Discuss reactor technology	V. D. Nixon W. R. Kanne	5-5-55	5-6-55	X		
B. R. Elder to: Argonne National Lab. Lemont, Illinois	Review non-destructive testing methods and current materials advanced technology	F. Foote	5-9-55	5-9-55	X		
B. R. Elder to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Review non-destructive testing methods and current materials advanced technology	F. Forschor	5-12-55	5-12-55	X		

[redacted]

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
B. R. Elder to: Nuclear Metals, Inc. Cambridge, Massachusetts	Review non-destructive testing methods and current materials advanced technology	P. Lowenstein	5-18-55	5-18-55	X		
R. D. Switters to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Consultation regarding construction materials for high temperature corrosive chemical service-Project CG-613	W. M. Leaders W. Knecht R. Sommers	5-2-55	5-3-55	X		
R. D. Switters to: National Lead Company Fernald, Ohio	Consultation regarding construction materials for high temperature corrosive chemical service Project CG-613	F. J. Podlipec	5-4-55	5-4-55	X		

CG-20

ENGINEERING DEPARTMENT - PROJECT SECTION

I. Visits to other Installations

D. L. Hovorka to: Argonne National Lab. Lemont, Illinois	Conference on high temperature corrosion, zirconium technology, non-destructive testing and fabrication	F. Foote	5-9-55	5-9-55	X		
D. L. Hovorka to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Conference on high temperature corrosion, zirconium technology, non-destructive testing and fabrication	F. Forscher	5-12-55	5-12-55	X		
D. L. Hovorka to: Nuclear Metals, Inc. Cambridge, Massachusetts	Conference on high temperature corrosion, zirconium technology, non-destructive testing and fabrication	P. Lowenstein	5-19-55	5-19-55	X		

ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS

[redacted]

I. Visitors to this Works

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
W. G. Baxter Aircraft Nuclear Propulsion Lockland, Ohio	Discuss process post-irradiation examination of GE-ANP materials	L. D. Turner C. L. Boyd	5-25-55	5-27-55	X		300-L XXX
F. C. Brandel National Lead Company Fernald, Ohio	Discuss inspection procedures, quality level, and inspection equipment	S. M. Gill E. W. O'Rorke	5-19-55	5-20-55	X		100-H 105 300-L 303 700
J. J. Chyle A. O. Smith, Corp. Washington, D. C.	Discuss weld metal composition for use in welding low carbon and stabilized stainless steel	W. R. Smith M. C. Fraser	5-26-55	5-27-55	X		300-L XXX
H. W. Cooper Superior Tube Company Los Angeles, California	Discuss zirconium process tube fabrication	V. R. Cooper E. A. Eschbach W. E. Wallace	5-9-55	5-9-55	X		100-H 105 300-L 303
R. M. Edwards Mallinckrodt Chem. Works St. Louis, Missouri	Observe continuous denitration and pot room operation	R. G. Geier	5-17-55	5-18-55	X		200-W 221-U 300-L XXX
A. E. Guay National Lead Company Fernald, Ohio	Attend Metal Quality Working Committee Meeting	R. B. Richards W. T. Kattner R. W. Benoliel	5-31-55	6-3-55	X		300-L 303 700
V. L. Herzog Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element and file materials problems	J. J. Cadwell L. P. Bupp V. R. Cooper	5-8-55	5-10-55	X		300-L XXX
F. Hittman Brookhaven National Lab. Upton, Long Island, New York	Discuss waste concentrations and irradiation of cobalt	O. H. Greager R. B. Richards J. A. Berberet	5-2-55	5-4-55	X		100-B 105-C 100-D 105 100-H 105 100-K 105-KE, KW 200-E 201-C 202-A 200-W Redox 300-L XXX; 700

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
C. W. Huntington National Lead Company Fernald, Ohio	Discuss refinery technology at General Electric	F. W. Woodfield	5-25-55	5-25-55	X		200-W 221-U 300-L XXX 700
J. L. Klein Nuclear Metals, Inc. Cambridge, Massachusetts	Consultation on uranium,(alpha and beta)	S. H. Bush	5-4-55	5-6-55	X		100-K 105-KW, KE 300-L 303
J. Kostalos Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss radiation monitoring of fluid in pipes, low level nuclear instrumentation safety shutdown	R. S. Paul	5-16-55	5-17-55	X		100-B 105-C 100-D 105 100-H 105 100-K 105-KW 300-L XXX;700
B. R. Kramer Phillips Petroleum Company Idaho Falls, Idaho	Plutonium processing, TBP operations, slug weight, uranium to aluminum ratios, flowmeters, pumps, caskets	F. W. Woodfield V.R. Cooper	5-9-55	5-13-55	X		100-B 105-C 100-D 105 100-H XXX 100-K 105-KE 200-E 201-C 200-W 221-U, 231, Redox 300-L 303 ; 700
C. W. Kuhlman Mallinckrodt Chemical Wks. St. Louis, Missouri	Observe continuous denitration and pot room operation	R. G. Geier	5-17-55	5-18-55	X		200-W 221-U 300-L XXX
B. Manowitz Brookhaven National Lab. Upton,Long Island, New York	Discuss waste concentrations and irradiation of cobalt	O. H. Greager R. B. Richards J. A. Berberet	5-2-55	5-4-55	X		100-B 105-C 100-D 105 100-H 105 100-K 105-KE, KW 200-E 201-C 202-A 200-W Redox 300-L XXX; 700
S. S. Minault National Research Corp. Newton Highlands, Massachusetts	Discuss vacuum melting equipment and problems	O. J. Wick	5-18-55	5-18-55		X	300-L XXX

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass. Areas
E. E. Motta North American Aviation Downey, California	Observe hot cell and hot laboratory facilities	J. J. Cadwell L. L. Burger	5-3-55	5-3-55	X	200-W 221-U 300-L XXX
S. B. Roboff Sylvania Electric Products Pittsburgh, Pennsylvania	Discuss fuel program	V. R. Cooper	5-3-55	5-3-55	X	300-L 303 700
T. C. Runion National Lead Company Fernald, Ohio	Discuss refinery technology at General Electric	F. W. Woodfield	5-25-55	5-25-55	X	200-W 221-U 300-L XXX 700
J. E. Spooner Mallinckrodt Chemical Wks. St. Louis, Missouri	Observe continuous denitration and pot room operation	R. G. Geier	5-17-55	5-18-55	X	200-W 221-U 300-L XXX
N. F. Spraggins E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Metallurgical discussion	J. W. Riches S. H. Bush	5-4-55	5-6-55	X	100-K 105-KW 300-L 303
U. M. Staebler U. S. Atomic Energy Comm. Washington, D. C.	Discuss reactor development and reactor training program	A. B. Greninger	5-11-55	5-13-55	X	300-L 303 700
R. O. Teeg Nuclear Metals, Inc. Cambridge, Massachusetts	Consultation on uranium, (alpha and beta)	S. H. Bush	5-4-55	5-6-55	X	100-K 105-KW, KE 300-L 303
F. M. Warzel Phillips Petroleum Company Idaho Falls, Idaho	Plutonium processing, TBF operations, slug weight, uranium to aluminum ratios, flowmeters, pumps, caskets	F. W. Woodfield V. R. Cooper	5-9-55	5-13-55	X	100-B 105-C 100-D 105 100-H XXX 100-K 105-KE 200-E 201-C 200-W 221-U, 231, Redox 300-L 303; 700
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

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
G. C. Westfall Knolls Atomic Power Lab. Schenectady, New York	Discussions on KAPL-120 in-pile loop facilities	G. E. Wade	5-25-55	5-27-55	X		100-D XXX 100-H 105 100-K 105-KW; 700
D. M. Wilsey All States Employee Schenectady, New York	Regarding KAPL-120 in-pile loop modification	J. A. Berberet	5-1-55	8-1-55	X		100-B 105-B,105-C 100-D XXX 100-H 105 100-F XXX 100-K 105-KW 300-L 303
N. E. Wilson Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss radiation monitoring of fluid in pipes, low level nuclear instrumentation safety shutdown	R. S. Paul	5-16-55	5-17-55	X		100-B 105-C 100-D 105 100-H 105 100-K 105-KW 300-L XXX; 700
II. Visits to other Installations							
J. M. Atwood to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss high temperature water technology	E. J. Bohlmann	5-16-55	5-16-55	X		
J. M. Atwood to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Attend AEC corrosion symposium	V. I. Montenyohl	5-17-55	5-19-55	X		
R. W. Benoliel to: National Lead Company Fernald, Ohio	Discuss uranium specifications	G. Wunder	5-18-55	5-20-55	X		
R. W. Benoliel to: National Lead Company Fernald, Ohio	Discuss uranium specifications	G. Wunder	5-26-55	5-27-55	X		
J. A. Berberet to: U. S. Atomic Energy Comm. Washington, D. C.	Attend meeting on new engineering test reactor	E. J. Bloch	5-2-55	5-3-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
J. G. Bradley to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss continuous calcination and separations processes	D. M. Lang F. L. Culler F. R. Bruce	5-23-55	5-27-55	X		
L. P. Bupp to: Knolls Atomic Power Lab. Schenectady, New York	Discuss cooling water technology	F. B. Hornby	5-9-55	5-11-55	X		
L. P. Bupp to: Battelle Memorial Inst. Columbus, Ohio	Discuss research on uses of carbon materials in nuclear reactors	H. W. Russell	5-12-55	5-13-55	X		
M. W. Carbon to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss technical aspects of reactor design and operation	C. W. J. Wende	5-16-55	5-17-55	X		
E. D. Clayton to: North American Aviation Downey, California	Discuss graphite lattices and exponential pile experiments	E. R. Cohen S. W. Kash R. Laubenstein	5-2-55 5-3-55	5-3-55 5-5-55	X X		
D. R. de Halas to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Present paper at AEC corrosion symposium	V. I. Montenyohl	5-17-55	5-19-55	X		
E. A. Evans to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Present paper at AEC corrosion symposium	V. I. Montenyohl	5-17-55	5-19-55	X		
T. W. Evans to: Phillips Petroleum Co. Idaho Falls, Idaho	Observe Material Test Reactor's technical experiments	D. R. Alvord	5-9-55	5-13-55	X		
T. W. Evans to: Phillips Petroleum Co. Idaho Falls, Idaho	Discuss metallurgical problems, slugs, and fuel element program on MTR	D. R. Alvord	5-17-55	5-18-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
M. D. Fitzsimmons to: Knolls Atomic Power Lab. Schenectady, New York	Discussion on submarine reactor	J. Owens	5-24-55	5-25-55	X		
N. D. Groves to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Attend AEC corrosion symposium	V. I. Montenyohl	5-17-55	5-19-55	X		
N. D. Groves to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Discuss uranium pellets and plant corrosion problems	E. Tetter	5-20-55	5-20-55	X		
R. O. Gumprecht to: Argonne National Lab. Lemont, Illinois	"Bluenose" conference	F. Hagemann	5-18-55	5-19-55	X		
W. T. Kattner to: National Lead Company Fernald, Ohio	Consultation on uranium	C. E. Polson	5-9-55	5-9-55	X		
W. T. Kattner to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Consultation on uranium	G. R. Northrup	5-10-55	5-10-55	X		
W. T. Kattner to: Argonne National Lab. Lemont, Illinois	Consultation on uranium	F. G. Foote	5-11-55	5-11-55	X		
W. T. Kattner to: Ames Laboratory Ames, Iowa	Consultation on uranium	F. H. Spedding H. A. Wilhelm P. Chiotte N. E. Carlson	5-12-55	5-12-55	X		
D. C. Kaulitz to: Phillips Petroleum Co. Idaho Falls, Idaho	Discuss metallurgical problems, slug, and fuel element program	D. R. Alvord	5-17-55	5-18-55	X		
E. M. Kinderman to: Argonne National Lab. Lemont, Illinois	Attend "Bluenose" planning meeting	F. Hagemann	5-18-55	5-20-55	X		

