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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

FOR

FEBRUARY 1955

HANFORD 58472

Compiled By
DEPARTMENT MANAGERS

March 18, 1955

RICHLAND, WASHINGTON

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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

FEBRUARY 1955

GENERAL SUMMARY

PRODUCTION OPERATIONS

Inventories of both bare and finished slugs remained below efficient operating levels for slug preparation during the month due to low metal receipts, although production of 107% of the forecast was achieved.

Use of the hot start-up procedure was temporarily suspended during the month to permit a procedural review, and resulted in 200 hours downtime following seven scrams. A revised hot start-up procedure limiting power level rise to 50 megawatts per minute was put into effect February 24.

At K Reactor following the repair of the damaged tube and graphite in channel 4669-KW at the end of January, all vertical rods, process tubes and water piping affected by the work were restored to the original condition. During the month it was discovered that Van Stone gaskets were rapidly deteriorating. By month's end all Van Stone gaskets had been replaced and the front face cap gaskets had been replaced with gaskets of a modified design.

The Redox and Bismuth Phosphate plants produced low ngs material during the month, achieving 107 percent and 138 percent respectively of their official forecasts.

Redox resumed operations on low ngs material on February 2 following an extended outage for equipment repairs and diversion to the low ngs production program.

ENGINEERING TECHNOLOGY

Further studies in the continuous calciner have demonstrated the feasibility of preparing UO_3 powder with reactivities in the range of 1.0 to 1.2 by the addition of sulfate ion.

A production test was approved to operate the C Pile at graphite temperatures of 600 C over a five month's period probably beginning in March.

Conclusions derived from analysis of the K Pile safety control system were that the steel balls now in use should be replaced with boron-steel balls, and pending receipt of sufficient balls, the available spare boron-steel balls should be used in discreet columns near the fringe enrichment ring to obtain optimum utilization.

PERSONNEL & SERVICES

Plans for the third Attitude Survey among HAPO employees have been established with questionnaires to be distributed and returned on Friday, March 25, 1955.

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
FEBRUARY 28, 1955

DEPARTMENT	EXEMPT		OTHER		TOTAL	
	2-28-55	1-31-55	2-28-55	1-31-55	2-28-55	1-31-55
Counsel	3	3	2	2	5	5
Operations Research Study	6	6	1	1	7	7
Special Study	3	3	3	3	6	6
Employee & Public Relations						
General	9	9	7	1	16	10
Salary & Wage Administration	11	11	10	12	21	23
Personnel Practices	14	13	39	39	53	52
Education & Training	6	7	42	43	48	50
Emp. Comm. & Pub. Rel.	10	10	43	41	53	51
Union Relations	5	5	1	2	6	7
Aux. Oper. & Plant Prot.	115	120	805	806	920	926
Community	84	84	329	327	413	411
Health & Safety	53	54	196	193	249	247
Engineering Department						
Engineering Administration	39	40	89	88	128	128
Advance Engineering	9	9	1	1	10	10
Design	181	180	121	124	302	304
Project	208	224	155	156	363	380
Pile Technology	227	222	146	149	373	371
Separations Technology	164	166	88	87	252	253
Manufacturing Department						
General	21	21	7	7	28	28
Reactor	293	292	1 347	1 345	1 640	1 637
Separations	283	276	1 442	1 398	1 725	1 674
Metal Preparation	101	101	552	544	653	645
Transportation	41	41	445	445	486	486
Purchasing & Stores	54	55	203	207	257	262
Electrical Utility	15	15	74	74	89	89
Financial Department						
General	9	9	4	3	13	12
Budgets & Measurements	4	4	4	4	8	8
Contract Cost	23	23	97	96	120	119
General Accounting	9	9	65	65	74	74
Property Accounting	16	16	45	45	61	61
Auditing	15	15	2	2	17	17
S. F. Accountability	10	9	26	25	36	34
Personnel Accounting	8	8	51	54	59	62
Procedures & Computing	26	25	52	57	78	82
Radiological Sciences Department						
General	5	-	-	-	5	-
Records & Standards	26	28	157	152	183	180
Biophysics	53	55	67	64	120	119
Biology	34	34	38	38	72	72
Engineering	6	6	1	1	7	7
Adm. & Communications	3	4	5	5	8	9
Grand Total	2 202	2 212	6 762	6 706	8 964	8 918

AREA PERSONNEL DISTRIBUTION
FEBRUARY 28, 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	27	62	-	13	24	-	56	63	275	308	828
Other	12	34	2	65	14	-	20	28	212	213	600
Total	39	96	2	78	38	-	76	91	487	521	1 428
Manufacturing Department											
Exempt	60	55	65	61	55	-	42	256	102	112	808
Other	282	297	307	246	225	-	208	1 275	552	678	4 070
Total	342	352	372	307	280	-	250	1 531	654	790	4 878
Financial Department											
Exempt	-	-	-	1	-	-	1	3	5	110	120
Other	-	-	-	3	2	-	-	12	11	318	346
Total	-	-	-	4	2	-	1	15	16	428	466
Employee & Public Relations											
Exempt	22	6	7	10	9	-	4	13	11	225	307
Other	52	44	88	45	76	11	36	120	107	893	1 472
Total	74	50	95	55	85	11	40	133	118	1 118	1 779
Radiological Sciences											
Exempt	2	-	36	-	-	-	2	19	55	13	127
Other	6	-	41	-	-	-	12	18	172	19	268
Total	8	-	77	-	-	-	14	37	227	32	395
General											
Exempt	-	-	-	-	-	-	-	-	-	12	12
Other	-	-	-	-	-	-	-	-	-	6	6
Total	-	-	-	-	-	-	-	-	-	18	18
Total Exempt	111	123	108	85	88	-	105	354	448	780	2 202
Total Other	352	375	438	359	317	11	276	1 453	1 054	2 127	6 762
Grand Total	463	498	546	444	405	11	381	1 807	1 502	2 907	8 964

MANUFACTURING DEPARTMENT
MONTH OF FEBRUARY 1955

METAL PREPARATION SECTION

A net production of 396 tons of acceptable slugs was achieved in February. Fifteen tons of this total were cored slugs. The production was 107 percent of the official forecast. Inventories of both bare and finished slugs remained below efficient operating levels during the month due to low metal receipts.

The canning yield was 79 percent for the solid slugs and 73 percent for the cored slugs. The overall canning yield continued to be low at 79 percent. Some improvement over the last month's bad weld reject rate was experienced due to improved performance of new welding equipment and continued emphasis on operator training.

Two autoclave failures occurred on the last day of January and are reflected in February statistics. There were no failures in February.

A total of 1674 "C" slugs were processed during the month with 348 being canned by the hot press method.

REACTOR SECTION

The monthly reactor input production for plutonium was 97.3 percent of the official forecast. The reactor time operated efficiency was low, 64.4 percent, primarily because of a 24 day horizontal rod replacement outage at F Reactor and lower than normal operating efficiencies at other reactors. The latter condition was caused by a temporary suspension of the use of the hot start-up procedure to permit a procedural review and resulted in 200 hours downtime following seven scrams. A revised hot start-up procedure limiting power level rise to 50 megawatts per minute was put into effect February 24.

The plutonium output production was 26 percent above forecast in order to meet separations plant goal requirements. Tonnages of low and high concentration material discharged during the month were 230 and 152 respectively.

Maximum established reactor power levels, excluding enrichment burnout, were increased a total of 70 megawatts, 56 at C Reactor and 14 at H Reactor. At C Reactor the increase resulted both from a small reactivity increase from long term gains as well as from continued benefit from previous enrichment column changes. The H Reactor increase was due to a normal decrease in inlet water temperature and to improved flattening following a discharge of high concentration material.

Ten slug failures occurred in February. These included six regular uranium pieces (one on production test), one J slug at DR and three uranium slugs in production test tubes containing unbonded, hot press canned solid and cored slugs, and unbonded and mechanically bonded slugs with Point Closures. The outage time required for removal of the ruptured slugs was 190 hours.

Twenty-three scrams occurred during the month. Of these, 14 at B, C, DR and H were caused by normal Panellit system variables. Two scrams were caused by Beckmans, one at C as the result of an unexplained rise in a Beckman and one at DR during a trip setting adjustment. C was manually scrammed twice when faulty thermocouples indicated high tube temperatures. H and D Reactors were both scrammed when a dragline struck a 230 KV power line. D Reactor was scrammed when a short circuit in a compressor caused process instrument power fuse failures, and DR was simultaneously shut down by the D-DR Beckman intertie circuit.. DR was manually scrammed once when a tube temperature exceeded the limit. Total outage time attributed to scrams was 322 hours. This unusually large amount of outage time resulted from the fact that in seven instances temporary suspension of the hot start-up procedure resulted in minimum time outage following scrams. Most of the charge-discharge work was done during these minimum outages.

One process tube leak occurred at H Reactor in conjunction with a slug failure. Water collection rates at F Reactor remained high through February 4 when the reactor was shut down for complete horizontal rod replacement. During the outage, all tubes were leak tested after replacement of the rear Van Stone flange gaskets, and one leaking tube was found.

Horizontal rod work, other than at F Reactor, included the replacement of a loose rod seal at C Reactor and the removal of a thimble and installation of a new thimbleless type rod at B. A leaking thimble was blanked off at D Reactor in preparation for the installation of a new type rod at a later date.

At K Reactor following the repair of the damaged tube and graphite in channel 4669-KW at the end of January, all vertical rods, process tubes and water piping affected by the work were restored to the original condition. During the month it was discovered that Van Stone gaskets were rapidly deteriorating. At month end all Van Stone gaskets had been replaced, the front face cap gaskets had been replaced with gaskets of a modified design, and pre-start-up inspection and testing of equipment and instruments were in progress.

Pre-start-up inspection and testing on equipment and instrument systems were started at KE on February 8 and continued through the month end.

The U-233 input production was 18 percent below forecast as the result of a low operating efficiency at C Reactor. The input tritium production was 35 percent above forecast because a rod outage at DR, originally scheduled during the period, was postponed.

SEPARATIONS SECTION

The Redox and Bismuth Phosphate plants produced low ngs material during the month, achieving 107 percent and 138 percent respectively of their official forecasts.

Redox resumed operations on [redacted] February 2 following an extended outage for equipment repairs and diversion to the low ngs production program. The operating efficiency for the month was 81 percent with outages being required to replace a leaking backcycle jumper and a failed waste pump in addition to downtime required to unplug the process waste line to the Redox Tank Farm. Although no shutdown was required, work on the silver reactors caused the operating rate to be lowered to 7 tons per day from February 8 to February 10. The average operating rate for the month was 6.5 tons with a 9.5 ton rate being sustained for a period of four days.