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
R. C. Lovington to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss technical aspects of reactor design and operation	C. W. J. Wende	5-16-55	5-17-55	X		
R. C. Lovington to: Knolls Atomic Power Lab. Schenectady, New York	Discuss technical aspects of reactor design and operation	V. D. Nixon	5-18-55 5-29-55	5-19-55 5-29-55	X		
R. F. Maness to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss continuous calcination and separations processes	D. M. Lang F. L. Culler F. R. Bruce	5-23-55	5-27-55	X		
N. R. Miller to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss high temperature water technology	E. J. Bohlmann	5-16-55	5-16-55	X		
N. R. Miller to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Attend AEC corrosion symposium	V. I. Montenyohl	5-17-55	5-19-55	X		
J. E. Minor to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Attend AEC corrosion symposium	V. I. Montenyohl	5-17-55	5-19-55	X		
J. E. Minor to: Mallinckrodt Chemical Wks. St. Louis, Missouri	Discuss uranium pellets and plant corrosion problems	E. Teeter	5-20-55	5-20-55	X		
R. H. Moore to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss continuous calcination and separations processes	D. M. Lang F. L. Culler	5-23-55	5-27-55	X		
W. J. Ozeroff to: Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL-Hanford Assistance program	T. M. Snyder	5-2-55	5-3-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
H, E. Ralph to: Phillips Petroleum Co. Idaho Falls, Idaho	Check on HAPO fuel element testing facility and equipment	D. R. Alvord R. J. Nertney	5-9-55	5-13-55	X		
O. W. Rathbun to: National Lead Company Fernald, Ohio	Discuss uranium specifications	G. Wunder	5-18-55	5-20-55	X		
O. W. Rathbun to: National Lead Company Fernald, Ohio	Discuss uranium specifications and metal fabrication	G. Wunder	5-27-55	5-27-55	X		
R. B. Richards to: Vitro Corp. of America New York, New York	Discuss Reactor Handbook meeting	H. Lowenberg	5-19-55	5-20-55	X		
R. B. Richards to: Technical Information Service Washington, D. C.	Attend Reactor Handbook meeting	F. A. Owings	5-21-55	5-21-55	X		
J. W. Riches to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Consultation on uranium metallurgy	J. A. Fellows	5-10-55	5-11-55	X		
J. W. Riches to: National Lead Company Fernald, Ohio	Consultation on uranium metallurgy	C. E. Polson	5-12-55	5-13-55	X		
J. W. Riches to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on uranium metallurgy	T. C. Evans	5-16-55	5-17-55	X		
J. W. Riches to: Atlas Steel Company Wiland, Ontario	Experimental work on heat treatment of uranium in connection with joint Canadian-U.S. stability program	W. A. Thomas	5-17-55	5-20-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. W. Riches to: Bridgeport Brass Adrian, Michigan	Consultation on uranium metallurgy	R. M. Treco	5-23-55	5-26-55	X		
W. R. Smith to: Argonne National Lab. Lemont, Illinois	Consultation on pile materials	F. G. Foote	5-9-55	5-9-55	X		
W. R. Smith to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Consultation on pile materials and welding	F. Forscher	5-12-55	5-12-55	X		
W. R. Smith to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Attend AEC corrosion symposium	V. I. Montenyohl	5-17-55	5-19-55	X		
W. R. Smith to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Discuss uranium pellets and plant corrosion problems	E. Tetter	5-20-55	5-20-55	X		
R. E. Tomlinson to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss Purex Flow Sheet problems	R. I. Martens	5-5-55	5-6-55	X		
R. E. Tomlinson to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss Purex Flow Sheet problems	R. I. Martens	5-5-55	5-6-55	X		
R. L. Tomlinson to: U. S. Atomic Energy Com. Washington, D. C.	Attend AEC Shielding conference	C. R. Horner	5-12-55	5-13-55	X		
R. L. Tomlinson to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss shielding contact work	E. P. Blizzard	5-16-55	5-17-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
W. P. Wallace to: National Lead Company Fernald, Ohio	Discussions on uranium	S. L. Cuthbert	4-14-55	4-14-55	X		
O. J. Wick to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Discuss plutonium fabrication	B. Widdenbaum	5-9-55	5-9-55	X		
O. J. Wick to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Discuss plutonium metallurgy fabrication	J. C. Potts	5-10-55	5-12-55	X		
L. A. Wilson to: U. S. Atomic Energy Comm. Washington, D. C.	Attend AEC Shielding conference	C. R. Horner	5-12-55	5-13-55	X		
V. R. Cooper to: National Lead Company Fernald, Ohio	Discuss uranium specifications	G. Wunder	5-26-55	5-27-55	X		
M. W. Carbon to: Knolls Atomic Power Lab. Schenectady, New York	Discuss technical aspects of reactor design and operation	V. D. Nixon	5-18-55 5-29-55	5-19-55 5-29-55	X X		
MANAGEMENT -							
I. Visitors to this Works							
R. J. Cordiner General Electric Company New York, New York	Overall Hanford program	W. E. Johnson	5-23-55	5-24-55	X		All Areas-All Buildings, including 234-5
J. F. Harris General Electric Company New York, New York	Overall Hanford program	W. E. Johnson	5-23-55	5-24-55	X		All Areas-All Buildings, including 234-5
C. W. LaPierre General Electric Company New York, New York	Overall Hanford program	W. E. Johnson	5-23-55	5-25-55	X		All Areas-All Buildings, including 234-5

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted D. Class.	Unclass.	Areas
F. K. McCune General Electric Company Schenectady, New York	Overall Hanford program	W. E. Johnson	5-23-55	5-25-55	X		All Areas-All Buildings, including 234-5
MANUFACTURING DEPARTMENT							
I. Visitors to this Works							
B. W. Call U. S. Atomic Energy Comm. Arco, Idaho	Discuss Stores and warehousing	R. F. Kenner	5-23-55	5-24-55		X	Richland Barricade;
II. Visits to Other Installations							
G. J. Behling to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on analytical methods, and instrumentation on Purex and Recuplex probesses	R. B. Fenninger	5-2-55	5-5-55	X		
R. D. Crosier to: U. S. Atomic Energy Comm. Arco, Idaho	Consultation on electrical distribution problems	J. Conley	5-16-55	5-16-55	X		
S. M. Gill to: National Lead Company Fernald, Ohio	Consultation on uranium production, specifications, and technology	C. L. Karl	5-25-55	5-27-55	X		
R. W. Harvey to: Knolls Atomic Power Lab. Schenectady, New York	Review industrial engineering practices on preventive maintenance for KAPL, West Milton, and HAPO	E. Brown E. P. Lee	5-20-55	5-20-55	X		
T. W. Hauff to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Consultation on metallurgical processes	W. M. Leaders	5-9-55	5-9-55	X		
T. W. Hauff to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on analytical control, process control and radiation monitoring	D. A. Miller W. P. Overbeck M. H. Wahl	5-10-55	5-12-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
T. W. Hauff to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Consultation on process control and radiation monitoring	I. B. Venable	5-13-55	5-13-55	X		
H. R. Helmholz to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on analytical methods, and instrumentation on Purex and Recuplex processes	R. B. Fenninger	5-2-55	5-5-55	X		
F. A. Hollenbach to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Operational equipment and start-up discussion of Savannah Purex Plant	J. K. Lower S. D. Smiley	5-23-55	5-26-55	X		
E. W. O'Rorke to: National Lead Company Fernald, Ohio	Discussion on uranium specifications, production and technology	C. L. Karl	5-25-55	5-27-55	X		
R. E. Roberts to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on analytical methods, and instrumentation on Purex and Recuplex processes	R. B. Fenninger	5-2-55	5-5-55	X		
K. V. Stave to: U. S. Atomic Energy Comm. Savannah River Plant Augusta, Georgia	Discuss fuel element fabrication problems	T. W. Evans	5-24-55	5-27-55	X		
W. W. Windsheimer to: U. S. Atomic Energy Comm. Savannah River Plant Augusta, Georgia	Discuss fuel element fabrication problems	T. W. Evans	5-24-55	5-27-55	X		

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OPERATIONS RESEARCH STUDY

I. Visits to other Installations

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[redacted] DECLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Area
C. A. Bennett to: Argonne National Lab. Lemont, Illinois	Information meeting on Project "Bluenose"	F. T. Hagemann	5-16-55	5-20-55	X		
L. W. Smith, Jr. to: U. S. Atomic Energy Comm. Washington, D. C.	Discuss Mathematical Planning Techniques	C. D. W. Thornton	5-25-55	6-15-55	X		

RADIOLOGICAL SCIENCES DEPARTMENT

I. Visits to other Installations

H. J. Dishburger to: University of Rochester Rochester, New York	Discuss techniques used in handling plutonium and other radiation sources	J. N. Stannard	5-19-55	5-19-55	X		
J. J. Fuquay to: Argonne National Lab. Lemont, Illinois	Conference on meteorology research and micrometeorological instruments, research and development	H. Moses	5-27-55	5-27-55	X		
R. F. Foster to: U. S. Atomic Energy Comm. Washington, D. C.	Ecological conference on levels of radioactivity in organisms	P. B. Pearson	5-19-55	5-21-55	X		
R. F. Foster to: Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL liquid waste disposal problems	L. J. Cherubin	5-23-55	5-23-55	X		
J. W. Healy to: U. S. Atomic Energy Comm. New York, New York	Meeting on permissible limits of certain materials	M. Eisenbud	5-16-55	5-18-55	X		
F. F. Hungate to: U. S. Atomic Energy Comm. Washington, D. C.	Attend conference on ecological problems	P. B. Pearson	5-19-55	5-21-55	X		

[redacted]

DECLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
H. M. Parker to: U. S. Atomic Energy Comm. New York, New York	Hazards on Radiation Meeting	M. Eisenbud R. E. Albert	5-16-55	5-17-55	X		
D. W. Pearce to: U. S. Atomic Energy Comm. Washington, D. C.	Conference on plant process influences on the environment	J. C. Bugher	5-19-55	5-21-55	X		
R. C. Thompson to: Argonne National Lab. Lemont, Illinois	Discuss research findings on strontium and ruthenium	A. M. Brues	5-19-55	5-20-55	X		

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RADIOLOGICAL SCIENCES DEPARTMENT

MAY 1955

SUMMARY

Twenty-eight informal, nineteen Class I and one Class II radiation incidents were recorded. The Class I total was the highest of record; it included six cases of failure to wear personnel meters in radiation zones.

Emission of I^{131} averaged 12 curies per week, which is close to the appropriate limit. Over 200 square miles of off-project land had vegetation contamination above limits.

Substantial progress was made on various problems relating to closer long-range delineation of Columbia River contamination. Short-term problems in the river resulting from the ruptured KE effluent discharge pipe were not serious.

Appropriate standards for thorium exposure were discussed at a New York meeting with representatives of other sites. There was no firm resolution of the different approaches used, and no sound evidence to deviate from the conservative Hanford method.

Biological work on uptake of radioisotopes from various natural food sources rather than from simple inorganic solutions continued with measurements on transfer of radiostrontium to milk.

Ten papers were prepared for the Geneva Conference.

RADIOLOGICAL SCIENCES DEPARTMENT

MAY 1955

The month-end force of 407 included 37 supervisors, 90 engineers and scientists, 21 clerical and 259 other personnel.

Number of Employees on Payroll	
Beginning of Month	404
End of Month	407
Net Increase	3

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

Name	Title of Invention
None	None

There were 48 radiation incidents, including 19 Class I incidents and one Class II incident. The Class II incident involved beta-ray exposure of a radiation monitor to the extent of 3 rads. The Class I total of 19 was the highest ever recorded. It included 6 cases of failure to wear prescribed personnel meters in radiation zones. A vigorous campaign to promote interest in meter wearing is again needed. Apparently this need recurs about every two years, and an annual "Personnel Meters Week" may be the solution.

Particle surveys on personnel, vehicles and miscellaneous equipment continued in good volume, with positive results at about the same frequency as in recent months.

Emission of I^{131} amounted to 12 curies per week, as compared with the target of 10 curies or less per week. Over 200 square miles of off-project land remained above the permissible limit of 10^{-5} uc/g for vegetation contamination. For the first time noted, this evaluation was confused by the simultaneous deposition of bomb debris containing enough I^{133} and I^{135} to make a factor of 2 uncertainty in the measurement of I^{131}.

Active work is progressing by others to provide means of maintaining iodine emissions at an appropriate level for future operating loads. Additional silver reactors will probably be needed since their practical efficiency of 99.5% permits 5 times the evolution computed from the originally expected efficiency of 99.9%. This change is greater than any that has been made in iodine limits in the past few years. Thus the Radiological Sciences Department Monthly Report of November 1951 quotes 2 curies per day plant total as a plausible limit, against the recent recalculation of 10 curies per week, or preferably 1 curie per day. However, it was expected in 1951 that the limit would tend to move upwards. Findings of damage to sheep at lower levels, and the rather indefinite human intake from vegetation and milk now make a substantial upward movement improbable.

Radiological Sciences Department

Positive findings in human thyroids last month prompted a recalibration of the detectable amount of I^{131} by present techniques. The sensitivity limit is found to be on the order of 0.005 uc, which would yield a dose rate of about 20 mrads per week. Other calibration items of interest were excellent agreement between the National Bureau of Standards and Hanford for film badge exposures, and agreement for tritium between Argonne and Hanford.

Several advances were made that will contribute toward the ultimate definition of Columbia River contamination. These included satisfactory operation of the new total beta-activity monitor with both KW and KE effluents, a new ion-exchange technique for separation of barium isotopes from strontium, and the finding of Np^{239} in effluent water. The neptunium appears to account for 20-40% of the activity previously ascribed to mixed rare earths.

Shorter range problems connected with the river included possible hazards arising first from the rupture of the KE effluent discharge pipe, and later from its repair. Drinking water contamination at the next downstream reactor area had to be considered. As a solution to the discharge pipe buoyancy, it was desirable to drill vent holes at intervals along its length. This procedure was estimated to increase the drinking water contamination at 100-D by about 50% which would be tolerable. Under some conditions, multiple vent holes in the discharge line would improve the downstream contamination picture by promoting more rapid mixing. This would be most favorable for the last reactors downstream. The necessity for such a maneuver at K may provide experimental data applicable to the other locations.

Data on river temperature at Priest Rapids, Pasco, and Umatilla for June to September of the years 1944-52 have been published by the Fish and Wildlife Service. This answers, in part, the long debated point as to how reliably this data reveals the power level of Hanford reactors. For the summer period, one would conclude that there are more reactors between Pasco and Umatilla than between Priest Rapids and Pasco! Obviously, the test would have been more suitable in the winter periods of low river flow. However, it is generally clear that factors other than Hanford heat vary the river temperature enough to confuse the security picture. In fact, in a secret test by this department it was found possible to derive the power levels much more closely by simple means than would ever be possible by refined river temperature measurements.

In the field of waste disposal to ground, the picture improved this month with the relative success of a calcium scavenging process for removal of radiostrontium from the TBP wastes. Projected increases in Purex plant capacity have led to recommendations for change of location of waste disposal to preserve the integrity of crib disposal systems and to manipulate ground water mounds to best advantage.

Beginning with the recent preliminary experiments on uptake of P^{32} when incorporated in fish or plant tissue, the whole field of radioisotope uptake as a function of organic binding of the supplied material has become of major interest. In some work with Sr^{90} in the sheep, the turnover into milk ran at about

Radiological Sciences Department

3-5% of the fed material per liter of milk for Sr^{90} spiked hay and for organically bound Sr^{90}.

At a New York meeting sponsored by the Atomic Energy Commission, the topic of permissible limits for thorium was explored. The Hanford calculations on this are considerably more conservative than other values. The basic reason is that the computation here is based on the metabolic similarity of thorium and plutonium, while others use a parallel with uranium, which is much less plausible. Relaxation of limits is somewhat encouraged by two factors:

1. Lung retention of heavy metal particles is probably lower than the values conventionally used in inhalation calculations.

2. Factory experience in thorium refineries and the gas mantle industry has not shown the dramatic injury associated with radium dial painting.

It is most likely that final limits will settle down between the Hanford values and the others. Until the matter is better resolved, we shall continue to recommend the conservative approach at this location.

In the administrative field, the department is having some budget difficulties, this time in the direction of an under-run. Analyses of the reasons charges a substantial portion of this to the time lag in financial measurements, which earlier in the year signalled the department to reduce expenditures. The reversed signal arrived too late for sensible corrective actions to be effective. Modifications of the measurement system are being proposed to establish a more effective feed-back control on expenditures for FY 1956.

Of the twelve abstracts submitted for the Geneva Conference on peaceful applications of atomic energy, ten were developed into submitted papers. These papers are unfortunately grouped on the program such that six papers are included in two sessions. This will undoubtedly lead to casualties in the final selection.

A comprehensive internal procedure delegating responsibility and authority about as widely as permitted by O&PG's was prepared. Corresponding performance measurements for these delegated functions are being developed. In one exceptional case, the delegation has moved in the opposite direction. Experience has shown that it will be beneficial in future to offer formal radiological design criteria in a standard form with the director's approval signature, instead of the informal liaison type transmittals previously used.

The department's position in the recent attitude survey was generally favorable as shown by the following indices:

AVERAGE PERCENT FAVORABLE SCORES ON 8 CATEGORIES

	All Departments	R.S. Dept.
Non-exempt	68.4%	70.0%
Exempt nonsupervisors	71.4%	74.8%
Supervisors	80.4%	86.0%
All employees (weighted average)	70.1%	72.8%

Radiological Sciences Department

Another useful index is the algebraic sum S of the differences between a department score and the plant score for the three classes of employees. For Radiological Sciences, S = + 10.6, which is the highest index, other departments ranging from S = -2.6 to S = + 10.2.

Examined at section level, the survey results show some areas of relative weakness, which will receive close attention. A most interesting finding is that some areas that were weak in earlier surveys are now phenomenally strong. This is a definite encouragement to use the survey results to steer the emphasis in the improvement of human relations, although this somewhat "squeaking wheel" philosophy has some unsound features.

Promising results came from a nation-wide tour to investigate potential improvements in protective clothing. Of particular interest was a non-woven fabric with good breathing qualities. A practical time-saver was the provision of rubbers with toepieces color coded to indicate size. Similar rapid identification could be applied to other items provided that experience shows that employees are not sensitive to such visible indications of their size requirements.

H M Parker

Director,
RADIOLOGICAL SCIENCES Department

Radiological Sciences Department

APPENDIX

1. Condensed Exposure Records

Type	Number of Readings	Potential High Results	Confirmed High Results
Pocket chambers - gamma	286,690	17	0
Pocket chambers - slow neutron	1,476	0	0
Film Badges - beta-gamma	48,031	23	0
Neutron film	717	1	0
Pu bioassay	1,121	17	0
F. P. bioassay	1,221	2	0
U bioassay	480	0	0
Alpha hand counts	38,489	11	0
Beta hand counts	24,748	2	0

Radiological Sciences Department

2. Regional Monitoring Records

Sample Type and Location	Activity Type	Average Activity Density μc/ml	Trend* Factor
Drinking Water and Related Materials			
Benton City Water Company Well	alpha	1.6×10^{-8}	--
Richland, N. Richland, Benton City Wells	alpha	$(0.6 \text{ to } 2.1) \times 10^{-8}$	--
100 Areas	beta	$(0.5 \text{ to } 9.0) \times 10^{-7}$	--
200 Areas	beta	$(0.7 \text{ to } 3.7) \times 10^{-7}$	--
Pasco, Kennewick, McNary Dam	beta	$(1.2 \text{ to } 5.1) \times 10^{-7}$	--
Backwash Solids - Pasco Filter Plant	beta	1.4×10^{-2} μc/g	--
Backwash Liquids - Pasco Filter Plant	beta	5.0×10^{-7}	--
Sand Filter - Pasco Filter Plant	beta	1.8×10^{-4} μc/g	--
Anthracite Filter - Pasco Filter Plant	beta	2.2×10^{-4} μc/g	
Other Waters and Related Materials			
300 Area Wells #1,2,3	alpha	$(1.0 \text{ to } 1.3) \times 10^{-8}$	--
300 Area Well #4	alpha	4.6×10^{-8}	--
Well #4 measured as Uranium	U	3.1×10^{-8}	--
Other Wells on the Reservation	beta	$< 5.0 \times 10^{-8}$	-10
Columbia River - Hanford Ferry	beta	2.0×10^{-5}	--
Columbia River - Below Reactors	beta	1.8×10^{-5}	--
Columbia River - Patterson to McNary	beta	3.7×10^{-7}	--
Columbia River - shore mud	beta	$(0.24 \text{ to } 2.3) \times 10^{-4}$ μc/g	+2
Raw Water - Operating areas	beta	$(< 0.05 \text{ to } 2.5) \times 10^{-6}$	--
Reactor Effluent Retention Basins to River	beta	8,700 to 42,000 μc/sec/reactor $(0.11 \text{ to } 1.0) \times 10^{-2}$	--
Reactor Effluent Retention Basins to River	alpha	< 0.04 μc/sec/reactor $< 5 \times 10^{-9}$	--
I-131 in Farm Wastes to River	I-131	23 μc/day 4.4×10^{-7}	-- --
I-131 in Columbia River - Hanford	I-131	8.0×10^{-8}	--
300 Area Pond Inlet	alpha	8.8×10^{-7}	--

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Radiological Sciences Department

Sample Type and Location	Activity Type	Average Activity Density /uc/ml	Trend* Factor
Atmospheric Pollution			
Gross Alpha Emitters	alpha	$(<4.0 \text{ to } 6.0) \times 10^{-15}$	-4
Gross Dose Rate - Separations Areas	beta - gamma	0.86 to 3.9 mrad/day	-2
Gross Dose Rate - Residential Areas	beta - gamma	0.32 to 0.92 mrad/day	--
Active Particles - Separations Areas	beta	$(0.36 \text{ to } 1.2) \times 10^{-12}$	--
I-131 Separations Areas	I-131	$(0.08 \text{ to } 1.6) \times 10^{-12}$	--
I-131 Separations Stacks	I-131	1.7 curies/day	-2
Ruthenium - Separations Stacks	$Ru^{103,106}$	<0.01 curie/day	--
Active Particles - Wash., Idaho, Oregon, Mont.	-	0.01 to 0.099 ptle/m^3	--
Active Particles - HAPO	-	0.002 to 0.18 ptle/m^3	--
Tritium (as oxides) - Reactor Stacks	T	0.22 curie/day	--
Vegetation			
Environs of Separations Areas	I-131	$(0.7 \text{ to } 4.4) \times 10^{-5}$ /uc/g	-2
Residential Areas	I-131	$(<3.0 \text{ to } 8.0) \times 10^{-6}$ /uc/g	--
Eastern Washington and Oregon	I-131	$(<3.0 \text{ to } 3.0) \times 10^{-6}$ /uc/g	-2
Non-volatile Beta Emitters- Wash. and Oregon	beta	$(4.1 \text{ to } 5.6) \times 10^{-5}$ /uc/g	-5
Alpha Emitters - Separations Areas	alpha	$(<0.5 \text{ to } 1.6) \times 10^{-7}$ /uc/g	-3
Alpha Emitters - 300 Area	alpha	$<5 \times 10^{-8}$ /uc/g	--

* The trend factor shows the n-fold increase (+) or decrease (-) from last month, where values of n less than 2 will not be noted.

FINANCIAL DEPARTMENT MONTHLY REPORT
MAY, 1955

On May 16 a meeting was held with AEC Finance Division personnel, at which arrangements were made for coordination of work in connection with the fiscal year-end closing of the books and closing dates were established.

A control budget covering operations for the fiscal year 1956 was prepared in May by the Budgets and Measurements Section, which is to be reviewed with department managers in June. This will be used for measurements purposes.

Authority was received from the Commission to report monthly Reactor product cost in MWD's produced rather than calculated grams of plutonium. It is believed that this change will greatly improve the usefulness of the Product Cost Report; however, the authority to make this transfer to MWD's was accompanied by a request for rework of a large number of past statements.

Calculations on document XX 1230 covering savings from Research and Development were revised and brought up to date through the calendar year 1954 for the Engineering Department. These calculations included unit cost savings, uranium savings, and reduced capital expenditures through increased pile life, increased pile and separations output.

Arrangements have been concluded with the Atomic Energy Commission whereby, effective June 1, 1955, we will not charge construction costs with Depreciation or Loss Allowance for Major Construction Equipment, as reserves at this time appear adequate. This plan will remain in effect until such time as the asset value of this equipment is materially changed through new purchases.

Individual reports of each HAPO employee's personal share in the General Electric Benefits Plans were prepared in Personnel Accounting Section for distribution to employees. The reports summarized for each employee the benefits to which his contributions and those of the Company entitled him as a participant as of December 31, 1954. The reports were distributed to employees through supervision on May 20, 1955.

In connection with its program of detection of fraudulent claims for unemployment benefits, the Employment Security Department, State of Washington, requested that the Company report total earnings of each employee up to a maximum of $6,000 for the year 1954, rather than the required $3,000, and supply the Department with a weekly list of employees added to the payroll and employees removed from the payroll. The information with respect to 1954 earnings was furnished in May and weekly reports of additions and removals from payroll were initiated during the month.

Preparations for the installation of the Electronic Data Processing Machine (International Business Machines' No. 702), which is scheduled to arrive in Richland June 6, were nearing completion at the end of the month. The special room in the 713 Building to house this equipment was finished, work

on mechanical refrigeration and air conditioning equipment was nearing completion, and installation by IBM engineers of testing equipment and cable connections for the machine were under way. The equipment left Poughkeepsie, N. Y., in three trucks on May 26 and 27.

An analyst from the Numerical Analysis Unit, assigned to an Operations Research Study production problem, was in Poughkeepsie from May 23 until June 3 to assist in the machine checking of 702 programs for production scheduling calculations.

Plant and equipment values exceeded one billion dollars during May, 1955. Included are values of facilities still under construction which will upon completion be operated by the General Electric Company.

An analysis of assets related to the Richland Schools was completed during the month preparatory to recommending the transfer of values to the Atomic Energy Commission.

North Richland tavern and cafeteria equipment was transferred to the Atomic Energy Commission in the following amounts: tavern - $23,254 (asset), $23,254 (reserve); cafeteria - $95,661 (asset), $95,661 (reserve). The transfer of equipment, custodial changes, and reconciliation of records effected cost code changes on approximately 3000 individual record units.

The third annual physical inventory of electrical material in the custody of Electrical Utility Section and communication materials in the custody of Telephone Sub-Section was taken this month. Tentative results of these inventories reflect net overages.

Preliminary results of the annual physical inventory of essential materials (excluding coal and fuel oil) which was taken as of April 30 indicated a net shortage of $23,000. The shortage is relatively minor considering the volume of material handled and its value. Although work is still under way in determining reasons for the shortage, it appears the variance is due mostly to methods employed in valuing material consumed and variances between unit prices used to value the physical inventory and Manufacturing's unit price. Report covering final results of this inventory will be issued in June.

Custodians of zirconium will transfer to Stores Unit on July 1 all inventory material in their custody, and after July 1 disbursements of zirconium and warehousing of zirconium will be handled by Stores.

Most of the temporary facilities at White Bluffs are no longer required for the construction program at HAPO and their disposition through sale or other means is being planned by the Commission. Although final determination of the exact buildings to be retained is still under consideration, it appears that they will be: those required by Minor Construction, the heavy equipment shop and parts warehouse and adjacent auto repair shop, the machine shop, the fire station, and a few other miscellaneous facilities. The Commission desires to transfer from their accounts to the General Electric Company the facilities to be retained and a proposal has been submitted to the Engineering Department that they assume the landlordship of the area in question.

Secondary source and special nuclear materials, specifically thorium, U-233 and enriched uranium, the latter in both "less than 75% enrichment" and "over 75% enrichment" categories, were the subject of a Commission survey (Part I-USAEC Survey No. 12), the findings on which were summarized as follows:

1. Accounting for the materials covered in the survey is reasonably accurate.

2. In the reviewer's opinion, the SS Accountability Station material balance statement and records fairly represent its inventory position; the quantitative control exercised by Station HGE over SS material is adequate and appropriate.

3. Material control and accounting procedures are commensurate with dollar value.

As the result of a request by the USAEC-Idaho Operations Office, an investigation was made of a suspected scrambling of shipments enroute to the Phillips Petroleum Company. Since results indicated loading procedure at HAPO to be proper, it appeared that the problem might lie in unloading methods at ARCO. It was recommended that these be revised, specific suggestions being given. Since this recommendation was made, no further complaints have been received.

Activities among the SS Accounting Units included the completion of a new system of Reactor Area accounts and assisting in its establishment; and the completion of a survey of SS accounts for the Redox plant, a final review report to be issued later.

Since July 1, 1954, there have been numerous improvements in the theoretical calculations applicable to plutonium in piles and pile basins. These improvements were retroactively applied to the period 7-1-54 through 3-31-55. Neither the Ending Inventory nor transfers to Separations were affected but the Beginning Inventory and the pushes were revised downward. The effect has been to reconcile the Material Underaccounted For which developed due entirely to the limitations in calculations.