The T plant operation established new records for a 28 day month. Equipment problems associated with a dissolver and a centrifuge unit did not seriously affect production during the period. Minor changes in process aided in reducing the overall time operating cycle.

The TBP Plant production was 118 percent of forecast. During the first part of the month, production was limited to one feed concentrator throughput at 4.5 to 5 tons per day. Following the repair and start-up of a second feed concentrator on February 15, the plant rates were gradually increased to 7 tons per day by month end, although the plant capacity continued to be limited by excessive air leakage into the intercycle concentrator system.

The UO_3 plant monthly production was 113 percent of the forecast. The operation was continuous for the month with only a minimum of difficulty. A total of 8 cars of powder were shipped offsite.

All material processed in the Isolation Building was of the low level concentration. The monthly production was 107 percent of the forecast. The replacement of the Task III equipment continued in the Fabrication Building with no production being forecast for February.

The West Area evaporator operated throughout the month with first cycle waste as feed material and with a volume reduction of 59.4 percent. The East Area facility remained in standby.

The removal of metal waste continued principally on material with a minimum age of 2.5 years.

GENERAL

Personnel

On Roll February 1, 1955	4821
Net Increase	57
Total on Roll February 28, 1955	4878

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

1.2 [illegible]

HW-35530 DEL

MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY
FOR
MONTH OF FEBRUARY 1955

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

INVENTOR	TITLE
None	None

J. E. MAIDER
MANUFACTURING DEPARTMENT

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MONTHLY OPERATING REPORT
FEBRUARY 1955

DECLASSIFIED
WITH DELETIONS

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WITH DELETIONS

HW-35530 DEL

DECLASSIFIED
WITH [redacted] DELETIONS

March 7, 1955

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
February, 1955

I. RESPONSIBILITY

There was no change in responsibility during this period.

ACHIEVEMENT

A. Operating Experience

1. Statistics	February	January	Year to Date
Total Acceptable Slugs Canned (Tons)	396	406	802
Composite Canning Yield (%)	79	78	78
Efficiency (%)(Canning Throughput)	96	92	94
Forecast Achievement (Current Commitment)	107	100	103
Net Acceptable Solid Slugs (Tons)	381	384*	765
Slugs Returned from Reactor (Tons)	2.27	8.22	10.49
Canning Yield (%)	79	79	79
Net Acceptable Cored Slugs (Tons)	15	22	37
Slugs Returned from Reactor (Tons	0	0	0
Canning Yield (%)	73	69	71
Autoclave Failure - Solid (No./M)	.02	.00	.01
Autoclave Failure - Cored (No./M)	.00	.00	.00
Acceptable C-4 Slugs Canned (Pieces)	156	766*	922
Acceptable Pb-Cd Slugs Canned (Pieces)	2461	4032	6493
Average Steam Generated (M lbs/hr)	58.5	64.2	
Maximum Steam Generated (M lbs/hr)	78.0	81.0	
Total Steam Generated (M lbs)	39,326	47,780	
Coal Consumed (Tons)	2,563	2,883	
Sanitary Water from 3000 Area(Million Gals.)	49.5	54.6	
Total Water from 3000 Area (Avg.Rate-GPM)	1,228	1,223	

*Corrected Figures

2. Activities

Net production of 396 tons of acceptable finished slugs was achieved in February. Fifteen tons of this total were cored slugs. A seventh canning line-shift was started on February 7 and all seven line-shifts operated on a minimum relief basis throughout the month.

Due to insufficient slug finishing machine capacity, it was necessary to convert to three-shift operation. The marking fluoroscopes, cut-off lathes, and frost test equipment were moved into the new 313 Building Addition on weekends during the month. This equipment will be used until the new finishing lines are operable.

A composite yield of 79 percent was experienced in February, an increase of one percent from January. A two percent improvement in bad weld reject rate was achieved, due primarily to continued emphasis on operator training, closer control of welding variables, and improved performance of new welding equipment.

There were no autoclave failures during the month. Two eight-inch solid uranium autoclave failures which occurred on the last day of January have been reflected in February's statistics. Both failures were apparently caused by dimples in the weld bead which permitted moisture to penetrate the can wall.

Inventories of both bare and finished slugs remained below minimum during the month. Close liaison between the Reactor and Metal Preparation Sections continued in order to maintain production continuity.

3. Special Operations

A total of 1674 "C" slugs were processed during the month; 348 were canned by the hot press method. Acceptable lead-cadmium slugs canned by the "C" process were inspected and transferred to storage. The inventory of finished lead-cadmium slugs at month-end was 5158 pieces.

The transformation and outgassing of uranium slugs continued during the month. A short metal supply continued to complicate efficient scheduling of material through these operations. Several lots could not be outgassed and a higher-than-normal poor bond rejection rate was experienced for this material.

Uranium inserts were removed from 4,622 recovered cored slugs by a special machining crew during the month. In addition, 500 four-inch solid slugs were machined, drilled and counterbored for cold closure canning experiments.

Analysis of two slightly irradiated canned reject slugs used for start-up of the KW reactor revealed that the radiation levels plus the deposit of small quantities of fission products in the recovery solution made the recovery of this material in 300 Area very undesirable. It was tentatively decided to hold the slugs, which amount to approximately 30 tons, for Purex start-up.

4. Schedule Variance

Acceptable canned slug production was 107 percent of forecast, due primarily to an exceptionally high canning line efficiency of 96 percent.

B. Equipment Experience

1. Operating Continuity

The canning line efficiency was maintained at 96 percent during February, an increase of four percent over January. The excellent performance of new induction furnaces, temperature recorders, and auxiliary canning equipment, combined with the continued efforts of supervision to minimize down time, were responsible for this achievement.

2. Inspection, Maintenance and Replacement

The replacement of silicon-carbide thermowells in canning furnaces with steel wells as reported last month, has resulted in significantly less instrumentation down-tim

A complete steam outage was experienced on February 7 when the instrument control system air compressor failed at the power house. Without adequate steam pressure, the auxiliary equipment would not operate. All export steam had to be cut off to bring the system back into operation. The air supply systems have been re-designed and modified to provide alternate sources in event of failure.

The carload handling facility for acid and caustic was accepted and the first tank car of caustic was unloaded into storage February 25.

Work was begun on the dismantling of the 101 canning machine in 314 building. Usable parts have been crated and taken to Excess. The balance of the machine will be disposed of as salvage or scrap material.

C. Improvement Experience

1. Production Tests

PT-313-47MT "Cored Slugs from Extruded Blanks and Rolled Rods"(HW-33189)
The preparation of eight-inch cored slugs by the lead dip process was continued during this period. A total of 14.6 tons of acceptable canned slugs was produced with a finished yield of 72.9 percent. Major causes for rejection were poor bonds and bad welds.

The gamma ray core tester is being used successfully to detect AlSi and lead in the cores of canned slugs. The reject rate on the first 9400 slugs tested was 0.4 percen

Progress is being made on the development of uranium and aluminum plugs that can either be crimped or pressed into the counterbores of cored slugs as a substitute for welded plugs. It currently appears that pressures in the range of twelve to fifteen tons will be required to crimp uranium plugs initially and about eighteen tons for re-cycled reject slugs. Satisfactory aluminum plugging has been obtained by pressing hollow-based plugs into grooved counterbores under 2-$\frac{1}{2}$ tons pressure. Further evaluation is being made.

Because of an increase in the low concentration program and the delayed start-up of the K reactors, it has become necessary to revise the fabrication schedule for cored slugs. Immediate plans are to prepare as many slugs as possible from available inventories for the initial KE reactor charge. Then, for an interim period of about five months, cored slugs will be charged in the old reactors operating on high concentration material at a rate of about 40 tons per month. Thereafter, schedules will be increased as necessary to replace metal discharged from the KE reactor.

1. Production Tests - continued

With the concurrence of the Pile Technology Section, it is planned to reduce the extrusion phase of the cored slug program to quantities required for developmental purposes and will amount to about five tons of slugs per month. Schedules will be reviewed again in August to determine if an increase in the production of extruded slugs is warranted.

PT-313-51MT "Canning of Slugs from Un-alloyed Dingot Uranium for Pile Evaluation" (HW-34511) The purpose of this test is to make a preliminary comparative evaluation of the irradiation characteristics of fuel elements prepared from dingot and normal process uranium. A total of 450 eight-inch slugs were canned by the lead dip process which included 230 slugs fabricated from dingot uranium and 220 slugs fabricated from regular process material.

2. Process Tests and Revisions

The productivity gain in the canning operation made possible by the excellent performance of new furnaces and furnace control equipment, as reported last month, has been evaluated as a $2500.00 monthly savings in direct labor at present production levels.

3. Inventions and Discoveries

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

D. Events Influencing Costs

1. Labor Variance

Labor costs will remain essentially the same as the previous month.

2. Material Variance

No significant change is expected in direct material unit costs.

3. Other Costs

Other costs remain substantially the same.

E. Plant Development and Expansion

1. Project Status

Project CA-514 "Expansion of 300 Area Production Facilities"
Project authorized funds total $5,085,000. Project costs plus commitments total $3,911,986 as of February 13, 1955. Over-all design is complete and construction is estimated to be 64% complete as of February 28, 1955. Total estimated cost, as presently scoped, remains at $6,200,000. The revised Project Proposal, Revision #3, is being circulated for approval. All fans in the heating and ventilating units for the building have been balanced and accepted. The installatic of the underfloor piping for the slug pickle machines has been completed. The trenches for these units have been poured and bricklined. The majority of the floor brick have been installed. The power cable supports for the cap, can and sleeve cleaning machines have been installed. Two sleeve preparation machines have

1. Project Status - continued

been moved into the building and are being installed. The ten resistance furnaces in the canning and recovery areas have been accepted. Inadequate ventilation is being encountered in the canning area. The furnace ventilation is being modified on one canning furnace for test purposes. The exceptionally high noise level of the Acme-Gridley cut-off machines is being studied. Project Engineering studies are being made relative to the collet liners and the inability of the cut-off machines to maintain proper tolerances on slug length and cap thickness. All efforts to resolve problems associated with the proper functioning of the penetration etch machines have been unsuccessful. A new basket design which would be satisfactory has been submitted to Project Engineering but no action has been taken to date. Final inspection operation was moved from 303-A Building into the new 313 Building. Product is now unloaded from the autoclaves and immediately inspected without material movement delays. The 28 autoclaves have been accepted. The general and supporting facilities are approximately 85% complete.