Charges from HAPO to the Overhead Allowance amounted to $2,647 in May, consisting of travel and living expense variation of $1,454 and conference expense of $1,193.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

SUMMARY OF CASH DISBURSEMENTS, RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of $6,500,000 and $7,150,000, respectively, by the Atomic Energy Commission) for the months of May and April, 1955, is shown below:

Disbursements	May	April
Payrolls (net)	$3 031 834	$3 529 627
Materials and Freight	2 051 434	1 877 999
Payroll Taxes	836 732	1 039 950
Payments to Subcontractors	551 933	522 490
United States Savings Bonds	310 235	202 523
Group Insurance Premium	144 118	2 901
Pension Plan - Employees' Portion	107 485	97 483
ADM 1578 Special Expenses for Year 1954	85 254	-0-
Travel Advances to Employees	68 574	77 377
Business and Occupation Tax Transmitted to AEC	2 204	1 047 528
All Other	150 226	116 600
Total	7 340 029	8 514 478
Receipts		
Rent	124 133	116 574
Electricity	88 246	77 613
Sundry Accounts Receivable	69 235	10 079
Hospital	54 021	51 978
Telephone	52 117	52 796
Sales to AEC Cost-type Contractors	24 662	23 090
Bus Fares	8 891	8 415
Refund of Travel Advances to Employees	8 313	14 338
Refund of Business and Occupation Tax	2 204	1 047 528
Refunds from Vendors	301	51 374
Other	4 731	5 503
Total	436 854	1 459 288
Net Disbursements	$6 903 175	$7 055 190

Outstanding advances as of May 31, and April 30, 1955 were as follows:

	May	April
Cash in Bank - Contract Accounts	$1 407 504	$1 810 678
Cash in Bank - Salary Accounts	15 000	15 000
Total	$1 422 504	$1 825 678

AUDITING SECTION
MONTHLY REPORT - MAY, 1955

Reports were issued for the completed audits listed below:

Maintenance, Utilization and Safeguarding of Capital Assets
Classified Files
Non-Exempt Payroll Preparation and Check Distribution
Overtime Lunches
Records Operations and Forms Control
General Electric Employee Purchase Plan
Accounts Payable

At month-end, reports were being prepared for audits of:

General Accounts
Traffic Activities

Field work was continued on the following audits:

Bank Account Reconciliations and Cash Controls
Construction Work in Progress

The following audits were started during the month:

Deposits, and Income from Investments
Traveling, Living and Entertaining Expenses
Graduate School of Nuclear Engineering

Follow-ups were made to determine the extent of compliance with recommendations made in reports of following audits:

Costs - Hanson-VanWinkle-Munning Company - Purchase Order HWC 7073
Accounts Receivable - Rent
Accounts Receivable - Electricity

As of May 31, 1955, L. B. Christopher transferred from Auditing Section to Property Accounting Section and D. S. Parsley transferred from Contract Cost Section to Auditing Section.

Two exempt employee information meetings, one of which was also a safety meeting, were held during the month.

BUDGETS AND MEASUREMENTS SECTION
MONTHLY REPORT - MAY, 1955

General

Recruiting of Business Graduates took place during May at five universities located in the San Francisco Bay Area. Four offers were made but number of acceptances has not yet been determined. Present indications are that we will employ approximately fifteen new Business Graduates this season with the greater portion reporting late in June.

Three suggestion awards for Financial Department personnel were approved by the Suggestion Board during May. One award is being reviewed again by the Board in June to re-evaluate the amount based on ingenuity of the contribution.

Budgets

A control budget was completed and reviewed with the Manager - Finance covering FY 1956 operations. During June this budget, which is lower than the budget submitted to the Commission for obtaining funds, will be reviewed with all department managers for concurrence or revision. It will then become effective July 1, and will be used to measure performance.

Bogey estimates were completed on schedule for use by the Manager - Manufacturing and the General Manager during the May monthly cost review.

Measurements

Plans for increasing the staff in order to adequately cover all phases of this work progressed well. Interviews were held with Manufacturing and Radiological Sciences personnel to select specialists for transfer to the Financial Department who will perform measurements work relative to their respective former departments. S. G. Smolen will transfer from Manufacturing effective June 1, and Zane Carey will transfer from Radiological Sciences effective June 15. No selection has yet been made from the Engineering Department.

Department managers were advised of our willingness to hold area meetings with first and second line supervision on the philosophy and responsibilities of measurement work at HAPO. Good response is anticipated and will be reported upon as it materializes.

A meeting was held with the Manager - Personnel Practices Section and the Manager - Personnel Accounting Section to delineate responsibilities relative to the development and utilization of measurements applicable to employee relations. Work is progressing well in this area.

CONTRACT COST SECTION
MONTHLY REPORT - MAY, 1955

SECTION - GENERAL

Authority was received from the Commission to report monthly Reactor product cost in MWD's produced rather than calculated grams of plutonium. It is believed that this change will greatly improve the usefulness of the Product Cost Report; however, the authority to make this transfer to MWD's was accompanied by a request for rework of a large number of past statements.

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A review of funds included in the FY 1955 Financial Plan for Plant and Equipment projects was completed during the last week in May. After discussion with HOO-AEC budget personnel, a schedule was prepared indicating amounts to be obligated to General Electric during FY 1956 in order to complete work currently in progress or to be started from FY 1955 Budget items. Amounts to be obligated are as follows:

Fissionable Materials Program

General Electric Company	$ 45 174 068
Lump-Sum Contractors	10 319 237
J. A. Jones Labor Contract	9 680 943
Total Fissionable Materials Program	$ 65 174 248

Weapons Program

General Electric Company	$ 165 482

Instructions have been received from the Commission to write off "Mint" decay at production inventory value at the time decay is reported by Accountability. Decay during FY 1955 will be journalized at the end of June and decay occurring thereafter will be written off periodically.

The adult patient day census at the hospital has remained essentially at the level established in early March. However, since the budget anticipated this, costs in the current month are expected to approximate the budget provision. Further reductions in hospital personnel were accomplished during the month. Hospital management has effected a reduction of ten employees in the past six weeks, compared with a planned force reduction of thirteen people.

EMPLOYEE AND PUBLIC RELATIONS COST UNIT

During the month, considerable time was spent with Administration Area personnel in discussing ways in which unit cost information may be developed covering janitor service in the 700 Area buildings. Other studies were under way pointing towards the development of additional unit cost information, such as cost per hour for attendance at training classes, cost per Rotational Trainee, cost of hiring a new employee, cost of terminating an employee, and others. We hope to include these additional measurements in unit cost binders within the next few months.

A study of hospital costs is currently under way to determine the cost per square foot of space utilized in the hospital. Results of this study will be used in connection with possible rental charges to Industrial Medical for space occupied.

Preliminary work was started on a proposed method of charging Construction Contractors for physical examinations. This service was formerly provided by physicians employed by the Contractors, but will in the future be provided by our Industrial Medical Unit with costs being liquidated to the Atomic Energy Commission.

Beginning July 1, 1955, the Community Section will bill School District No. 400 for Waste Removal Services and Sewerage. Although it is normal practice for school districts to pay for this type of service, we have never charged for this service in the past. It is estimated that the total charge will approximate $5,000 annually. This has been cleared with Community Management in the AEC, and the local school district will be informed in writing by the Manager - Community Operations Sub-Sectior

Community Cost has started preliminary work on the annual Landlord Report for the Community Section. Forms are being prepared and certain utility costs which are figured on a fee schedule basis are being inserted. Letters have been sent to Plant Accounts and other units involved advising them of information which will be required as soon as books are closed for this fiscal year.

The Education and Training Section has developed a proposed Technician Training Program for Hanford Works. This is a two-year program of rotational work assignments for promising high school graduates or technical institute graduates with strong backgrounds in science and mathematics. This program will include four rotational work assignments, each of six months' duration and concurrently two years of evening studies of science, mathematics, and engineering on the student's own time. From a cost standpoint, we plan to handle expenses of this program in the same manner as we are now handling those of the Rotational Training Program for Technical Graduates. The program was reviewed with managers in Engineering and Manufacturing Departments and with representatives of Legal and Union Relations. Reimbursement authorization has been obtained from the Atomic Energy Commission.

ENGINEERING COST UNIT

A review of the actual General Electric Indirect Construction Expense ratio to total Construction Cost for FY 1955 through April was made and a schedule comparing this ratio, plus the estimated ratio for May and June of FY 1955 with the estimate for FY 1956, was prepared. The results indicate that Indirect Construction Expense for FY 1955 will be approximately 2.25% of total Construction Cost as compared with an estimate of 2.73% for FY 1956. This compares with a standard rate of 3% currently in use and revisions thereto may be required if Plant and Equipment Projects do not materialize as planned.

Informal information regarding changes and deletions in General Electric's Plant and Equipment Budget for FY 1957 and Revision for FY 1956 have been received from HOO-AEC. A schedule of changes is being prepared and will be transmitted to Department Managers for comment on June 7, 1955.

Minor Construction Stores Operating and Inventory Procedures were completed and accepted. The new procedure for Inventories was placed into effect with the taking of physical inventories on May 31, 1955. The Operating procedure is to be effective June 1, 1955. Reconciliations are now in progress. A completed schedule of inventory dates has been established which will result in the completion of all physical inventories of Minor Construction Stores materials by November 28, 1955.

A review of Design Orders liquidating to Design Projects revealed that some inconsistency existed when coding such Design Orders to scope, detail, or liaison. This situation was discussed with representatives of the Design Section and a review of all Design Orders pertaining to Design Projects was made, resulting in adjustments being made for three Design Orders. These adjustments will be reflected in Design Section Operating Statements issued for the month of May, 1955.

Investment and cost statistics relative to Research and Development in the Pile Technology, Separations Technology and Advance Engineering Sections of the Engineering Department were prepared in order to compare with similar data at other research installations within the General Electric Company.

A procedure was established this month which expedites the reporting of "Equipment Work In Progress - Engineering." The current expenditures when received during the month are now accumulated by equipment classifications. After the EWIP balance is determined at month-end the information required by Plant Accounting is made available much sooner. Previously this information was not available until the lengthy report "Equipment Not Budgeted In Construction Projects" was completed.

GENERAL AND CONSOLIDATIONS COST UNIT

A discussion was held with personnel of the Radiological Sciences Department to determine the distribution of Analytical Techniques to Biophysics Research and Dosimetry. Following this discussion a revised budget for Fiscal Year 1956 was resubmitted to the Commission.

A study was made to determine the retention period for IBM cards that are used for cost purposes. In most cases it was recommended that these cards could be destroyed as soon as the IBM reports are prepared.

The Fiscal Year-End Closing Schedule was completed and distributed this month. Closing dates compare favorably with fiscal year ending 1954 even though we are scheduling a five week month this year (June 1955) as compared to a four week month last year (June 1954).

Two new reports were delivered on a routine basis starting in May.

1. Weekly Expense Code (Cost to date by month)

   These work orders are routinely closed each month-end. This report was originally intended to save month-end bottleneck summary punching but will also save time in computing current month to date charges on any routine order upon completion of each weekly IBM summarization. The report will be distributed to customer units requiring routine weekly charges, in lieu of the old monthly summary reports.

2. Project Engineering - Cost to Date

   This report is being processed simultaneously with the old W. O. Cost to Date ledger until such time as it is practical to eliminate cost to date ledgers.

The FY 1956 Store Order Cutoff schedule was accepted as submitted in April and will serve as a time saver during FY 1956 in getting store orders into the Computing Unit approximately 1½ days earlier each month.

Eight pages of the uniform cost code book were revised during May. A copy of the general ledger accounts and subsidiary accounts will be issued in cost code book size during June.

Representatives from each of the interested cost units have been scheduled to correct vouchered payroll cost codes in the Computing Unit each Monday. This has resulted in a notable reduction in SDC's being processed.

MANUFACTURING COST UNIT

Two suggestion awards were received by Manufacturing Cost Unit personnel. A $100 award was presented for a suggestion related to a reduction in clerical effort associated with the recording of purchase requisition data, and a $25 award was received for a suggestion reducing typing time on operating reports.

The accounting records maintained by the laundry personnel in the Separations Section for recording laundry wash and disbursements was reviewed at the request of the Superintendent of Radiation Monitoring. After a careful survey of the purposes of the records, a revised form was prepared. The form was adopted and preliminary indications are that approximately 40 hours per month will be saved by clerical people in the laundry.

A special Power Operations Cost report was prepared for the Metal Preparation Section Manager for his use in the Manufacturing Department monthly cost meeting. This report showed a comparison of production cost of steam and water during FY 1954 vs. the first 10 months of FY 1955.

At the request of the Engineering Department, an estimate of unit cost of plutonium nitrate including SF material, conversion and depreciation from 1956 through 1960 was prepared. This estimate was based on production information provided by the Manufacturing Department.

In accordance with a request from the Budgets and Measurements Section, work was begun to compile data on essential material consumption by commodity and by facility for FY 1955.

Special cost standards were prepared which will be used as a basis for charging Purex startup for the preparation of cold run material. The use of these standards will eliminate a considerable amount of detail work by Metal Preparation Section supervision.

The Indirect Expense ratio to applied labor in the Reactor and Separations Maintenance has been declining. Liquidation rates were, therefore, changed effective May 2 for the units, thus reducing the standard unit cost per hour of labor expended on maintenance work.

The first of a series of cost meetings with the Transportation Section was attended by Manufacturing Cost Unit personnel. It is expected that cost unit personnel will take an active part in these meetings and will make presentation of cost and budget information.

Z Plant process codes were reissued in order to segregate Task I costs upon completion of recent modifications of the 234-5 facility.

The new procedure of processing stores orders through General Ledger without regard to numerical sequence has caused an increase in the work load of our stores order clerk to the extent that an additional clerk is needed. A clerk is to be assigned to this work as soon as one can be obtained.

A summary of Purchasing and Stores Section costs was formulated together with several indices for measuring performance during April. This report will be prepared on a monthly basis in the future.

A round table discussion was conducted by the Reactor Financial Representative with the personnel in the Reports and Records group who prepare Reactor Section Financial Reports. In addition to clearing up some questions concerning cost reporting methods, considerable interest was shown in the use of the reports by field supervision. Cost forecasting and analysis was discussed in considerable detail.

GENERAL ACCOUNTING SECTION
MONTHLY REPORT--MAY, 1955

ADMINISTRATIVE PLANNING

A total of 67 new or revised organization and policy guides were distributed during May. Three of these were instruction or policy guides, the balance were organization guides. The three instruction guides were:

13.4, General Electric Pension Plan and Emergency Loan Plan, which was rewritten with no substantive change except for considerable reduction in length.

13.22, Attendance Recognition Plan, which was rewritten with no substantive change.