Modifications of the 3706, 3707-A and 3707-B buildings are 60% complete. The Patrol and Drafting & Design Units have moved into their newly remodeled quarters in the 3706 Building.

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

Project authorized funds total $55,000. Scoping and preliminary design are complete Construction is scheduled to start June 1, 1955. The detailed design is expected by April 1, 1955.

Project CG-614 "Hanford 4-X Program - 300 Area Production Increase" ($130,000)
The estimated date for completion of scoping is March 7, 1955. Detailed design of the process equipment was started February 2, 1955. Bids have been received for four semi-automatic welders. The transformers for these welders, which are no longer manufactured, have been located and effort is being made to procure them. Requests for bids for other equipment have been issued. In view of the recent changes in the low concentration production program, the entire scoping of the 4-X Program must be reviewed.

Project CA-590 "Fly Ash Collection Equipment - 384 Building" ($33,500)
The revised project proposal is being held to include additional points of justification which have recently appeared.

Project CA-601 "General Grounds Improvement - 300 Area" ($95,000)
The revised proposal has been submitted to the Commission for approval.

Project ER-A-3113 "Development of Independent Water Supply - 300 Area" ($31,000)
Scoping is 50% complete and project preparation 30% complete. A rough draft of the proposal has been sent to the field for comment.

2. Plant Engineering

Direct answer computers for manpower and unit cost estimating were designed and constructed.

Design was completed on a fully automatic quench-stamp machine for the canning line.

F. Significant Reports Issued

1. Routine

Number	Title	Author	Date
HW-34486	Uranium Quality Control Analytical Results	WG Hudson	1-10-55
HW-34629	Statistical Quality Report,300 Area January through December, 1954	GX Beard	1-26-55
HW-34827	Report of Uranium Accountability in Metal Preparation Processes for the Quarter Ending December 31,1954	GF Yost	2-1-55
HW-34829	Monthly Report, Metal Preparation Section, Process Sub-section, January, 1955	EW O'Rorke	2-1-55
HW-34920	General Analytical Control Program I, Uranium Metal, Nov.1 to Dec.31,1954 Mallinckrodt Chemical Works	PR Anderson	2-7-55
HW-34921	General Analytical Control Program I, Uranium Metal, Nov.1 to Dec.31,1954 National Lead Company of Ohio	PR Anderson	2-7-55
HW-35012	Monthly Report, New Fuel Element Production Program,January,1955	WA Blanton	2-7-55
HW-35200	Monthly Report,Metal Preparation Section, Operations Sub-section, January, 1955	WW Windsheimer	2-7-55

2. Non-Routine

HW-34277	Material Balance Flow Charts Canning and Recovery Cycle of Lead-Dipped Uranium Slugs	HP Kraemer,Jr.	2-1-55
HW-34917	Fabrication History of Uranium Slug Cores, C,K,L,M,N,P, and Q Lots	SM Gill	2-7-55

III. PERSONNEL

A. Organization

No change.

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	2	2	0
Operations	210	208	-2
Power & Maintenance	330	331	+ 1
Process	91	97	+ 6
Projects & Personnel	13	13	0
Section Total	646	651	+ 5

[redacted] Eb-6

C. Safety Experience

There were no major or sub-major injuries this month.

D. Radiation Experience

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

E. Personnel Activities

1. Visits and Visitors

W.A. Shanks and G.A. Huff attended the Production Maintenance Forum sponsored by the General Electric Apparatus Division in Spokane.

T.B. Correy visited Seattle, Portland, and Florence, Oregon to inspect welding equipment for use in the canning process. Mr. Correy also visited the Model and Instrument Works in Seattle to inspect the radiographic machines and fixtures being fabricated there.

Drs. N.E. Berry and W.M. Leaders of the Mallinckrodt Chemical Works visited Hanford this month to discuss metal quality and fabrication methods.

2. Meetings

An information survey was conducted and results compiled on "Supervision Training and Development Needs".

The second session of a series of ten on "Work Simplification" has been completed.

W.W. Windsheimer spoke at an information meeting for the personnel of the Electrical Utilities Section and discussed the relationship and importance of electrical service in the various phases of the metal preparation process.

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

[redacted]

Richland, Washington
March 7, 1955

MANUFACTURING DEPARTMENT
REACTOR SECTION
MONTHLY REPORT
FEBRUARY, 1955

I. RESPONSIBILITY

The Reactor Section assumed responsibility for KE Reactor on February 8, completing transfer of KE facilities to the Manufacturing Department. KW Reactor, which was transferred to Engineering Department responsibility on January 11, for repair of channel 4669-KW, was returned to the Reactor Section on February 5. KW Reactor was again transferred to Engineering Department responsibility during the period February 9 to 14, for front face cap gasket modification and revision of the temperature monitor system.

II. ACHIEVEMENT

A. Operating Experience

Reactor time operated efficiency was low, 64.4 per cent, primarily because of a 24 day horizontal rod replacement outage at F Reactor, but also because of lower than normal operating efficiencies at the other reactors. This latter condition resulted from an abnormally high amount of outage time due to failures to recover from scrams. Effective February 10, a change in operating philosophy resulted in temporary suspension of the hot start-up procedure subsequent to scrams in order to provide maximum reactor safety. As a result, seven reactor scrams caused by power surges, instrument variables and similar reasons, which under previous operating philosophies would have resulted in probable recovery, resulted in minimum time

A. Operating Experience (Continued)

outages. Total time involved from this cause was approximately 200 outage hours. Effective February 24, use of the hot start-up procedure was reauthorized, limited by a 50 megawatt per minute power level rise.

Scheduled outage time, other than that at F Reactor, was unusually low since most of the charge-discharge work was accomplished during the minimum time outages described above.

Plutonium and total input productions were slightly, approximately 2.5 per cent, below forecast as the result of the low time operated efficiency. Mint input was approximately 35 per cent above forecast, because the forecast included consideration of a two week horizontal rod replacement outage at DR Reactor which was postponed when the F Reactor outage was extended. Thorium input was approximately 18 per cent below forecast as the result of a low operating efficiency, 65.7 per cent, at C Reactor. Production charged to the Mint program at C and DR Reactors was 1.3 and 11.8 per cent, respectively. Production charged to the thorium program at C and H Reactors was 7.9 and 5.4 per cent, respectively.

Plutonium megawatt day output production was approximately 26 per cent above forecast in order to satisfy 200 Area requirements.

During February, goal concentrations remained the same as those established January 1, namely base goal plus 250 megawatt days, except at D Reactor where a pilot concentration program of base goal plus 300 megawatt days was in progress, and at C Reactor which continued to produce low concentration material. Tonnages of low and production concentration material discharged during February were approximately 230 and 152 respectively. The latter figure includes approximately 26 tons discharged at D Reactor at essentially base goal plus 300 megawatt days.

Maximum established reactor power levels, excluding enrichment burnout, were increased a total of 70 megawatts, 56 at C Reactor and 14 at H Reactor. At C Reactor, the increase resulted both from a slight reactivity increase due to long-term gains, and as continued benefit from previous enrichment column changes. At H Reactor, the increase was due to the seasonal decrease in inlet water temperature, and to improved flattening resulting from discharge of high concentration material.

A. Operating Experience (Continued)

Ten confirmed slug failures occurred during February as detailed below.

	B	C	D	DR	F	H	Total
Eight-Inch Regular	2	2	1			1*	6
"J" Material				1			1
Production Test		3**					3
Totals	2	5	1	1	0	1	10

* Irradiated under Production Test 105-539-E, "Slug Exposure at a Concentration of 900 MWD/Ton."

** One failure from Production Test 105-578-A, "Irradiation of Unbonded Slugs."
One failure from Production Test 105-577-A, "Irradiation of Solid and Cored Hot Pressed Fuel Elements."
One failure from Production Test 105-584-A, "Unbonded and Mechanically Bonded Slugs with Point Closures."

One additional suspected regular failure was discharged from B Reactor at month end. Since the failure was discharged, of necessity, into a chute filled with metal, the probability of confirmation is small, and it is not included above. Reactor outage time required for removal of February failures was approximately 190 hours.

In February, KW Reactor was returned to Reactor Section responsibility, and KE Reactor was initially transferred to Reactor Section responsibility. At both reactors, most of the month was devoted to equipment testing and pre-start-up work as described under "Activities."

1. Statistics

Operating statistics are summarized in the table on Page 4.

2. Activities

At KW Reactor, repair of channel 4669-KW was completed on January 29. Subsequently, all vertical rods, process tubes and rear face effluent piping were returned to normal. The reactor was returned to the Manufacturing Department on February 5, for pre-start-up testing, but was again turned over to the Project Section on February 9, for modification and replacement of front face process tube cap gaskets, and revision of the temperature monitoring system. This work completed, the reactor was returned to the Manufacturing

1. Statistics

	B	C	D	DR	F	H	KE	KW	Total Or Average
Reactor Time Operated Efficiency (%)	67.6	65.7	75.8	83.0	13.7	80.6	-	-	64.4 *
Reactor Outage Time (Hrs)									
Plutonium Production	210.9	183.6	152.9	113.0	568.0	80.6	-	-	1309.0
Special Irradiations and Tests	6.5	46.8	10.0	1.0	12.0	49.9	-	-	126.2
Total	217.4	230.4	162.9	114.0	580.0	130.5	-	-	1435.2
Reactor Unscheduled Outage Time (Hrs)	217.4	196.0	75.7	114.0	-	68.5	-	-	671.6
Metal Discharged (Tons)	39.6	115.3	30.1	11.7	85.7	93.6	-	7.0	383
Water Quality (ppm Iron)									
Raw Water - Average	0.06	0.06	0.06	0.06	0.05	0.06	-	0.09	
Raw Water - Maximum	0.12	0.16	0.19	0.19	0.07	0.14	-	0.19	
Process Water - Average	0.005	0.006	0.005	0.004	0.007	0.004	-	0.008	
Process Water - Maximum	0.007	0.010	0.008	0.007	0.018	0.007	-	0.018	
Water Pumped (MM Gals)									
Bldg. 190 to Reactor	1452	2488	1831	1480	391	1867	-	1456	10965
Bldg. 182 to 200 Areas	-	-	-	-	271	34	-	-	305
Bldg. 181		4501		3954	826	2192	-	1774	13247
Steam Generated (MM Lbs)		138		216	50	102	-	18	524
Coal Consumed (Tons)		8450		13120	3031	7003	-	-	31604
Oil Consumed (Gals)	-	-	-	-	-	-	-	167000	167000

* Excluding KE and KW Reactors.

A. Operating Experience

2. Activities (Continued)

Department on February 14. During the month, it was discovered that Van Stone gaskets were rapidly deteriorating, and the decision to replace all gaskets at both KW and KE Reactors was made. At month end, replacement at both reactors was complete. In addition, during the month, pre-start-up testing and preparations were in progress, including inspection of all rear pigtails, functional testing of vertical and horizontal rods, Ball 3X system, annunciator and Beta monitor system, and checking of all tube charges.

KE Reactor was transferred to Manufacturing Department responsibility on February 8. The remainder of the month was devoted to pre-start-up inspections and testing, including nozzle alignment, Ball 3X, vertical rod, Beta monitor system, octant monitor system, and horizontal rod testing, and Van Stone gasket replacement as described above. A detailed description of equipment testing and pre-start-up activities at both of these reactors may be found in Document HW-35623, "Monthly Report Reactor Section - Operations Sub-Section, February, 1955."

F Reactor was shut down on February 4 for a two-week outage for horizontal rod replacement in conjunction with Project CG-558 (Reactor Plant Modification for Increased Production). This outage was subsequently extended an additional week due to difficulties encountered in replacing the rear face nozzle gaskets. During the outage, six horizontal rods were replaced with rods of the new, thimbleless type. The other three rods were previously replaced during other outages. Other work accomplished during the outage included replacement of rear face nozzle gaskets, replacement of fringe tube galvanized nozzles with aluminum nozzles, and installation of rubber "O" ring type gaskets between rear face process tube Van Stone flanges and the gun barrels to minimize the possibility of water from Van Stone flange leaks entering the reactor via the annulus between tube and gun barrel.

During the F Reactor outage, water processing equipment and reservoirs were inspected, cleaned and repaired as necessary, a condenser was retubed, and a leaking circulating water line in a boiler was repaired.

Operation at all reactors except D Reactor was limited during February by temporary outlet water temperature limits as specified in Process Standard 105-A-040, "Process Tube Outlet Water Temperature Limits - Trip Before Instability." H Reactor was

A. Operating Experience

2. Activities (Continued)

additionally limited by maximum graphite temperatures permitted by the maximum allowable helium concentration. At D Reactor, operation was limited by the provisions of Production Test 105-546-E, "The Effect of Helium on D Pile Distortion," which permits use of up to 60 per cent helium.

Charge-discharge activities in February associated with major special irradiation programs included the discharge, without recharging Mint material, of 56 J-N tubes at DR Reactor. The month-end balance of J-N tubes at C and DR Reactors was 75 and 313, respectively. No J-Q tubes were charged or discharged at C or H Reactors. The month-end balance of tubes under the quantity thorium irradiation program continued to be 156 and 94 tubes at C and H Reactors, respectively.

Activated silica manufacturing and feeding facilities in all 100 Areas were prepared for use in anticipation of the seasonal decrease in raw water quality.

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

	Tubes Charged	Tubes Discharged	Casks Shipped
Production Tests	7	143*	6
Mint (flattening)	22	18	0
Chemical 10-66	0	11	3
Rala	0	7	2
Totals	29	179	11

* The unusually large number of Production Test tubes discharged in February resulted from the discharge of 113 tubes subsequent to the completion of a portion of Production Test 105-539-E "Slug Exposure at a Concentration of 900 MWD/Ton."

B. Equipment Experience

Twenty-three reactor scrams occurred during February. Of these, 14 at B, C, DR and H Reactors were caused by normal Panellit system variables. Two scrams were caused by Beckmans, one at C Reactor as the result of an unexplained rise of No. 2 Beckman, and one at DR Reactor as the result of inadvertent by-passing of a third Beckman to adjust trip settings. C Reactor was manually

B. Equipment Experience (Continued)

scrammed twice when apparent high tube temperatures were noted. Subsequent investigation revealed faulty thermocouples. D and H Reactors were both scrammed once by a power surge which resulted when a drag line struck the 230 KV power line at 100-K Area. D Reactor was scrammed when a short circuit in a compressor caused the failure of process power fuses. This incident caused a scram at DR Reactor through the D-DR Reactor inter-tie circuit. DR Reactor was manually scrammed once when a tube temperature exceeded limits. Total outage time attributed to these scrams was 321.9 hours. This unusually large amount of outage time resulted from the fact that in seven instances, involving approximately 200 outage hours, temporary suspension of the hot start-up procedure, as explained above in "Operating Experience," resulted in minimum time outages where previously reactor recovery could reasonably have been assumed.

One process tube leak occurred during the month, this at H Reactor in conjunction with a slug failure. Water collection rates at F Reactor remained high through February 4 when the reactor was shut down for an extended outage. During the outage, all process tubes were leak tested after replacement of the rear Van Stone flange gaskets. One leaking tube was found. Since F Reactor continued down at month end, it was not possible to determine whether or not the cause of the abnormal water collection rates had been corrected.

Horizontal rod work in February, other than at F Reactor, included at C Reactor replacement of No. 14 rod seal which had pulled loose from its housing, at B Reactor removal of No. B thimble and installation of the new thimbleless type rod, and at D Reactor blanking off the leaking No. 8 thimble pending installation of the new type rod.

At B Reactor, repairs to the cushion chamber in the effluent system were necessary as the result of pressure on the step plugs. Additional steel plates and timbers had worked loose, and a steel cage was installed to hold the remaining chamber lining in place until more extensive repairs can be made.

Reliability checks at all operating reactors during February revealed 23 faulty trips as detailed below.

	High Trips	Low Trips	Misc.	Total
B Reactor	0	0	0	0
C Reactor	2	2	2	6
D Reactor	0	0	5	5
DR Reactor	2	1	0	3
F Reactor	4	0	1	5
H Reactor	1	3	0	4
Totals	9	6	8	23

B. Equipment Experience (Continued)

This level of gage performance represents considerable improvement, with the total trips being less than one-half the number experienced in December and January.

There continues to be some trouble with the 190-C pump components. During a Class "A" inspection of No. 2 unit, a broken rotor deflector plate in the fluid drive assembly was found. In addition, the No. 9 unit was inspected due to excessive noise. The oil pump gears were replaced, but these gears failed during a subsequent start-up. A representative of the vendor, American Blower Company, is expected on the plant in the near future for consultation on these problems. The program of realignment of units is continuing.

Considerable difficulty continues to be experienced with the KW Reactor process tube temperature monitor. The primary cause of the difficulty is moisture in the rear face connectors at the sensing elements which reduces the reliability. At month end, corrective work is in progress.

C. Improvement Experience

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

PT-105-7-MR (Irradiation of High Quality Production Uranium Slugs) Irradiation to failure of 10 tubes of this material continued at H Reactor without incident during February. At month end, an exposure of approximately 650 megawatt days per ton had been achieved. Dual Panellit gages have been provided on these tubes to verify pressure increases at the time of rupture.

PT-105-539-E (Slug Exposure at a Concentration of 900 MWD/Ton) The third "A" group failure occurred during February and terminated the "A" portion of this test with the result that the remaining 113 tubes of group "A" were discharged at an average exposure of 980 megawatt days per ton. A process tube leak occurred in conjunction with the February failure. One group "B" failure has occurred to date in 140 tubes which at month end had reached an average exposure of 1025 megawatt days per ton.

PT-105-567-A (Preliminary Irradiation of J-Q Columns) Irradiation of the 12 J-Q tubes under this test at H Reactor continued without incident.

PT-105-579-A (Quantity Irradiation of J-Q Columns) No J-Q tubes under this test were charged or discharged during February. The month end balance remained 156 tubes at C Reactor and 94 tubes at H Reactor.

C. Improvement Experience (Continued)

PT-105-546-E (Effect of Helium on D Pile Distortion)
D Reactor continued to operate under this test during February without incident. The test permits outlet temperatures up to 110 C, providing trip-before-instability limits are not exceeded, and a 60 per cent maximum helium concentration to maintain graphite temperatures between 460 and 500 C.

PT-105-506-E Suppl. C (Recirculation Studies)
This Production Test continued at H Reactor during February without incident.

PT-105-537-E (Effect of J-Q Pairs on Radiation Damage to Graphite)
This Production Test continued at F Reactor during February without incident.

Eleven revised Process Standards - Reactor were approved and issued during February. These were standards titled "Process Tube Outlet Water Temperature Limits - Trip Before Instability," "Process Water Pressure Trip Settings," "Panellit System Control," "Horizontal Rod Cooling Water," "Thermal and Biological Shield Cooling Water," "Ruptured Slug Detection," "Make-Up of Special Tube Charges," "Process Tube Temperature Monitor," "Vertical Rod Withdrawal - Rate and Waiting Period," "Properties of Process Tubes," and "Panellit Maintenance." The most significant changes accomplished by these revisions included, provision of slightly higher trip-before-instability limits for process tubes equipped with coarse mesh cone screens since these screens reduce the possibility of partial plugging and increase the reliability of tube flow measurements; respecification of the rate of vertical rod withdrawal to limit the reactivity increase of a reactor to a maximum of 10 inhours per second; and specification of conservative hydraulic pressure limits for KE and KW Reactor tubes pending availability of test data to be published by Pile Technology Section.

On February 6, based upon the need for the presence of Process Sub-Section personnel at KE and KW Reactors on a 24-hour basis, the temporary program of field checking operations of all reactors on a 24-hour basis was discontinued. However, the practice of requiring the presence of a Process Engineer and a Process Physicist at all cold reactor start-ups to provide additional aid in the event problems are encountered was continued.

A new type high range (up to 500 rads per hour) portable monitoring meter, with a three and one-half foot entended probe, has been received by the Radiation Monitoring Sub-Section. This meter, fabricated by the Radiological Sciences Department from criteria furnished by the Reactor Section, is a great improvement over the previous instrument as the result of easier manipulation and readability.

C. Improvement Experience (Continued)

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

D. Events Influencing Costs

During February, Reactor Section costs were adversely affected by a significant drop in reactor production, approximately 30 per cent, as compared to the record high input production of January. This decrease in production was due, in part, to the shorter month, but primarily to the very low time operated efficiency resulting from the 24 day horizontal rod replacement outage at F Reactor and lower than normal efficiencies at other reactors as explained previously. Also adversely affecting February costs were increased maintenance costs resulting from nozzle gasket replacement work and associated activities at F Reactor.