24.3, Reimbursement for Contaminated Personal Effects, which was rewritten to eliminate a routine monthly report and to add a time limit for the submission of another report.

In addition to the OPGs mentioned above, 79 are awaiting production and distribution.

One office letter was processed: No. 209, Memorial Day Holiday.

Eight complete OPG books were compiled and distributed and 837 extra copies of OPGs distributed.

In an attempt to keep organization and appointment guides more up to date, arrangements have been made to receive the monthly organization charts and rosters issued by the following Sections: Metal Preparation, Separations, Pile Technology, Separations Technology, Design, Projects, and the Radiological Sciences Department.

Approval has been obtained from all interested departments on the proposed draft of OPG 04.1.1, Performance of Project Work.

A report was made summarizing AEC transmittals received within HAPO for the month of April, 1955.

A report summarizing all OPGs issued during April was prepared and distributed to all section and department managers. The comments received were mostly favorable. The summary will, therefore, be issued regularly in the future.

The following organization and policy guides are currently being revised or reviewed for possible revision:

04.1.1 Performance of Project Work
04.1.2 Management of Maintenance Work
04.1.3 Research and Development
04.2 Engineering Standards
04.10 Control of Reactor and Other Special Materials

ADMINISTRATIVE PLANNING (Continued)

05.1 Plant and Equipment Appropriations
05.3.1 Authorizations for Work to be Performed by Other HAPO Departments
05.3.4 Authorization for Technical or Consulting Work or Other Special Services
05.3.5 Authorization for Work to be Performed by Other Contractors of HOO-AEC
05.3.7 Authorizations of Work by Hanford Operations
05.4 Work or Expenditures Which Require AEC Reimbursement Authorization or Letter Approval
13.2 Membership in Trade and Professional Societies or Associations
13.13 Overtime Lunches
18.2 Absences & Tardiness
18.14.4 Induction of New Employees
18.14.5 Employee Transfer & Payroll Status Change
21.8 Shipping, Receiving & Acceptance Procedures

ACCOUNTS PAYABLE UNIT

Vouchers processed in Accounts Payable during the month numbered 4,471 and amounted to $3,888,354. Freight bills paid amounted to $349,603 and numbered 1,734; this is the highest number of freight bills processed in any one month since January of 1953.

Cash discount earned during May amounted to $7,848 and the fiscal year to date total was $64,943.

Active contracts handled by Accounts Payable, excluding requirements contracts, numbered 34, and contract commitments at the end of May amounted to $456,056. Payments on these contracts in May totaled $90,480. Requirements contract orders placed during May numbered 13, in the amount of $452,903, and commitments at the end of May amounted to $695,729. Payments under requirements contracts for the month were $461,454.

Subcontract completion certificate, release and waiver of lien in connection with Special Agreement No. G-5 and G-12 have been returned by the National Carbon Company and are presently in process of approval.

The number of purchase orders received in Accounts Payable during the past several months indicate that the future work load will remain at the present level for an extended period.

ACCOUNTS PAYABLE UNIT (Continued)

Accounts Payable:	May	April
Balance at beginning of month	$ 870 812	$ 774 248
Vouchers entered	3 888 354	4 760 620
Accrual for inventories	*	112 754
Cash receipts	301	51 373
	4 759 467	5 698 995
Less:		
Vouchers paid	3 997 960	4 782 342
Reversal of accruals	112 754	45 841
	4 110 714	4 828 183
Balance at end of month	$ 648 753	$ 870 812

*This entry being made to Miscellaneous Accrued Liabilities

Other Statistics:		
Number of vouchers recorded	4 471	4 507
Number of checks issued	2 545	2 706
Number of freight bills paid	1 734	1 572
Amount of freight bills paid	$349 603	$332 000
Number of purchase orders received	2 472	2 593
Amount of purchase orders received	$2 180 033	$2 175 228
Amount of cash discount earned	$7 848	$10 371

ACCOUNTS RECEIVABLE UNIT

The gross accounts receivable balance at May 31, 1955, amounted to $279,866, a decrease of $37,577 from the balance of $317,443 at April 30. The reduced balance results primarily from decreases in Electricity, Sundry, AEC Cost-type Contractors and Rent accounts.

Invoices in the amount of $25,326 each were issued to the Northern Pacific Railroad Company and the Union Pacific Railroad Company for the fifth (of twenty-five) annual payments for use of the southern railway connection out of Richland. Payments of both invoices were received during the month.

A letter was mailed to all GE employees housed in North Richland, from whom we have been making payroll deductions for rentals due, in accordance with signed authorizations. This letter advised these employees that they would be required to vacate the camp on or before June 15, in accordance with the request of Commonwealth, Inc., operators of the camp. Also that a final deduction from salaries would be made from salary checks received June 10, 1955, covering rentals through May 31, 1955. If these employees continued to occupy space after May 31, arrangements for space and rentals were to be made with Commonwealth, Inc.

ACCOUNTS RECEIVABLE UNIT (Continued)

At the request of the Commission, and in connection with proposed methods in handling of delinquent rental accounts, a listing of all unpaid accounts at May 19 was prepared. Subsequent meetings with personnel of AEC Community Management and Finance Divisions were attended, and we are presently awaiting word from them concerning proposed changes in procedures.

Other statistics pertaining to accounts receivable are summarized below:

Account	Balance 4-30-55	Net Charges	Collections	Balance 5-31-55	Bills Issued in May
Kadlec Hospital:					
Active	$ 95 125	$ 58 285	$ 56 257	$ 97 153	1 260
Collection Agencies (79 Accounts)	9 241	798	2 519	7 520	
Electricity	56 280	74 191	89 676	40 795	4 037
Telephone	31 554	55 337	53 511	33 380	6 897
Sundry:					
Active	33 664	62 146	69 150	26 660	298
Collection Agencies (140 Accounts)*	7 863	106	195	7 774	
AEC Cost-type Contractors	26 880	14 987	25 213	16 654	28
Rents	33 083	386 478	393 792	25 769	6 816
Equipment sales to Facilities (1 Account)	21 987		349	21 638	
Safety Shoes	1 404	2 700	1 937	2 167	329
Loans to Employees (2 Accounts)	362		6	356	
Sub-total	317 443	$655 028	$692 605	279 866	19 665
Reserve for Bad Debts	24 526 cr.			25 046 cr.	
General Ledger Balance	$292 917			$254 820	

*Includes all utility and rental accounts.

CONTRACT REIMBURSEMENTS

Three letters were written to the Commission in accordance with OPG 05.4 ("Work or Expenditures Which Require AEC Reimbursement Authorization or Letter Approval") and approvals as requested were obtained. These covered The Travelers Insurance Company's payment of attorney's fees and costs in a workmen's compensation case; the participation of a HAPO employee in a Company-sponsored radiation equipment study group; and the payment of a physician for testimony in workmen's compensation appeal cases and a court reporter for transcripts in those cases.

The Contract Reimbursements group handled 10 inquiries on reimbursement problems during the month, four of which originated outside the Financial Department.

CONTRACT REIMBURSEMENTS (Continued)

Charges from HAPO to the Overhead Allowance in May amounted to $2,647, consisting of: travel and living expense variation $1,454; and conference expense, $1,193.

A change in the routing of copies of purchase orders has been instituted to permit the Contract Reimbursements group to review the Accounts Payable Unit's copy en route from the Purchasing Sub-Section to the Accounts Payable Unit. This review is intended to assist in establishing the propriety of purchases prior to payment and to assure that proper AEC approvals have been obtained.

The April "Summary of Disbursements," which was transmitted to the Commission through the Chief of its Finance Division, covered disbursements of $7,055,190, as follows:

Payrolls and Payroll Deductions Disbursed	$4 522 268
Materials (including payments on requirements contracts) and Freight	2 320 433
Subcontracts and Agreements	80 056
Advances for Traveling and Living Expenses	77 377
Miscellaneous Payments	1 514 344
Gross Disbursements	$8 514 478
Less: Revenue	1 459 288
Net Disbursements	$7 055 190

In preparing this report, a review was made of each of 338 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

On May 16 a meeting was held between interested members of the Financial Department and the AEC Finance Division for the purpose of discussing fiscal year-end closings and establishing closing dates. As a result of agreements reached, the established dates have been announced and steps have been taken to provide for the compilation and recording of necessary data and preparation of year-end reports.

In connection with study under way to determine feasibility of changing our arrangements regarding Automotive and General Liability and Property Damage Insurance, total costs to the Government from September 1, 1946 to January 1, 1955 were calculated and forwarded to the Insurance Unit. These costs, representing payments to the Travelers Insurance and Indemnity Companies, totaled $716,412.

GENERAL BOOKS UNIT (Continued)

Discussions were held with personnel of the Cost Units, Plant and Inventory Accounting and with AEC personnel for the purpose of simplifying the present procedure relating to costs transferred between General Electric and the Commission. A new procedure has been developed as a result of these discussions and an approximate annual saving of $2,400 of clerical, typing and duplicating expense will be realized.

This change in procedure is of benefit to the A.E.C. in that considerable savings will also be realized by their organization. In addition, the new procedure will, by its simplicity, expedite cost transfers from A.E.C. to G.E. and application of charges to the appropriate accounts.

A new travel and living expense report form, designed exclusively for use by personnel on long assignments, was put into use in May. This form enables the traveler to report expenses for a full month on one sheet, with summary information on the face and details on the back. The short form now in use provides for the reporting of nine days' expenses per page, which is adequate for nearly all travel except inspectors, expeditors, and other travel of long term assignment.

The new cash register machines in the Works Cashier's Office are proving very effective, both from a control and a time standpoint. The daily closing time for each cashier has been reduced 30 to 45 minutes by eliminating the need to run adding machine tapes on each type of transaction. The control of the cash registers and the daily summary of receipts has been established with an employee who has no other responsibility for cash functions.

Document accountability of store orders was discontinued in May, which enabled Stores to reduce its staff by one employee. Store orders prior to May were placed in numerical order by Stores and transmitted to General Ledger with a listing of stores tickets held by stores and a listing of tickets held out of previous days' tickets included in the current day's transmittal. Under the new procedure the store orders are not serialized nor is a transmittal prepared, since it has been determined that this additional work was not justified.

A study was conducted in May regarding the delay in billing of costs in connection with accidents involving government and other vehicles where a second or third party liability is determined. As a result of the study, action has been taken to bill estimated costs in those incidents where repair costs are under $100. This will eliminate approximately 30 to 45 days' delay in billing time. Based on past experience, the estimated costs should not vary from actual costs plus or minus 3%.

GENERAL BOOKS UNIT (Continued)

	May	April
Advances from A.E.C.		
Balance at beginning of month	$1 825 679	$ 1 730 868
Advances received from A.E.C.	6 500 000	7 150 000
Other cash receipts	436 854	1 459 288
	8 762 533	10 340 156
Less disbursements	7 340 029	8 514 478
Balance at end of month	$1 422 504	$ 1 825 678
Advances requested for subsequent month	$6 200 000	$ 6 500 000
Travel and Living Expenses		
Travel Advances to employees		
Balance at beginning of month	$ 66 829	$ 54 063
Advanced to employees	68 574	77 377
	135 403	131 440
Less:		
Travel, living, and conference expenses reported by employees	53 072	50 273
Cash refunded by employees	8 313	14 338
	61 385	64 611
Balance at end of month	$ 74 018	$ 66 829
Outstanding Travel Advances to Employees		
Current	$ 66 779	$ 60 380
Outstanding over 30 days	7 239	6 449
Total	$ 74 018	$ 66 829
Number of expense reports submitted by employees	256	221

Works Cashier's Office

	May	April
Receipts Issued	$11 585	$11 181
Bus System Operations		
Cash collections: Village	$ 651	$ 689
Area	$ 7 639	$ 7 326
Tickets: Value of tickets sold	$ 600	$ 400
Number of tickets sold	12 000	8 000
Number of tickets collected	9 443	9 450
Cash Overages and (Shortages)		
Number	7	6
Amount	$18.87	$ (.62)

PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT - MAY, 1955

Individual reports of each HAPO employee's personal share in the General Electric Benefits Plans were prepared in Personnel Accounting Section for distribution to employees. The reports summarized for each employee the benefits to which his contributions and those of the Company entitled him as a participant as of December 31, 1954. The reports were distributed to employees through supervision on May 20, 1955.

In connection with its program of detection of fraudulent claims for unemployment benefits, the Employment Security Department, State of Washington, requested that the Company report total earnings of each employee up to a maximum of $6,000 for the year 1954 rather than the required $3,000 and supply the Department with a weekly list of employees added to the payroll and employees removed from the payroll. The information with respect to 1954 earnings was furnished in May and weekly reports of additions and removals from payroll were initiated during the month.

The ranking of non-exempt jobs in Personnel Accounting Section was completed in May under the program of review of all non-exempt jobs at Hanford being conducted by Salary and Wage Administration Section.

In the administration of the General Electric Insurance Plan, certain functions formerly performed by Accounting Services Division, Schenectady, have been delegated to local components. The functions delegated are as follows:

1. Acceptance and approval of statements of health of employees who apply for insurance coverage more than 31 days after eligibility in those cases where the life insurance coverage is $5,000 or less.

2. Processing of agreements for installment settlement of the proceeds of life insurance.

3. Processing of claims under the health and accident portion of the Plan for employees retained in service beyond normal retirement.

4. Processing requests for replacement of insurance certificates in those cases of adversely held certificates (usually certificates held by former beneficiaries who will not release same).

5. Processing of claims in Controverted Workmen's Compensation cases.

A summary of the recent Attitude Survey of HAPO employees was delivered to employees through supervision on May 27, 1955.

An analysis was made of the ages of all HAPO employees as of May 31, 1955. The analysis indicated that the average age of employees is 38 years and approximately 85% of all employees are 50 years of age and under. In the age group 31 to 40 years, there are 2,943 employees, or 32% of the total.