Beneficially affecting Reactor Section costs was a decreased amount of horizontal rod maintenance and leak testing work, and a shorter payroll month. In addition, a decrease in steam generation and water requirements of approximately 27 and 24 per cent, respectively, resulted in a decrease in coal and chemical costs totalling approximately $100,000.

Preliminary estimates indicate that both plutonium irradiation and total irradiation unit costs will be approximately 45 per cent higher in February than the record low costs established in January.

February Reactor Section charges to the expansion program continued to be high as the result of the pre-start-up work at KE and KW Reactors as described in "Activities" above.

E. Plant Development and Expansion

1. Project Status

The most significant Reactor Section project activity is reported below. Further details concerning projects may be found in the report, "Status of Reactor Section Projects, Informal Requests and Budget Items," F. A. R. Stainken to J. H. Warren, dated February 18, 1955.

CA-431 (100-C Plant)
All extrusions for C Reactor rods have been received from Reynolds Aluminum Company by the Los Angeles plant of Western Gear Company.

E. Plant Development and Expansion

1. Project Status (Continued)

CG-558 (Reactor Plant Modifications for Increased Production) Scope design is estimated to be 100 per cent complete. The revised project proposal has been signed by all necessary departmental representatives, and has been forwarded to the Financial Department for approval and transmittal to the AEC. All rod extrusions from Alcoa and all rings from Asco have been received by Pacific Oerlikon. The first horizontal rod replacement outage occurred at F Reactor, beginning on February 4, and extending through the end of the month. Details are presented under "Activities." In order to complete work at 100-K Area, the remaining horizontal rod outages have been postponed, with the next outage, at DR Reactor, tentatively scheduled for April 11. Preliminary project work at 100-D Area continued during February, including rerouting of electrical lines, reinforcing of the Building 181-D operating floor and replacement of Building 181-D No. 17 turbine driven pump with a motor driven pump.

CA-512 (100-K Plant) Construction of KE and KW Reactors and Water Plants is estimated by the AEC to be 100 per cent complete. Preparations for start-up of the reactors are described under "Activities."

2. Plant Engineering

A number of engineering and development studies were active in the Section during February. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in Document HW-35652. Items of interest are reported below.

The present Beta monitor slug failure detection system, which requires a steady sample flow of approximately 500 cc per minute, is considered susceptible to sample line vapor binding when effluent water temperatures exceed 100 C. In order to determine and evaluate methods of eliminating this potential difficulty, a request for funds is being prepared to provide a hot water flow facility.

A drum of Megnihib 136, a high molecular weight polyamine, has been ordered from Crest Research Laboratories for evaluation in regard to control of steam condensate corrosion in the 100-K Area steam generating facilities. The vendor is supplying in addition a Corrosometer with several probes for use in determining rates of corrosion. Initial investigations

E. Plant Development and Expansion

2. Plant Engineering (Continued)

will be conducted at 100-K Area, and if found to be successful, application of the inhibitor in other areas will be studied.

F. Significant Reports

1. Routine

Monthly operating reports issued for January were:

HW-34631-A	Reactor Section	J. H. Warren	2/7/55
HW-34904	Operations Sub-Section	R. O. Mehann	2/1/55
HW-34891	Process Sub-Section	O. C. Schroeder	2/1/55
HW-34828	Projects and Personnel Development	F. A. R. Stainken	2/1/55
HW-34871	Radiation Monitoring Sub-Section	P. C. Jerman	2/2/55
--	Maintenance Sub-Section	E. E. Weyerts	2/3/55
HW-34881	Power Sub-Section	J. C. McLaughlin	2/3/55

Other routine reports issued during February included:

HW-35469	"Monthly Progress Report, Reactor Section Expansion, February, 1955"	J. P. Langan	2/23/55
--	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	F. A. R. Stainken	2/18/55
HW-34831	"Reactivity Balance and Associated Data - Period January, 1955."	A. P. Vinther	2/1/55

2. Non-Routine

HW-34650	"Process Test MR-105-25, Supplement A, Reactor Purge at Low Concentrations"	N. V. Starkebaum	1/27/55
HW-34867	"Reactor Operational Engineering Problems"	R. B. Hamilton C. W. Botsford	2/3/55
HW-34806	"An Analysis of the Reactor Water Leak Problem"	J. H. Warren	2/3/55
HW-33942	"Analysis of Tube Boiling Limits"	K. W. Hess	1/20/55
HW-35589	"Steam Loss at 190-B, D, DR, F and H Buildings"	F. A. R. Stainken	2/25/55
HW-33910	"Hydraulic Characteristics of Slugs Canned With Oversized Sleeves"	P. C. Walkup O. C. Schroeder	2/4/55
HW-35062	"Six Months Post Acceptance Report, Project IR-160 - Asbestos Shingles for Building Exteriors - 100-B, D and F Areas"	J. H. Warren	2/10/55
HW-35588	"Six Months Post Acceptance Report, Project CG-524 - High Pressure Water Supply to Single Front Face Tube - 105-B, D, DR, F and H"	J. H. Warren	2/28/55

F. Significant Reports

2. Non-Routine (Continued)

-- "Appraisal of 100 Areas Coal Utilization" M. P. Johnson, G. W. Wells 2/16/55

III. PERSONNEL

A. Organization

There were no appointments made in the Reactor Section During February.

B. Force Summary

	Beginning of Month	End of Month	Net Change
Section General	2	2	0
Operations	366	366	0
Maintenance	603	605	/ 2
Projects and Personnel Development	40	40	0
Power	488	487	- 1
Process	62	63	/ 1
Radiation Monitoring	78	79	/ 1
Section Total	1639	1642	/ 3

Changes during February included 17 transfers into the Section, 10 transfers out of the Section, two new hires, six terminations, one reactivation, and one deactivation.

C. Safety Experience

Three Sub-Major Injuries, Nos. 269, 270 and 271, occurred in the Reactor Section during February. All three involved Operations Sub-Section operators. No. 269 occurred on February 9, at KW Reactor, when a process tube cap rolled off the table of a "T" cart, striking an operator on the foot and resulting in a fractured right second toe. No. 270 occurred on February 13, at C Reactor, when an operator sustained a broken nose as the result of being struck by a small piece of metal. This piece of metal had been bolted to the load chain of a storage area electric chain hoist to acuate the reversing switch on the hoist when raising a yoke, thus limiting the distance the yoke could be raised. At the time of the injury, the piece of metal was out of place, missed the switch, and was snapped off by the hoist housing as the chain entered during the raising of a yoke. No. 271 occurred on February 20, also at C Reactor, when an operator received a broken finger during the removal of a box of uranium slugs from the "D" elevator. The box, which was being slid off the elevator due to its weight, slipped off a step at the end of the elevator, catching the operator's hand between the box

C. Safety Experience (Continued)

handle and the step above. There were no Major Injuries in the Reactor Section during February.

D. Radiation Experience

Two Radiation Incidents, one Class I and one Class II, occurred in the Reactor Section during February. Class II Incident No. 91 occurred at H Reactor on February 19. The pencils used by an Operations Sub-Section operator indicated 150 mr and off-scale (> 280 mr). When processed, the badge showed 9.9 rads, including 310 mr. During the shift, the operator decontaminated dummies on the wash pad, entered a sample room to take water samples, and transferred bags of soiled SWP clothing. Although the cause of the incident was not definitely determined, the investigation indicated that exposure probably resulted from either particles or a smear on the chest area of the coveralls received during dummy decontamination. Class I Incident No. 426 occurred at H Reactor on February 26 when, during movement of the D test hole thimble to the burial ground, water leaked from the thimble, contaminating the area from the reactor building to the burial ground. These incidents are described in detail in Documents HW-35637 and HW-35638, respectively.

E. Personnel Activities

At month end, 16 employees are receiving on-the-job training for engineering or supervisory assignments in the Section; eight of these are on assignment under the rotational training program.

Two information meetings, primarily for non-exempt employees, were conducted by J. H. Warren and E. E. Weyerts at 100-F Area on February 4. Subjects discussed were the K Reactors, and Maintenance Sub-Section organization and functions.

Extensive training programs were continued during February at both KE and KW Reactors, and included instruction in the use of start-up procedures and operation of equipment.

An information meeting for all Projects and Personnel Development Sub-Section exempt people was conducted by the Sub-Section Superintendent to discuss the new salary plan, Bacon-Davis Act implications, and other informational items.

F. A. R. Stainken, Projects and Personnel Development Sub-Section Superintendent, departed February 27 on a one week trip to assist the Technical Recruitment Unit in recruiting technical graduates at the University of California, University of California at Los Angeles and University of Nevada.

E. Personnel Activities (Continued)

J. S. Corbett and E. A. Wegner, Radiation Monitoring and Operations Sub-Sections analysts, respectively, visited several clothing manufacturing plants in Yakima, Washington, and Portland, Oregon, on February 17 and 18 for the purpose of discussing protective clothing requirements with vendors.

[redacted]

Richland, Washington
March 4, 1955

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
FEBRUARY, 1955

I RESPONSIBILITY

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

II ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	February		January	
	Normal	Acid Wash	Normal	Acid Wash
Charges started in Canyon Bldgs.	98	0	97	2
Charges completed in Conc. Bldgs.	100		102	
Special charges - Conc. Bldgs.	5		0	
Charges completed-Isolation Bldg.	199		160	
Average Waste Losses, %	3.97		3.67	
Special charges-Isolation Bldg.	12		12	
Material balance, %	107.9		105.5	

[redacted]

a. Bismuth Phosphate Operations (continued)

	February		January	
	Normal	Acid Wash	Normal	Acid Wash
Yield through Process, %	103.9		101.8	
Average cooling time (days)	100		104	
Minimum cooling time (days)	67		60	

b. Redox Operations

	February	January
Equivalent charges started	109.2	28.0
Charges completed	95.6	59.7
Tons Uranium delivered to storage	181.6	36.8
Average Production Rate per Operating day, Tons	8.0	5.1
Average Daily Operating Rate for the month, Tons	6.5	1.2
Average yield, %		
Uranium	96.5	98.0
Plutonium	101.7	106.3
Total Waste Loss, %		
Uranium	0.33	0.88
Plutonium	0.79	2.01
Average cooling time, days	92	103
Minimum cooling time, days	75	97
Percent down time	19.0	77.0

c. 234-5 Operations

	February	January
Batches completed through Task II		26
Runs completed through Task III	None	37
Reduction yield, RM		97.4
Waste Disposal, units		0.5

d. UO_3 Operations

	February	January	To Date
Uranium drummed, Tons	304.46	110.75	8625.77
Uranium shipped, Tons	283.01	107.96	8601.53
Average cooling time, days (Redox)	97	115	
Minimum cooling time, days (Redox)	80	85	
Waste loss, %	.02	.02	

e. TBP Operations

	February	January	To Date
Tons received from Metal Removal	134.86	87.77	4941.88
Tons shipped to UO_3 Plant	129.95	76.12	4777.80
Average Production Rate per Operating day, Tons	5.65	4.45	
Average Daily Operating Rate for the month, Tons	4.64	2.46	
Average yield, %	95.18	101.04	
Total Waste Loss, %	3.48	3.41	
Ratio actual waste volume removed to theoritical volume	0.98	2.01	
Percent Down Time	17.86	44.83	

f. Power

	200 East	200 West
Raw water pumped, gpm	960	6 463
Filtered water pumped, gpm	540	945
Steam generated, lbs/hr	62 985	193 000
Maximum steam generated, lbs/hr	88 000	236 000
Total steam generated, M lbs.	42 326	129 869
Coal consumed, tons (est.)	2 785	7 630

g. Waste Storage

	Equivalent Tons U	
	February	January
Metal Waste reserve storage capacity-T Plant	364	504
1st Cycle reserve storage capacity-T Plant	416	384
Metal Waste reserve storage capacity-B Plant	866	1095
1st Cycle reserve storage capacity-B Plant	74	74
Redox Waste reserve storage capacity	1278	1383

2. Activities

a. Redox Processing

The plant started up and operated at a 5 tons uranium/day rate for a brief period on February 2, following the extended January shutdown. A leak in the 3DW backcycle jumper and an obstruction in the waste concentrator overflow line forced a shutdown after only seven hours operating time. Both of these difficulties were repaired by impacting the jumpers, and startup was effected on February 3, 1955.

A nominal 7 tons/day rate was held until February 8; the reduced rate being necessitated by metal feed shortages brought about

a. ~~Redox Processing~~ (continued)

because of the plugging of the C-3 and B-3 silver reactors. A 35 hour shutdown was made on February 8 to replace the D-8 pump, which had developed a bad leak, with a jet assembly. After correcting the pump and reactor troubles, the plant was started up on February 10. An 8.5 tons/day rate was achieved by February 14, when a 50 minute crash shutdown occurred as the result of the interruption of organic flow due to an air lock in the supply line. Another short shutdown (45 minutes) occurred on February 15 due to apparent flooding in the 1A column. Rates were gradually increased to a maximum of 9.5 tons per day on February 21, since a trial effort at 10 tons/day indicated that either the 1AW letdown valve was too small or that column flooding was diverting part of the organic stream out of the let down valve. The G-1 (organic receiver) to O-1 (276-S organic storage) pump also appeared to be at its maximum capacity at 9.5 tons/day rate.

On February 25th the process waste line between the D-8 neutralizer and the 241-S tank farm became partially plugged necessitating a rate cutback to 5 tons/day. Flushing did not clear the line sufficiently, and a shutdown was taken to replace the D-8 to 241-S jet with a new pump. On February 27 processing was resumed at a maximum rate of 8 tons/day since the line restriction could not be completely cleared with water flushing. On February 28, a hot 50% caustic flush apparently removed the restriction, and a production rate of 9.5 tons/day through the waste cell was again possible. However, the actual throughput was maintained at 8 tons/day since difficulty was experienced with the J-6, condenser vent filter, drain line failing to drain properly.

b. Metal Recovery

1) TBP Processing

The extraction building operated more or less continuously throughout the month with interruption resulting on occasion from mechanical failures. Operational rates were increased to an average of about 6.5 tons/day by mid-month and this rate was maintained for the balance of the period. The capacity was limited by excessive air inleakage on a pump flange on the intercycle concentrator. This will be corrected early in March. Failure of the feed pumps to the first extraction batteries had an adverse effect on the continuity of operations and a total of about 120 hours of production time was lost.

Operational difficulties encountered with the Section 6 feed concentrator were corrected by replacement of its condenser with the result that the unit was able to operate at greater than design rates. During the month the overhauled Section 7 concentrator was placed in operation as a second feed concentrator, thus eliminating a major bottleneck of the plant. Rates of approximately 7.5 tons/day are forecasted during March.

2) UO_3 Processing

The UO_3 Plant operated continuously throughout the month with a minimum of difficulty.

3) Waste Metal Removal

Uranium feed material removed during February consisted primarily of BX-BT and TX sludge and supernate of 500-600 MWD/T irradiation level with a minimum age of 25 years. The uranium content was maintained at a satisfactory level, thus greatly assisting the plant to reach the rates attained.

Sluicing operations in the 204-C tank were discontinued when it became apparent that the tank was empty of sludge. A periscope was installed in the 107-TX tank, after removal rates decreased, and considerable sludge was visible around the periphery of the tank. Sluicing operations will be continued to affect complete removal of the last of the aged (3 years) material.

c. Isolation and Fabrication Processing

All material processed in the Isolation Building consisted of low level MWD material for off-plant shipment as nitrate. Production commitments were met without difficulty.

The scheduled replacement of the Task III equipment curtailed operation of the Fabrication Line. Personnel assigned to the 234-5 operations were utilized during the month in support of the Task I and Recuplex operational testing and in the activities associated with replacement of Task III equipment.

d. T Plant Processing

Major equipment problems connected with the 3-5L dissolver unit, the 13-2 centrifuge, and an electrical outage of 23 hours did not seriously affect the plant production during the period. During the 28 day period an average daily production record of 1.009 Kg was established with the commitment being exceeded by 38.5%. Minor process changes during the month resulted in some additional time cycle reductions, furthering the efforts to increase capacity through the Bismuth Phosphate Plant.

3. Special Operations

a. Waste Evaporators

The evaporation of T Plant first cycle waste proceeded satisfactorily during the month in the 242-T Waste evaporator, with a total of 320,000 gallons being processed with a volume reduction of 59.4 percent. The 242-B facility remained in standby.

b. Plutonium Recovery, Metal Fabrication

Recovery operations were suspended during the month and assigned personnel were utilized in readying the Recuplex facility for operation.

Calibration of vessels associated with the reception and blending hood has been initiated and acceptance tests for the slag and crucible hood are in progress.

4. Schedule Variance

Redox production exceeded schedule by 1.6 tons, with a maximum sustained rate of 9.5 tons uranium/day being achieved for approximately four days. T Plant production exceeded schedule by 38.5 percent, and an average daily production record of 1.009 Kgs was established. The Section commitment for separated plutonium slightly exceeded the forecast. All commitments for the Isolation facility were met, while none were scheduled for Metal Fabrication due to the replacement of the Task III equipment.

Uranium recovery production exceeded the forecast. Eight carloads of UO_3 Powder were shipped in February.

B. Equipment Experience

1. Operating Continuity

Redox down time totaled approximately six and one half days due to mechanical difficulties.

Down time in TBP amounted to approximately 120 hours for maintenance work.

Operations in the Isolation Facility continued throughout the month without interruption. Operations in Metal Fabrication were curtailed to effect replacement of the Task III Reduction equipment.

Continuity of operations were not significantly effected by mechanical difficulties in T Plant. Thirty-six hours of lost time occurred due to equipment failures and power outages.

2. Inspection, Maintenance and Replacement

a. D-8 Pump Failure - Redox

The D-8 pump was replaced with a jet assembly on February 9, after a severe leak was found at the pump head. This jet was later replaced with a new pump on February 26 when attempts were being made to unplug the D-8 to 241 waste line as previously noted.

b. Silver Reactors - Redox

The heaters in the B-3 and C-3 reactors were replaced on February 8 and 10, respectively, after the four inch off-gas line between the heater and reactor became plugged with solid material, believed to be a mixture of silver nitrate and silver iodide. On February 28, the new B-3 reactor heater was damaged beyond repair by overheating. The old C-3 reactor heater was salvaged by steaming out the plug in the off-gas line, and was being installed at month end.

c. 60 T Crane - Redox

The 10 ton hook became disengaged on February 2 and a new hook was installed under high radiation conditions. The Selsyn motor which controls rotation of the left hand optic failed on Feb. 15. Because of the high radiation levels at this work location, the permissible exposure limits of 122 operators and 22 craftsmen were required for decontamination work and replacement of the motor. The work was completed on February 19, 1955.

d. First Cycle Concentrators - TBP

Difficulties experienced in the 6-1 feed concentrator were corrected, resulting in operating rates in excess of design rates. The intermittent loss of vacuum to the condenser was corrected by manually bleeding air into the condenser vent system to control the vacuum and by replacing the condenser which was operating with a pressure drop 400% greater than normal. A spare 7-1 concentrator was installed, however its operation was identical to that of the 6-1 unit until similar corrective action was taken. Parallel operation of the two concentrator units now provides adequate feed concentration capacity.

e. Dissolver Equipment - T Plant

The total dissolving capacity in T Plant was reduced 25 percent during the period due to equipment failures. The heat exchanger coil of the 3-5L dissolver pot developed a leak, and replacement was in progress at month-end. Attempts will be made to repair the leak on the failed pot as procurement of a new pot from vendor will require from six to twelve months. In addition the reactor heater to 3-5L failed and was replaced, and the silver reactor to 4-5L plugged and was replaced.

f. Electrical Outage - T Plant

On February 14 the EX-20 Breaker at the 221-T Building opened due to a short in the 2300 volt system. The building electrical load was transferred to the emergency 2300 volt line supplying

 DECLASSIFIED

f. Electrical Outage - T Plant (Continued)

the building while an inspection and repairs could be made. It was found that condensate which had accumulated in a junction box shorted out the circuit. Repairs were made and the power supply was restored to normal. Two hours of production time were lost during the outage. All junction boxes were inspected and measures were taken to prevent recurrence of similar outages.