PERSONNEL ACCOUNTING SECTION (Continued)

As a result of the change in overtime controls, four reports of overtime hours and overtime payments previously prepared in Personnel Accounting Section have been eliminated. A survey of the use made of the Employees and Payroll Report indicated that there was not sufficient use made of the report to justify its continuance; accordingly, the report has been discontinued.

Round Table Meetings were held with all non-exempt employees during the month. Among the subjects discussed were the report to employees of their personal share in General Electric Benefits Plan, fire drill procedures, good housekeeping, Civil Defense evacuation instructions, and various items of General Electric history as extracted from the 100th Anniversary of the Schenectady Union Star dated April 22, 1955.

STATISTICS

Personnel Accounting Section

Number of HAPO Employees	Total	Monthly Payroll	Weekly Payroll
Changes during month			
Employees on payroll at beginning of month	9 152	2 252	6 900
Additions and transfers in	121	10	111
Removals and transfers out	(72)	(16)	(56)
Transfers from weekly to monthly payroll	-	29	(29)
Transfers from monthly to weekly payroll	-	-	-
Employees on Payroll at end of month	9 201	2 275	6 926

	May		April	
Overtime Payments During Month	Number	Amount	Number	Amount
Weekly Paid Employees	6 301	$104 707 -a)	7 796	$135 870 -b)
Monthly Paid Employees	402	31 480	451	36 718
Total	6 703	$136 187	8 247	$172 588

Gross Payroll Paid During Month	May	April
Engineering	$ 772 757	$ 827 866
Manufacturing	2 445 944	2 863 617
Other	1 133 092	1 300 207
Total	$4 351 793 -a)	$4 991 690 -b)

(a- Payments to weekly paid employees are for four week periods.
(b- Payments to weekly paid employees are for five week periods.

Employee Benefit Plans	Number Participating		Percent Participation	
Participation in Benefit Plans at Month End	May	April	May	April
Pension Plan	8 005	7 972	98.5%	98.4%
Insurance Plan				

	May	April
Pension Plan		
Number retired	2	4
Number who became eligible for participation	53	50
Number who applied for participation	52	49
Number who elected not to participate	1	1
Replies not received	0	0
Insurance Plan - Number of Claim Payments		
Employee Life Insurance	1	2
Employee accident and health insurance	465	457
Dependent accident and health insurance	515	487
Total	981	946
Good Neighbor Fund		
Number participating	6 484	6 506
Percent of participation	70.5%	71.1%
Suggestion Awards		
Number of awards	118	85
Total amount of awards	$1 799	$1 880
Preferential Rates		
Number (eliminated) or added	(2)	(3)
Number currently in effect	552	554
Number of Military Allowance Payments	5	5

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - May 1955

GENERAL

Construction in the 713 Building on the room for the 702 Electronic Data Processing Machine was completed and accepted by AEC-GE on May 31. Work on mechanical refrigeration and air conditioning equipment will be completed and tested in the near future. IBM Engineers are installing testing equipment and cable connections for the 702 which left Poughkeepsie, New York in three trucks on May 26 and 27. Arrival date in Richlan is scheduled for June 6.

Conversion of current machine procedures from punched-card to 702 EDPM is in process. All but six of the smaller procedures are in the conversion process.

An Analyst of the Numerical Analysis Unit, who was assigned to the Operations Research Study production problem, has been in Poughkeepsie, New York since May 23 assisting in the machine checking of 702 programs for production scheduling calculations. These calculations should be completed by June 3.

Calculations pertaining to the Attitude Survey were completed. Final results were furnished to the Statistics Unit of the Engineering Department on May 20. Advanced management copies were available on May 24 and copies for all nonexempt people were distributed on May 27.

The Procedural Analysis Unit prepared a benefits status report on each employee for the Benefit Plans Accounting Unit during the month. The calculations pertaining to the information were done on the 604 calculator. The forms themselves were printed by hand-feeding each individual page through the 407 Accounting Machine. The transmittal letters were also addressed on the 407. The forms, one for each employee on the plant, were prepared in approximately twenty-four hours operating time.

PROCEDURAL ANALYSIS

Forms control reviewed 396 orders during May covering 909,634 forms; 23 orders, amounting to 40,825 forms, were rejected; 91 new forms were designed.

At the request of Manufacturing Department supervision, forms being used by Purex, Redox, and "T" Plant are being revised and standardized for use in all three plants.

A new type form to record approximately 15,000 surveys per month made by Radiological Sciences and Manufactoring Monitoring Sub-Sections, has been designed and will be put into effect when received from the printer. Check boxes and punches incorporated in the new form design will eliminate 50% of written entries previously required and will permit quick and accurate sorting of data for reporting and review.

A system of preparing and duplicating shipping documents for SF Accountability was developed utilizing a small contact printer instead of carbon copies of typewritten data and ditto masters. The new system will furnish more permanent records and effect an annual savings of $800.00 for supplies.

Employee & Public Relations Department

The office machine repair billing procedure was revised to provide for inventory verification by the customer user.

Engineering Department

A meeting was held with Classified Files supervision to discuss proposed systems changes to permit integrated data processing of document control data. The principle of tape to card machines was discussed and is being given further study. The logic of 702 programming of the present files procedures was discussed in detail to permit a better mutual understanding of information needed to operate the files and to simplify the programming steps.

Financial Department

A report was issued on the feasibility of preparing SF Accountability reports for TBP and UO_3 plants on the new IBM 702 Electronic Data Processing Machine. The report recommended that work currently being posted and calculated by hand be computed and compiled by the 702. In addition, it will be possible to make certain checks on the accuracy of recordings and measurements.

A Stores physical inventory report was completed May 31. Fixed control panels were wired utilizing floating decimal techniques to make the necessary calculations and reports.

Radiological Sciences Department

The procedure for providing calibration and shop repair data on Radiation Monitoring instruments was installed May 9, 1955.

Data on calibration and shop repair are received daily for keypunching. This information is used to generate two monthly reports for the Calibration Unit of Radiological Sciences

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Employee and Public Relations Department	44	Standard	Storage	Cartons
Engineering Department	112	"	"	"
Financial Department	189	"	"	"
Manufacturing Department	110	"	"	"
Radiological Sciences Department	5	"	"	"
	460			

Four hundred and twenty cartons of records were destroyed.

Records Retention and Disposal Schedule Number 212, "Community Fire Unit Records" consisting of fifteen individual records and Number 213, "Community Police Records" consisting of twenty-nine individual records were developed and submitted to the Employee

and Public Relations Department for internal approval. Records Retention and Disposal Schedule Number 210, "Community Electrical Distribution Records" consisting of seventeen individual records were submitted to the Atomic Energy Commission for approval.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-36928-W.

COMPUTING OPERATIONS

During the month of May the following non-routine assignments were completed for customers:

Employee and Public Relations	4
Engineering	17
Financial	14
Manufacturing	1
Operations Research	12
Radiological Sciences	1
	49

Service charges for the month amounted to $43,688.86. Services, by customer, were as follows:

Atomic Energy Commission	$ 374.93	01% *
Employee & Public Relations	824.92	02
Engineering	9 311.13	21
Financial	28 303.44	65
Manufacturing	1 013.62	02
Operations Research	2 500.34	06
Radiological Sciences	1 360.48	03
	$43 688.86	100%

* Less than 1%.

PROPERTY ACCOUNTING SECTION
MONTHLY REPORT - MAY 1955

PLANT ACCOUNTING UNIT

Plant and equipment values exceeded one billion dollars during May 1955. Included are values of facilities still under construction which will upon completion be operated by General Electric Company.

An analysis of assets related to the Richland Schools was completed during the month preparatory to recommending transfer of values to the Commission.

Improvements to land and other facilities presently maintained by School District 400 are summarized as follows:

Spaulding Elementary School	$215 135.21
Jefferson Elementary School	19 743.90
Marcus Whitman Elementary School	30 487.87
Jason Lee Elementary School	25 541.96
Lewis and Clark Elementary School	13 831.55
Sacajawea Elementary School	11 559.67
Chief Joseph Junior High School	91 416.09
Carmichael Junior High School	291 649.91
Columbia Senior High School	77 360.70
	$776 726.86

Measurement activities during May were confined to the presentation and comparison of plant and equipment values (adjusted for inflation) through time to June 30, 1955, product output per dollar of investment per employee for 1948, 1955 and 1956, and other graphical presentations of fixed assets for use in connection with visits of top General Electric Management to HAPO.

Unitization Reports for both the Kaiser Project (CA-512) and the Blaw-Knox Project (CA-513-A) are scheduled for completion at June 30, 1955. While the schedule for CA-513-A is almost as planned, the previous date on CA-512 was May 15 and we believe this late date was occasioned by a shortage of the contractor's help. We have repeatedly advised the AEC coordinator that a late completion date should be anticipated if the rapid termination rate continued.

The values of these projects which will be recorded on Project Unitization Reports are:

CA-512 - 100-K	$147 428 496
CA-513 - Purex	74 371 727
	$221 800 223

PLANT ACCOUNTING UNIT (Continued)

Although work has been steadily progressing on all projects during May, only three Project Unitization Reports were completed, listed as follows:

CG-550	Reactivation of 108-B Facilities	$514 303
IR-161	Walkways and Paved Areas - Columbia Playfield	18 613
IR-182	6" Water Main - Stevens Drive	6 213

Due to increases in volume of Cost Transfers and Classification Activities, it was necessary to reassign work loads within the project unitization sub-unit to maintain current operation.

Custodial responsibility and record changes were effected for transfer of the 2101 - Graphite Fabrication Facilities within Manufacturing Department, Separation Section to Stores Sub-Section.

North Richland Tavern and Cafeteria equipment was transferred to AEC in the following amounts:

	Asset	Reserve	Net
Tavern	$ 23 254	$ 23 254	0
Cafeteria	95 661	95 661	0
	$118 915	$118 915	0

These values in turn will be transferred by AEC to the U. S. Army.

Special requests for information furnished to various organization components during the month included the following:

1. A listing of first cost, accrued reserve, and net book value of Richland residences.
2. A listing of Major Equipment by code showing total asset and reserve.
3. A listing of square yards for walks in Community and Plant.
4. A listing of Motor Vehicles showing number of vehicles and first cost.
5. A check of Firearms written off Plant Records as an inventory adjustment.

The transfer of equipment, custodial changes, and reconciliation of records effected cost code changes on approximately 3000 individual record units.

Plant and equipment values at May 31, 1955 are:

PLANT ACCOUNTING UNIT (Continued)

	(In Thousands) Asset	Reserve	Net
Completed Plant and Equipment	$ 754 344	$315 876	$438 468
Construction Work in Progress	42 043	0	42 043
Total Cost Recorded (GE Books)	796 387	315 876	480 511
AEC and Other Contractor Costs			
Land and Land Rights	5 801	0	5 801
Construction Work in Progress-1)	199 899	0	199 899
Total Plant	$1 002 087	$315 876	$686 211

	(In Dollars) This Month	Last Month
1) Kaiser	$119 617 170	$120 367 170
Blaw-Knox	59 963 212	60 092 159
AEC	20 318 058	21 873 921
Total	$199 898 440	$202 333 250

INVENTORY ACCOUNTING UNIT

The third annual physical inventory of electrical material in the custody of Electrical Utility Section and communication materials in the custody of Telephone Sub-Section was taken this month. Tentative results of these inventories reflect net overages. Results of these physical inventories will be issued shortly.

Notices were sent to all control custodians of special materials to remind them of the quarterly physical inventory requirements as set forth in OPG 04.10. It was pointed out that the Inventory should be taken on May 31, 1955 and results reported to Inventory Accounting by June 10, 1955 for reconciliation with accounting records.

Preliminary results of the annual physical inventory of essential materials (excluding coal and fuel oil) which was taken as of April 30, 1955, indicated a net shortage of $23,000. The shortage is relatively minor considering the volume of material handled and its value. Although work is still under way in determining reasons for the shortage, it appears the variance is due mostly to methods employed in valuing material consumed and variances between unit prices used to value the physical inventory and Manufacturing's unit price. Report covering final results of this inventory will be issued in June 1955.

Preparations have begun for handling the year end closing entries affecting inventory sub-accounts.

Meetings were held with Stores personnel this month to formulate procedures, time schedules and manpower requirements for taking the physical inventory of Excess Materials and Equipment. This inventory is scheduled to be taken as of June 30, 1955.

INVENTORY ACCOUNTING UNIT (Continued)

A new policy with regard to the handling and warehousing of zirconium was established this month. Custodians of zirconium will transfer to Stores Unit on July 1, 1955 all inventory material in their custody and after July 1, 1955, disbursements of zirconium and warehousing of zirconium will be handled by Stores.

The control of Reactor and Other Special Materials was modified this month to allow that special materials plated upon, amalgamated or alloyed with other materials non-precious in nature and where the special materials content is not estimated to exceed $50 and extraction for resale value would exceed the cost of the material would not be included as inventory items.

Following is a summary showing inventory account balances for the months of April and May 1955, together with amount of change.

(In Thousands)	Book Balance 4-30-55	Book Balance 5-31-55	Increase (Decrease)
Current Inventories			
General Supplies	$ 2 166	$ 2 185	$ 19
Fuel and Lubricants	79	81	2
Essential Materials	4 062	4 237	175
	6 307	6 503	196
Special Materials	1 360	1 349	(11)
Spare Parts	3 390	4 117	727
Standby	48	58	10
Excess Materials	263	260	(3)
	11 368	12 287	919
Less: Inventory Reserves for			
Essential Materials	118	123	5
General Supplies	84	141	57
Spare Parts	740	732	(8)
Standby	12	12	0
Excess Materials	(21)	(25)	(4)
Total Inventories - Net	$10 435	$11 304	$869
As a Memo: Excess Equipment	$518	$508	$(10)
Excess Equipment Reserve	(215)	(194)	(21)

PROPERTY MANAGEMENT UNIT

Most of the temporary facilities at White Bluffs are no longer required for the construction program at HAPO and disposition through sale or other means is being planned by the Commission. Although final determination of the exact buildings to be retained is still under consideration by the Project Section, Property Management, and the Commission, it appears in general that they will be:

1. Those required by Minor Construction.

2. The heavy equipment shop, the adjacent auto repair shop, and the heavy equipment parts warehouse (assigned to the Stores Sub-Section for warehousing certain equipment held at the request of the Commission).