C. Improvement Experience

1. Process Tests and Revisions

a. Dissolver Time Cycle Improvement - Redox

After rerouting the dissolver off-gas to the stack breeching, the need for staggering coating removal and dissolving operations was eliminated. This coupled with improved methods of dissolver operation have raised the capacity through the dissolvers to 10 1/2 tons/day. Improvement in the efficiency and application of present procedures is being sought with greater capacity still apparently possible without any equipment changes.

b. Waste Scavenging

There has been no improvement in waste scavenging. Stronger feeds during the month and start up of a waste concentrator on February 27 together with ditching of 400,000 gallons of unconcentrated waste have temporarily alleviated the immediate storage problem. The situation will become critical in March unless additional ditching facilities can be provided in time. Studies which might improve existing results are being rigorously pursued by all Departments.

c. Pot Caking - UO_3

Caking in the calcination pots did not present a serious problem during the month. A series of pot caking and reactivity tests were conducted during the month. A test in which sulfate (0.05 wt.% as H_2SO_4) was substituted for sulfamic acid resulted in an excellent reactivity ratio (1.31), but severe caking occurred. Petro AA and Silene EF, commercial anti-caking agents, were tested in combination with 0.08 wt.% sulfamic acid, but severe caking again resulted. Further testing is being conducted using Petro AA in combination with 0.05 wt.% sulfamic acid in an attempt to reduce the caking tendency of 0.05 wt.% sulfamic acid.

2. Inventions or Discoveries

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

D. Events Influencing Costs

It is anticipated that the increased essential material consumption associated with the continued high level of production from T Plant and the increased, over January, level of production from Redox and TBP, coupled with the addition of fifty-three employees to the Section roll, will result in February expenditures being approximately seven percent higher than in January.

E. Plant Development and Expansion

1. Project Status

a. Project CA-513-A - Purex

Construction as of February 15, 1955 is 96.2 percent complete compared to 100 percent scheduled completion. The "Ready for Operation" date is still estimated to be September 1, 1955.

Minor Construction has been assigned punch list items for 211-A, 203-A, 240-A cribs and waste lines, and the service area. It is anticipated that responsibility for completion of Project CA-513-A will be transferred from Blaw-Know Co. to Minor Construction on 3-15-55. Mechanical assistance for flushing and calibration will be initially provided by Minor Construction forces.

All of the canyon equipment has been processed through the mock-up shop. Spare units are now being worked on; three columns and five tube bundles remaining to be completed. Installation of vessels and rotating equipment in the canyon is complete.

A review of temporary construction buildings was made and it was decided to retain only the warehouse located on the north side of the 202-A Building for use as a 200 Area Essential Material warehouse.

The AEC has approved jumper and instrument changes required for a Purex capacity factor of 1.5 times nominal design capacity. These changes are expected to be completed before the equipment becomes "hot."

b. Project CG-551 - 234-5 Expansion

Installation of the new Task III equipment is progressing satisfactorily. Functional testing is scheduled to start March 1, 1955. There have been no significant delays on this project. Beneficial occupancy dates were met and final inspection of the facilities are nearing completion.

c. Project CG-496 - Recuplex Installation

The date for beneficial occupancy which is interpreted as the start of functional testing was met during February for the Reception and Blending Hood and its associated Cold Chemical Hood. Beneficial occupancy dates were also met for the Slag and Crucible Hood and for the Chemical Make-up Room. The scheduled beneficial occupancy date of February 28, 1955, for the Solvent Extraction hood was not met.

The calibration and run-in of equipment in the reception and blending hood and the chemical make-up room will be started during the first week in March. Minor Construction forces are scheduled to continue work in the area during March to complete current exceptions to the acceptance of the solvent extraction hood and to perform startup items.

d. Project 549 - Task I Activation

Beneficial occupancy and functional testing of Task I was initiated on February 24. Completion of the acceptance tests is expected by March 4, after which calibration work and preliminary run-in of the equipment will commence.

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

Progress on 233-S Concentration Building was slow and it appears that three or four more weeks will be necessary to complete construction work. The Progress on the 205-S Silica Gel Treatment facility has been slow, and the ready for use date has been extended to April 15.

f. Project CG-613 - UO_3 Expansion Program

It has been decided by the Design Council that March 1, 1956, will be the "target date" for beneficial use of the expanded UO_3 operation. The Council agreed on the desirability of procuring one continuous calciner at an early date and installing it on a temporary basis for test purposes. It is planned to install it in a temporary structure located adjacent to the Luckey pot room.

Procurement action has been instigated to obtain critical items that could delay the expansion completion date. Bids have been requested on the gas cooler, absorber tower, acid surge tank and 100% UNH hold-up tank. About thirty drawings have been approved. These include process flow, engineering flow, instrumentation and some details.

g. Project CG-603 - 4X Program

Revised production schedules received at month-end may alter the basis of scope as originally presented for B Plant reactivation. Recommendations for reactivation of B Plant are being

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

submitted to the AEC on the basis that B Plant will operate for a period of six months, if needed, instead of the originally scheduled two-year period. Project representatives are currently reviewing the entire scope of the project for B Plant reactivation to determine what work might be eliminated from that which was originally scoped. It is contemplated that items such as waste fill lines, waste clean-out lines, spare jumpers, SWP lobby, permanent platforms, and painting could be eliminated.

Minor Construction completed the necessary supporting facilities and continued rehabilitation work in the 221 Building, 271 Building, and 211 Chemical Storage Area. Installation of supporting facilities for the performance of work in the 224 Building is in progress at month end.

Personnel requirements for B Plant, as originally submitted, are being held-up at month-end due to the foregoing.

2. Manufacturing Engineering

a. Standards

The analytical service standards for the 202-S, 221-U, 224-U, and the 231 Buildings were revised for current sampling schedules. The studies of the labor standards were completed for the Redox Plant Services, UO_3 Operations, and TBP Operations Units. The revised labor standards for the Metal Recovery Plant are 78% complete; Z Plant 73%; and T Plant 14%. The Essential Materials standard for series operation in the TBP Plant was developed.

b. Work Simplification and Cost Reduction

The third series of round tables conferences was initiated this month for 33 participating personnel. Six conferences were held totalling 156 manhours of instruction and discussion. Nine specific operations or procedures are under study for simplification.

Assistance to operations in the installation of new procedures for the T Plant dispatching center was continued. This included (1) modifications to five forms, (2) administrative and technical actions supporting installation of modern and efficient communication systems both within the plant and between the plant and the laboratory, and, (3) advice on proper layout of the dispatcher's office. A final report on this study will be issued in the coming period.

Efforts were continued during the period to streamline paper work procedures in the three central maintenance units. Special

b. Work Simplification and Cost Reduction (Continued)

attention was given to the Shops Unit where a simplified procedure for the processing of work orders was developed for presentation to the customer.

c. Engineering Assistance

Industrial Television at Redox: Testing of component sections and final design is well underway. Emphasis is being placed on ease of maintenance and contamination protection.

Canyon cranes Flanging and Bearing Trouble: Investigation of flanging and bearing failure in the U, T, B, and possible Redox cranes have indicated the need for a qualified crane consultant from the vendor to assist in solving the problem. Data, pictures and other pertinent features are being gathered for transmittal to the Whiting Company for preliminary study and present plans call for an engineer to be present early in March at which time the U Crane is scheduled to have a complete set of new wheels installed.

Ventilation: Control of ventilation during modifications for Task III and Recuplex in 234-5 is being continued to prevent contamination spread. A balance check of 222-S has indicated a need for some filter replacements. Work was started in the shop on the filter testing chamber. This unit will be used to develop a satisfactory CWS type filter.

Cask Car Study: The initial hinged-lid design was discussed with responsible personnel of the Reactor and Separations Sections. Minor Revisions were presented to Design Engineering and an installation print suitable for test car modifications is nearing completion.

d. Property Management

Completion of the transfer of Mint property from the Reactor Section has been delayed pending completion of permanent Plant Record Unit cards by the Plant Accounting Unit. Indications are that the transfer can be effected early in March. In the meantime, steps have been taken to tighten controls so as to reduce the attention required to insure proper management of the property.

F. Reports Issued

1. Routine

Number	Subject	Author
HW-35591	Separations Section Redox Plant Sub-Section Monthly Report - February, 1955	R.T. Jessen

1. Routine (Continued)

Number	Subject	Author
HW-35592	Separations Section Metal Recovery Plant Sub-Section Monthly Report - February, 1955	T. Prudich
HW-35564	Separations Section T Plant Sub-Section Monthly Report - February, 1955	C.T. Groswith
HW-35581	Separations Section B Plant Sub-Section Monthly Report - February, 1955	S.G. Smolen
HW-35585	Separations Section Z Plant Sub-Section Monthly Report - February, 1955	W.N. Mobley
HW-35560	Separations Section Analytical Control Sub-Section Monthly Report-February, 1955	L.M. Knights
HW-35574	Separations Section Radiation Monitoring Sub-Section Monthly Report - February, 1955	A.R. Keene
Official Use Only	Separations Section Projects & Personnel Development Sub-Section Monthly Report - February, 1955	O.V. Smiset
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - February, 1955	C.P. Cabell
HW-35495	Monthly Progress Report - Plant Expansion - Projects and Personnel Development - Separations Section - February, 1955	F.A. Hollenbach
HW-35022	Separations Section Waste Status Summary for January, 1955	D.E. Peterson
HW-34886	Essential Material Consumption for T Plant January, 1955	G.E. Cooper
HW-34887	Essential Material Consumption for TBP Plant, January, 1955	G.E. Cooper
HW-34888	Essential Material Consumption for Redox Plant, January, 1955	G.E. Cooper
HW-34889	Essential Materials ordered Feb. 1, 1955 to February 28, 1955	G.E. Cooper
HW-34890	Essential Material Area Report to Cost and Purchasing, January 1 to January 31, 1955	G.E. Cooper
HW-35176	TBP - UO_3 Feed Availability, February, 1955 through June 1956	B.F. Campbell
HW-35215	Separations Section Process Council Minutes	O.F. Beaulieu

2. Non-Routine

None	Analytical Service Standard for the 231 Building	R.H. Silletto
None	Analytical Service Standard for the 221-U Building	R.H. Silletto
None	Reactor and Other Special Materials - Quarterly Inventory Report	V.D. Rouse
None	Status of Projects, Informal Approval Requests, and Budget Items - February, 1955	R.M. Shervem

1. Non-Routine (Continued)

Number	Subject	Author
HW-35463	Laboratory Analysis of Essential Materials Used in 221-T Building	W.G. Browne/ A.E. Barber
None	Detailing	C.T. Groswith
HW-34909	Status - Waste Scavenging - BY Tank Farm Area	C.R. Anderson
HW-35036	Recommended Analytical Re-Run Limits	C.R. Anderson by R.Y. Lyon
HW-34824	Waste Scavenging Status - 221-U	C.R. Anderson
HW-34808	Radioactive Decontamination Across the UO_3 Plant	R.B. Abrams - L.E. Bruns
HW-34804	Charts - Production Outlook for TBP and UO_3	C.R. Anderson
HW-35203	Expected On-Steam Efficiency - Purex	C.R. Anderson
HW-25201	Redox Plant Shutdown - January 8 - February 2, 1955	R.T. Jessen
HW-35540	Radiation Incident, Class I, No. 425	R.N. Donelson
HW-35575	Radiation Incident, Class I, No. 422	J.P. Corley
HW-34817	Redox Particle Study, Progress Report	H.F. Soule - G.L. Helgeson
HW-35442	Analytical Control Quality Report, February 15, 1955	L.M. Knights by D.T. Crawley, Jr.