3. The machine shop. (Disposition is still under consideration by the Commission. Currently under partial operation by Minor Construction.)

4. The fire station.

5. A few other miscellaneous facilities.

The Commission desires to transfer from their accounts to the General Electric Company the facilities to be retained. This raises the question of a receiving agent and landlord for the White Bluffs area. Under OPG 04.4 the landlordship of the subject area is vested in the Engineering Department and the Atomic Energy Commission. In view of the fact that the remaining facilities will be transferred to General Electric and, further, to the fact that Minor Construction will have the major interest in the area, a proposal has been submitted to the Engineering Department that they assume the landlordship of the area in question.

During the current month two groups of AEC machine tools of unusual interest, one held by the Carrier Corporation and the other by the Fairchild Engine Division, were made available to AEC installations to meet their upgrading programs or other requirements. Review of these lists with supervision from the various plant shops has resulted in temporary holds being placed on sixteen items of shop equipment having unit costs totaling $285,752. Of these items, ten represent upgrades for old equipment (more than ten years) which will be subsequently excessed, and six are for additional items included in the 1956-57 budget. In addition to the above, equipment having a unit cost totaling $20,000 was obtained from various excess lists to fill other upgrading requirements or to supply plant needs. These items included a cyclone separator for 300 Area Operations and two lathes, two drill presses and a power shear for Reactor Section, and a Do-All Saw for Minor Construction.

A study was requested by AEC relative to the desirability of all installations utilizing IBM and the Standard Commodity Classification (SCC) Codes for controlling and reporting metalworking machinery.

The Commission was advised that a commodity classification system (for application on a plantwide basis to HAPO equipment) has been established by our Plant Accounting Unit and that the Company is in the process of implementing same. In establishing this system, the Plant Accounting Unit made an intensive study and review of numerous systems and codes used throughout the country (including the Standard Commodity Classification Codes) to determine the feasibility of their application to HAPO problems. This study indicated that none of the systems reviewed could be applied satisfactorily at Hanford. As a result a system was developed to meet HAPO basic requirements.

PROPERTY MANAGEMENT UNIT (Continued)

Discussions held with Pile Technology Section and Separations Section personnel indicated that certain items of capital equipment held for future use at the Mint facility were charged to each of these Sections. In order that custody control of the equipment in this laid-up facility might be assigned to one Section, arrangements were made for the transfer of all custody control cards to the Separations Section.

Tentative release by the Commission was obtained on the Tocco tube annealing equipment procured for K Area construction and now held in storage at White Bluffs. Pile Technology has an immediate use for this equipment for annealing experimental zirconium tubes and the equipment will be used on a continuing basis by Reactor Maintenance. This latter organization is preparing an appropriation request covering acquisition of the equipment, and it will be loaned to Pile Technology for temporary use.

Two requests for oscilloscopes were filled when items meeting the needs were located from within the plant.

Assistance was given to representatives of the Commission in their survey of the plant and equipment budget. This survey included individual review of each item and a field survey of present plant holdings. Findings appeared to be satisfactory.

Records covering shop equipment and the reports of utilization of equipment submitted semi-annually by field forces were reviewed with responsible Manufacturing Department representatives pursuant to the survey being conducted by them related to the possible consolidation of shop facilities. Lists of equipment held in the White Bluffs construction shops were also accumulated and verified for their use.

The Plant Evaluation Survey of Materials and Supplies was continued.

Ninety-three requests for the disposition of property were investigated, processed and approved during May.

Arrangements were completed with the 300 Area supervision which will permit the disposal of scrap automotive tires and tubes at that area burning ground. Previously, this material had been disposed of at White Bluffs along with similar material generated by construction contractors.

Approval of the Commission for the disposal of mercury cell batteries as refuse was requested and received. Previously these batteries, used in many of the monitoring instruments and subject to routine replacement, had been considered as salvage due to the mercury content. The cost of handling and preparation for return shipment to the vendor was considered to be in excess of the salvage price obtainable.

Thirty-two appropriation requests totaling $297,326 were investigated, processed and approved during the month.

APPROPRIATIONS UNIT

The following Plant and Equipment projects were processed through the Appropriations Unit during May. GE and AEC approval action was as indicated below:

Project Number	Title	Amount of This Request		Total*	Date to AEC	Disposition
CA-555 Rev. 2	Graphite Hot Shop and Storage Facility - Building 3730	-	GE	83,500 29,500	4-13-55	AEC-52, Mod. 1, dated 5-2-55, and Work Authority dated 5-9-55 authorized AEC $83,500 and GE $29,500
CG-558 Rev. 4	Reactor Plant Modifications for Increased Production	-		26,800,000	3- 3-55	HW-309, Mod. 7, dated 5-3-55 authorized GE $26,800,000. This directive being held by Financial Department pending receipt of revised directive
CA-590 Rev. 1	Fly Ash Collection Equipment - 384 Building	38,000	GE	38,000 6,500	5- 3-55	Returned unapproved by AEC 5-26-55
CG-593 Rev. 1	Discharge Area Viewing Facilities - 100-B	13,500		49,000	5-10-55	HW-334, Mod. 1, dated 5-16-55 authorized GE $49,000
CA-601 Rev. 1	General Grounds Improvements - 300 Area	96,000	GE	96,000 22,500	2- 7-55	Approved by AEC, Washington, 5-26-55
CG-603 Rev. 1	Hanford 4X Program - Bismuth Phosphate Plants	1,800,000		5,300,000	5- 5-55	HW-338, Mod. 3. dated 5-13-55 authorized scope of work but not additional funds
CG-608 Rev. 2	Redox Crane Viewing Room	11,500		32,500	5-16-55	HW-344, Mod. 2, dated 5-23-55, authorized GE $28,500
CG-613 Rev. 1 Rev. 2	Hanford 4X Program - Metal Conversion Plant	2,660,000 -		3,000,000 -	3-31-55) 4-14-55)	HW-347, Mod. 3, dated 5-16-55, authorized $1,150,000. Directive being prepared increasing auth. funds to $1,500,000
CG-614 Rev. 1	Hanford 4X Program - 300 Area	210,000		340,000	4-25-55	Forwarded to AEC, Washington, 4-29-55

Project Number	Title	Amount of This Request		Total*	Date to AEC	Disposition
CG-616 Rev. 1	Installation of Acid Feed Equipment, 100-B, D, DR, F, and H	485,000		500,000	5-23-55	To be considered at AEC Board meeting 6-2-55
CA-619	Alterations to 186-D Building	32,000		32,000	3-10-55	Deferred by AEC Board for further study
			GE	8,000		
CG-621 Rev. 1	Redox Contamination Control Facilities	502,000		550,000	4-15-55	HW-351, Mod. 1, dated 4-26-55, authorized $98,000. Directive being prepared to increase auth. funds to $198,000
CG-624	Redox Railroad Tunnel Ventilation Barrier	57,000		57,000	3-21-55	HW-355, dated 5-4-55, authorized GE $57,000
CG-626	Alterations to Redox Inert-Gas Vent System	115,000		115,000	4-12-55	HW-356, dated 5-23-55, authorized GE $115,000
CA-627	Replacement of 300 Area Fence	26,000		26,000	5-12-55	AEC-57, dated 5-25-55, authorized AEC $26,000. Work Authority dated 5-27-55 auth. GE $3,500
			GE	3,500		
CA-628	Van Giesen Street Improvements - George Washington Way to Hunt Avenue	23,000		23,000	5-10-55	AEC-58, dated 5-23-55, authorized AEC $23,000. Work Authority dated 5-27-55 auth. GE $3,100
			GE	3,100		
CA-629	Replacement of Thin-Wall Steel Water Lines - FY-1955	35,000		35,000	5-18-55	AEC-59, dated 5-25-55, authorized AEC $35,000. Work Authority dated 5-27-55 auth. GE $3,300
			GE	3,300		
CG-631	Crib Replacement Facilities - 241-T Tank Farm	146,000		146,000	5-19-55	To be considered at AEC Board meeting 6-2-55
IR	Development of Riverside Park - North of Newton Street	8,700		8,700	4-13-55	Returned by AEC unapproved 5-2-55
			GE	1,370		
IR	Building 321 - Fire Detection	14,000		14,000	5-10-55	Deferred for further study by AEC Board 5-19-55
IR-193	Development of Riverside Park - North of Lee Boulevard	18,250		18,250	5-12-55	Approved 5-20-55
			GE	3,350		

Project Number	Title	Amount of This Request	Total*	Date to AEC	Disposition
IR	Procure and Install a Centralized Quality-Reporting System - 313 Building	15,000	15,000	5-23-55	To be considered at AEC Board meeting 6-2-55
IR	Surfacing of Roads and Parking Areas - Minor Construction - White Bluffs Headquarters	15,500	15,500	5-31-55	To be considered at AEC Board meeting 6-2-55

* Total previous authorizations plus this request.

SS ACCOUNTABILITY SECTION
MONTHLY REPORT - MAY,1955

One of the repetitive sources of new SS Accountability problems is that of new products. Major revisions in specifications have the practical effect of creating a similar condition. All of these programs are marked by a multiple variety of forms, weights or special markings which require segregated control. During such periods there is a disproportion to the normal relationships of control to the value of material. Ultimately the situation is relieved by process simplification. In the interim, however, the work load is abnormally high.

The Metal Preparation Area-SS Accountability Unit is currently involved in such a problem which has been presented by the introduction of cored and hollow slugs. At least four major categories are of present interest and may be defined as follows:

1. Cored Slugs produced by machining operations from rolled rod stock and subsequently center drilled from both ends. Normal Uranium inserts are welded into both ends and the assembly is canned so as to have the outward appearance of a solid slug.

2. Cored Slugs produced in the manner described above but with aluminum inserts replacing the Normal Uranium plugs.

3. Cored Slugs with either Normal Uranium or aluminum inserts but produced by extrusion rather than by machining.

4. Hollow Slugs - canned so as to allow passage of coolant inside and out - either machined from solid rolled rod or produced by extrusion.

The hollow slug program has a secondary position to the cored slugs as measured under presently recorded levels of activity. This may be a temporary status. All of the variables have direct effects on the weight per piece and create individual control problems. In addition, the controls have limitations in that the range of values have a larger spread than normally encountered for use of average values per slug.

Normal Uranium standard production slugs should have an average weight. By calculation it is possible to select a factor weight so that the product of number of pieces times factor weight should equal actual scale weight. Variance can then be posted to a Factor Weight Difference account and as such constitutes a yardstick by which variance can be observed. Under ideal conditions, the Factor Weight Difference account should present a history of normal random fluctuation

SS ACCOUNTABILITY SECTION
MAY, 1955 MONTHLY REPORT

1. Accounting for the materials covered in Part I is reasonably adequate.

2. It is our opinion that the station's material balance statement and records fairly represent its inventory position. The quantitative control exercised by station HGE over SS Material is adequate and appropriate.

3. Material control and accounting procedures are commensurate with dollar value.

The Reactor Area-SS Accountability Unit placed the double entry accountability system in operation during May and will dry run the accounts from February, 1955 through June 30, 1955 at which time they will assume full responsibility for the Reactor Area-SS Accountability records. This date coincides with the start-up of the new fiscal year. The procedures include bias correction associated with the use of average values and provide the equivalent of tube by tube accounting. Direct calculation on a tube by tube basis is not feasible under present conditions but will be capable of control by the 702 EDPM.

As the result of a request by the USAEC-Idaho Operations Office, an investigation was made of the suspected scrambling of shipments enroute to Phillips Petroleum Company. Results indicate that our loading procedure appears to be proper and that the observed scrambling was probably due to the speed of immersion of the cask in the basin well at ARCO. Recommendations were forwarded suggesting a revision in unloading procedure which we believe should eliminate this problem. The orderly arrangement provides a rapid and accurate check of piece count and has been the subject of numerous security investigations. Since our recommendation, no further complaints have been received.

Separations Area-SS Accountability Unit activities have centered around Task I and the RMA Line in Metal Fabrication. A production drive is currently in progress. Due partly to the prior interest in production and partly to start-up problems, no plutonium has been processed through Recuplex during May, 1955. Recent revisions have required adjustment of Flow charts and accounts.

A double entry set of accounts was established for the 241 Tank Farm system so as to coordinate with the TBP-UO_3 standard accounting procedure. In essence, this provides a coordinated accounting control for Depleted Uranium Recovery Operations.

Accounting difficulties have been experienced with respect to Task I activities and have been isolated as to cause. Present problems are associated with the measurement of the plutonium content of the Task I supernatant solution. Material Underaccounted For is currently excessive. It is anticipated that this situation will continue until Recuplex facilities are in operation. A similar situation exists with respect to Redox plutonium accounts where the extensions (233-S) of the process have created inventory problems.

SS Accounting Unit activities include the completion of the Reactor Area accounts and in rendering assistance in the establishment of the system. In addition, a survey of the Redox accounts was completed and a summary of the findings forwarded for discussion prior to the final Review report.

SS ACCOUNTABILITY SECTION
MAY, 1955 MONTHLY REPORT

A revised Recapitulation Flow Chart was devised incorporating the influence of Task I, Recuplex and other SS process flow revisions. This chart provides inventory status, flow and process relationships in summary form for material in production channels. This chart is incorporated in the Monthly Material Balance Report made to the USAEC.

SS Measurements Unit activities were directed towards the 233-S addition to the Redox process where the accounting records indicated inventory problems. Errors in source data were detected and procedures defined and corrected.

Continued activities directed towards the transfer of the Depleted Uranium stored in the 321 Bldg., underground storage tanks to TBP for recovery received a new source of enrouragement with the establishment of process tolerance. The ability of the TBP process to maintain production levels while recovering material from 321 Bldg., has been a serious obstacle to the return of this inactive status material to process. Transfers are now scheduled for June 15.

Numerous technical reviews are currently in progress or were completed during the month. Among these, the following are of importance:

1. Redox Inventory Manual reviewed in terms of the process changes and revisions scheduled for completion in June.
2. Reaffirmed the present factor weight for M and Z slugs.
3. Concurrence with accounting recommendations relative to the use of significant figures for the purpose of reducing potential accounting errors. This is a constant problem due to the fact the precision of individual components vary.
4. Tests conducted on the accuracy of the C-4 volume totalizer were completed. No significant error was indicated.
5. Completion of the measurement evaluation for Depleted Uranium across the Redox dissolver resulted in a reduction of losses by 50% since November, 1954.
6. Final precisions were established for Task I and are recorded in Document HW-36870.
7. Revised precisions for E-S, L-6 and 233-S inventory have been published in Document HW-36871.
8. Since July 1, 1954, there have been numerous improvements in the theoretical calculations applicable to plutonium in piles and pile basins. These improvements were retroactively applied to the period 7-1-54 through 3-31-55. Neither the Ending Inventory or transfers to Separations were affected but the Beginning Inventory and the pushes were revised downward. The effect has been to reconcile the Material Underaccounted For which developed due entirely to the limitations in calculations.
9. Recommendations for reduction in waste sample frequency were recorded but were not applied by Operations due to process control interests. Waste losses at D-2 were placed on a direct analysis basis.

10. Control charts for most Shipper-Receiver variances and plutonium MUF have been prepared.

In compliance with the interest of the Atomic Energy Act of 1954 revised, the Section's name was changed to Source and Special Nuclear Materials Accountability as of June 1, 1955.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION

MAY, 1955

	Current Month	Prior Month
Personnel Changes During Month		
Employees at beginning of month	457	460
Additions and transfers in	18	14
Removals and transfers out	(5)	(17)
Employees at end of month	470	457
Personnel by Components at Month-End		
General	10	10
Auditing Section	14	15
Budgets and Measurements Section	8	9
Contract Cost Section		
General and Consolidations Cost Unit	10	10
Engineering Cost Unit		
General	5	5
Design Cost	7	7
Project Cost	17	14
Technology Cost	12	11
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	8	8
Community Cost	4	5
Medical Cost	3	3
Manufacturing Cost Unit		
General	2	2
Financial Representatives	11	11
Budgets and Control	17	17
Reports and Records	16	16
Product Costs	4	4
	118	115
General Accounting Section		
Accounts Payable Unit	22	23
Accounts Receivable Unit	21	21
General Books Unit	18	16
Administrative Planning	3	3
Contract Reimbursements	5	5
	69	68

	Current Month	Prior Month
Personnel Accounting Section		
Payroll Planning and Analysis Unit	7	7
Weekly Payroll Unit	17	16
Monthly Payroll Unit	12	10
Benefit Plans Accounting Unit	13	12
Payroll Reports Unit	7	7
Weekly Payroll Records Unit	8	8
	64	60
Procedures and Computing Section		
Computing Operations Unit	21	20
Numerical Analysis Unit	8	8
Procedural Analysis Unit	21	20
Scheduling Unit	21	24
Records Operations Unit	8	8
	79	80
Property Accounting Section		
Appropriations Unit	5	4
Inventory Accounting Unit	11	10
Plant Accounting Unit	43	43
Property Management	4	4
	63	61
SF Accountability Section		
Reactor Area - SF Accountability Unit	5	3
Separations Area - SF Accountability Unit	16	12
Metal Preparation Area - SF Accountability Unit	8	8
SF Accounting Unit	6	6
SF Measurements Unit	10	9
	45	38
Rotational Trainees	0	1
	470	457

PROCEDURES & COMPUTING SECTION
MONTHLY REPORT - MAY 1955

GENERAL

Construction in the 713 Building on the room for the 702 Electronic Data Processing Machine was completed and accepted by AEC-GE on May 31. Work on mechanical refrigeration and air conditioning equipment will be completed and tested in the near future. IBM Engineers are installing testing equipment and cable connections for the 702 which left Poughkeepsie, New York in three trucks on May 26 and 27. Arrival date in Richland is scheduled for June 6.

Conversion of current machine procedures from punched-card to 702 EDPM is in process. All but six of the smaller procedures are in the conversion process.

An Analyst of the Numerical Analysis Unit, who was assigned to the Operations Research Study production problem, has been in Poughkeepsie, New York since May 23 assisting in the machine checking of 702 programs for production scheduling calculations. These calculations should be completed by June 3.

Calculations pertaining to the Attitude Survey were completed. Final results were furnished to the Statistics Unit of the Engineering Department on May 20. Advanced management copies were available on May 24 and copies for all nonexempt people were distributed on May 27.

The Procedural Analysis Unit prepared a benefits status report on each employee for the Benefit Plans Accounting Unit during the month. The calculations pertaining to the information were done on the 604 calculator. The forms themselves were printed by hand-feeding each individual page through the 407 Accounting Machine. The transmittal letters were also addressed on the 407. The forms, one for each employee on the plant, were prepared in approximately twenty-four hours operating time.

PROCEDURAL ANALYSIS

Forms control reviewed 396 orders during May covering 909,634 forms; 23 orders amounting to 40,825 forms, were rejected; 91 new forms were designed.

At the request of Manufacturing Department supervision, forms being used by Purex, Redox, and "T" Plant are being revised and standardized for use in all three plants.

A new type form to record approximately 15,000 surveys per month made by Radiological Sciences and Manufacturing Monitoring Sub-Sections has been designed and will be put into effect when received from the printer. Check boxes and punches incorporated in the new form design will eliminate 50% of written entries previously required and will permit quick and accurate sorting of data for reporting and review.

A system of preparing and duplicating shipping documents for SF Accountability was developed utilizing a small contact printer instead of carbon copies of typewritten data and ditto masters. The new system will furnish more permanent records and effect an annual savings of $800.00 for supplies.

PROCEDURAL ANALYSIS (continued)

Employee & Public Relations Department

The office machine repair billing procedure was revised to provide for inventory verification by the customer user.

Engineering Department

A meeting was held with Classified Files supervision to discuss proposed systems changes to permit integrated data processing of document control data. The principle of tape to card machines was discussed and is being given further study. The logic of 702 programming of the present files procedures was discussed in detail to permit a better mutual understanding of information needed to operate the files and to simplify the programming steps.

Financial Department

A report was issued on the feasibility of preparing SF Accountability reports for TBP and UO_3 plants on the new IBM 702 Electronic Data Processing Machine. The report recommended that work currently being posted and calculated by hand be computed and compiled by the 702. In addition, it will be possible to make certain checks on the accuracy of recordings and measurements.

A Stores physical inventory report was completed May 31. Fixed control panels were wired utilizing floating decimal techniques to make the necessary calculations and reports.

Radiological Sciences Department

The procedure for providing calibration and shop repair data on Radiation Monitoring instruments was installed May 9, 1955.

Data on calibration and shop repair are received daily for keypunching. This information is used to generate two monthly reports for the Calibration Unit of Radiological Sciences

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Employee and Public Relations Department	44	Standard	Storage	Cartons
Engineering Department	112	"	"	"
Financial Department	189	"	"	"
Manufacturing Department	110	"	"	"
Radiological Sciences Department	5	"	"	"
	460			

Four hundred and twenty cartons of records were destroyed.

Records Retention and Disposal Schedule Number 212, "Community Fire Unit Records" consisting of fifteen individual records and Number 213, "Community Police Records" consisting of twenty-nine individual records were developed and submitted to Employee

RECORDS OPERATIONS (continued)

and Public Relations for internal approval. Records Retention and Disposal Schedule Number 210, "Community Electrical Distribution Records" consisting of seventeen individual records were submitted to the Atomic Energy Commission for approval.

NUMERICAL ANALYSIS

The first set of data from the KE Reactor experiment was received on April 27. Data consists of temperature maps transcribed into Flexowriter tape at the pile, and panellit maps keypunched at the machine facility. Twenty-three temperature tapes have been received to date. The procedures for processing the data are working satisfactorily. Revision of the formula for computing flows from pressure drops was made when it was learned that the orifice or venturi in the K reactors is located upstream of the pigtail, instead of downstream as in the case of the other reactors. In the former case, the pressure drop is raised to the .500 power (square root), in the latter, to the .520 power. The length of time the experiment will run has been extended from two months to three months. The total number of temperature tapes to be processed, 135, will remain the same.

Processing of data from DR reactor to yield individual tube trip-before-instability limits was initiated this month. At present, D and DR reactors are operating under these limits on the basis of data processed in the Procedures and Computing Section machine facility. The procedures for correcting and reporting panellit gage bases and for calculating tube limits were merged into a single procedure for more efficient operation.

Results of experiments at the KE and KW reactors were analyzed to yield the effective size of these reactors. The data were taken prior to start-up and consisted of neutron flux measurements along longitudinal and transverse axes of the reactors. Analytical curves of the cosine and Bessel function type were fit to the data by the method of least squares. Two parameters were thus determined, one of which was the effective half-width of the pile in the direction under consideration. Fourteen sets of data were processed.

Keypunching of some 12,000 blueprint file index cards was begun this month. The data will be used as input to a system for more effective control of the blueprint file.

Additional calculations were carried out on the determination of lattice parameters from buckling measurements on an exponential pile. The experimental bucklings were not approximated as closely as desired, though the trends exhibited in theoretical buckling due to changing slug size, cell geometry and water volume proved to be of interest. The problem will be re-formulated and run on the 702, where it will be possible to consider more parameters than presently possible on the card-programmed-calculator.

A 9 x 9 system of linear algebraic equations was solved for the Exponential Physics Unit. The calculation was carried out on the card-programmed-calculator, using a standard program deck.

Calculations on the average eta of a Hanford cell have been completed, including cases in which Pu 240 and fission product build-up have been taken into consideration. The Theoretical Physics Unit will shortly issue a report in which the results of this calculation will appear.

NUMERICAL ANALYSIS (continued)

Additional calculations of the thermal utilization and resonance escape probability of a hollow slug have been requested. The present cases essentially duplicate the work done previously, except that two different values of effective cell radius are being considered. The values computed above will be combined with fast effect factors computed previously to obtain the infinite multiplication constant of the hollow slug cell. Some 104 combinations of slug and cell geometrics and water volume are being run.

Procedural work in connection with a statistical study of stainless steel corrosion was carried out. This work involved establishing punched-card-forms and a coding system whereby data from some 10,000 heat cards can be transcribed to punched-cards. Statistical correlations of chemical analysis, vendor, type, shape, size, and corrosion rate are to be made. The calculations will be carried out on the 702.

Programming of the Production Scheduling calculations being sponsored by the Operations Research study has been completed. The program is presently being tested on the IBM 702 at Poughkeepsie. In addition to this testing, additional subroutines for the functions logarithm and arctangent are being tested and a number of matrices are being inverted using a program developed on an earlier testing trip.

A manual on the use of floating-decimal sub-operations has been prepared and will be distributed to all programmer manual holders. A number of scientific calculations employing these sub-operations have been lined up and programming on them will begin shortly. The development of subroutines for evaluating the Bessel functions is being carried out. The standard series calculation for these functions is clearly too slow on the 702, hence approximation methods utilizing Tchebyshev polynomials are being studied.

COMPUTING OPERATIONS

During the month of May the following non-routine assignments were completed for customers:

Employee and Public Relations	4
Engineering	17
Financial	14
Manufacturing	1
Operations Research	12
Radiological Sciences	1
	49

Service charges for the month amounted to $43,688.86. Services, by customer, were as follows:

Atomic Energy Commission	$ 374.93	01% *
Employee & Public Relations	824.92	02
Engineering	9 311.13	21
Financial	28 303.44	65
Manufacturing	1 013.62	02
Operations Research	2 500.34	06
Radiological Sciences	1 360.48	03
	$43 688.86	100%

1193372 * Less than 1%.

OPERATIONS RESEARCH STUDY

MONTHLY REPORT
MAY, 1955

The following is the month end summary of personnel:

	As of 4-30-55			As of 5-31-55			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
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 from April 30 to May 24, 1955.

Mr. L. W. Smith, Jr. is on an extended trip to the east. During the month of May Mr. Smith visited the International Business Machines Corporation at Poughkeepsie, New York with regard to "debugging" for the production scheduling work on the new 702 machine to be installed at Hanford, visited the Esso Standard Oil Company in New Jersey and consulted with members of the General Electric Company's Management Consultation Services Division in New York City.

Production Planning

A two fold revision was made to the production scheduling model. The reactor section was revised to give a more satisfactory discharge pattern, and the TBP and UO_3 plants were added to the model to determine plant metal hold-up. The model was solved first without the TBP and UO_3 plants, maximizing a functional based on value of plant output. This value was then incorporated in the matrix as a restraint (and thus was preserved) and the full matrix solved. This time a functional giving total metal hold-up was minimized. The reactor and separations schedules of the above two solutions did not differ, indicating that the original solution inherently minimized metal hold-up as it maximized value. Parametric optimal solutions are now being obtained allowing the out-put value term to decrease while obtaining successive solutions minimizing metal hold-up. Study of these solutions should give added insight into the nature of the plant hold-up characteristics. Additional linear programming work on production planning is being done relative to obtaining more realistic reactor discharges in the final planning period.

During this work an interesting technique was successfully demonstrated. The optimal solution to the first matrix was used as a feasible solution to the second, thereby saving approximately 50 iterations. As far as we know this is the first time this method has been used to obtain a feasible solution to a linear programming problem.

Satisfactory results were obtained on linear programming sub-routines tried on the IBM 702 Data Processing Machine at Poughkeepsie. In view of this we can expect to do linear programming problems on the new machine at Hanford as soon as it is available. Further work is in progress to permit parametric or post optimal computations on linear programming systems with the new machine.

Data Processing

The Operations Research Study has been authorized to assist in determining how the IBM 702 Data Processing Machine can be of optimal value to Hanford. The study will include the information required from the machine by various levels of management, the basic data necessary to obtain the desired output, some of the economic considerations entailed, and an indication of the optimum order in which specific applications should be made.