III PERSONNEL

A. Organization

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

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	2	2	0
Redox Plant Sub-Section	236	232	-4
Metal Recovery Plant Sub-Section	279	282	+3
Z Plant Sub-Section	180	178	-2
T Plant Sub-Section	207	203	-4
B Plant Sub-Section	33	39	+6
Power & Maintenance Sub-Section	335	332	-3
Projects & Personnel Development	92	131	+39
Analytical Control Sub-Section	157	162	+5
Radiation Monitoring Sub-Section	154	167	+13
Section Total	1675	1728	+53

C. Safety Experience

There were no major or sub-major injuries in the Separations Section in February. At the close of the month, the Section had operated 488 days without a lost time injury, an outstanding achievement since it involves almost 5,000,000 exposure man-hours.

D. Radiation Experience

Two Class I radiation incidents occurred and included: (1) plutonium contamination to the face (25,000 d/m) and in the nose (15,000 d/m on smears) of a pipefitter following repair work on the F-2 centrifuge in 224-T, (No. 425); (2) localized contamination spread to the TXR vault area (up to 40,000 c/m) when flakes of rust and paint scale were emitted from the 291-TXR stack following a routine fan change, (No. 422).

Several unusually high dose rates, the highest measured as 4 r/hr at 2 inches from the bottom of one can, were found on PR cans in the 224-T Concentration Building early in the month. Contents of the cans were returned to the process. Exposure and contamination control during these transfers was excellent. Higher than normal concentration of Am, Cm, and Ba indicated the probability that green metal was inadvertently shipped and processed.

The contamination problem on the Redox crane approached conditions where maintenance work was virtually impossible without initial localized decontamination efforts. Exposure rates on the catwalks of the crane bridge averaged 2.0 rads/hr including 1.0 r/hr with a maximum dose rate of 23 rads/hr at 10 inches.

Contamination to 2 x 10^6 d/m was experienced during initiation of a program to decontaminate and remove excessive equipment from the back side of the RG line in the 234-5 Building. Excellent control was exercised to prevent spread of contamination to personnel or outside the confines of the working area.

Daily emission of I^{131} from the T and S Plant stacks averaged 1.5 and 2.2 curies respectively. The 3-5L and 4-5L reactors and the 3-5L heater in 221-T were replaced and effected a maximum 24 hour emission of 1.5 curies. The maximum 24 hour emission from the 202-S stack was 6.7 curies.

E. Personnel Activities

1. Personnel Programs and Training

GE Selection Program evaluation was completed for two Power and Maintenance Sub-Section personnel. Sixteen exempt persons completed Supervisors Safety Training program, fifty-five attended Purex Training program and thirty attended the fifth First Level Supervisors Information Meeting.

1. Personnel Programs and Training (Continued)

Sixty-two non-exempt people attended process training meetings; twenty-one Instrument personnel are presently attending a nine weeks training course; thirteen Radiation Monitoring personnel are receiving radiation and process equipment training; and twenty weldors attended welding school. In addition forty new employees attended orientation meetings.

2. Personnel Procurement

Requisitions for 250 employees are on file with Employment. Since staffing of B Plant may no longer be imminent, additional requisitions for 115 employees have been held, pending final analysis and study of the Section needs.

During the month fifty-three employees were received into the Separations Section.

3. Visitations

R.E. Toczek recruited personnel at several schools in the midwest during the week of February 21.

D. McDonald visited the Rand Co. in Santa Monica, California during the week of February 21 to assist in the solution of production scheduling problems being worked out on the 702 computer.

March 2, 1955

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

February, 1955

ACHIEVEMENT

Operating Experience

Power Statistics (See last page for details)

Plant Contract

Probable time of February Peak demand . . . 10 - 10:30 a.m., February 5
Probable measured peak demand for February. 140,000 KW*
Comparative measured peak demand for January.138,583 KW
Billing demand for February . . . . . 159,000 KW**
*As indicated by telemeter
**A billing demand of 159,000 KW is based on the premise that BPA accepts the reasons given them as sufficient justification for revising the Contract figure of 202,000 KW to 159,000 KW.

Energy consumption during February was approximately 14% under the average monthly figure for fiscal year 1955.

BPA System

On February 7 at 11:27 p.m., system frequency momentarily dropped to 59.58 cycles due to trouble on the LaGrande line.

On February 13, at 1:41 p.m. and 1:52 p.m., system surges were caused by P.P. & L. trouble at Portland.

On February 22, at 1:10 p.m., system frequency momentarily dropped to 59.72 cycles due to increase in load at Grand Coulee.

On February 26, at 12:30 a.m. for five minutes, system frequency dropped to 59.53 cycles. On February 27, at 8:51 a.m., for thirty minutes, the system frequency dropped to 59.7 cycles. On each occasion, the cause was due to overload conditions and loss of generation at McNary.

HAPO System

At 3:05 a.m., February 11, a crane operated by Kaiser Engineers contacted a conductor of the 230 KV line between KW and KE. Proper relay action tripped circuit breakers at each terminal, deenergizing the

faulted line section. The breakers were reclosed about one minute later. Although the 230 KV loop was opened, no area lost power.

In the interim, the crane had moved away. Subsequent inspection of the conductor was made and approximately twenty feet of damaged conductor was replaced. Charts made by automatic oscillograph indicated the fault was cleared in four cycles.

A report on the investigation held by Kaiser Engineers is not yet available. Their supervision is aware of the requirements when equipment is working in the proximity of overhead lines.

* * * *

Although unusually high winds prevailed on several days during the month, no production loss occasioned from inadequacy of facilities or from malfunction.

Equipment Experience

Full advantage was taken of the extended down time in 100-F Area for performance of preventive maintenance on both overhead lines and substation facilities. No unexpected findings of major importance were discovered. The insulating oil in the interrupter units of the G.E. oil circuit breakers, A-362 and A-364, was changed out. The oil had previously been found to be below established operating standards.

All work was performed during regular hours.

* * * *

On February 21, the trip coil on 230 KV OCB A-362 at 100-F burned out while the breaker was being opened during a planned outage.

Events Influencing Costs

Overtime hours expended were approximately 2% of the total hours worked.

* * * *

Attendance for the month was 98.63%.

Plant Development and Expansion

Planning is going ahead toward detailed arrangements for performing the 230 KV imposed fault tests in April. It is expected to have the

major portion of the details outlined by March 15. Coordinating requirements of this assignment are great.

* * * *

Planning work associated with Project CA-586 (3rd 230 KV line) was given considerable attention during the month.

* * * *

Project CG-558 continued to demand close liaison contact. The sequence of performing the work, particularly that associated with the addition of circuit breakers at 151-B-C and the additions at 151-D-DR both inside and out, require close attention and consideration.

ORGANIZATION AND PERSONNEL

Force Summary

	February
Exempt personnel	16
Dispatchers	5
Electricians	12
Linemen	22
Substation Operators	30
Secretary	1
Stenographer	1
Clerk	1
Storekeeper	1
Draftsman	1
	90

There was one transfer from a Lineman to a Substation Operator during the month.

Safety Experience

Two minor injuries occurred.

On February 1, a truck driven by a Line Maintenance employee was involved in a minor accident with a privately owned vehicle. The driver of the private car was at fault. This is the first reported accident to the vehicles assigned to this Section in over 500,000 miles of travel.

Radiation Experience

No incidents were reported.

Personnel Activities

Guest speaker at the Section's monthly informative meeting was W. W. Windsheimer. His talk was well presented, and as evidenced by the attention given, questions and later comments; was well received.

In addition, the writer discussed the Section's previous month's performance in terms of attendance, safety, awards, continuity of power, and incidents.

* * * *

Section Engineers spent several productive hours conferring with Mr. A. L. Rickley of the Doble Engineering Co. relative to the application of power factor measurements in preventive maintenance proof testing of oil circuit breakers, transformers, bushings, and other high voltage equipment.

O. Mageehon

ELECTRICAL UTILITY SECTION

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POWER STATISTICS
ELECTRICAL UTILITY SECTION
FOR MONTH ENDING FEBRUARY 28, 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)	26350	22150	45900	45000	77.1	73.2
A-4 Out (100-D)	17040	14170	25400	24800	90.2	85.(
A-5 Out (100-H)	9910	8680	16350	16200	81.5	79.7
A-6 Out (100-F)	8790	3710	13300	14300	88.8	38.6
A-7 Out (100-KW)	4752	4320	47500	38000	13.5	16.(
A-8 Out (200 Area)	6150	5870	10500	10500	78.7	83.2
A-9 Out (100-KE)	4224	1584	46000	40500	12.3	5.8
TOTAL OUT	77216	60484	204950**	189300**	50.6	47.5
MIDWAY IN	78114	61541	148000*	136000*	70.9	67.3
115 KV System						
BB3-S4 Out (300 Area)	2448	2216	4440*	4400*	74.1	74.9
66 KV System						
B9-S11 Out (100-K)	210	162	480*	400*	58.8	60.3
B7-S10 Out (W. Bluffs)	393	333	1035*	968*	51.0	51.2
Hanford Out	61	58	300**	300**	27.3	28.7
TOTAL OUT	664	553	1815**	1668**	49.1	49.3
HANFORD IN	633	548	1700*	1500*	50.1	54.3
Project Total						
230 KV Out	77216	60484	204950**	189300**	50.6	47.5
115 KV Out (300)	2448	2216	4440*	4400*	74.1	74.9
66 KV Out	664	553	1815**	1668**	49.1	49.3
TOTAL OUT	80328	63253	211205**	195368**	51.1	48.2
230 KV In	78114	61541	148000*	136000*	70.9	67.3
115 KV Out (300)	2448	2216	4440*	4400*	74.1	74.9
66 KV In	633	548	1700*	1500*	50.1	54.3
TOTAL IN	81195	64305	154140**	141900**	70.8	67.4

*Denotes Coincidental Demand
**Denotes Non-Coincidental Demand

Average Power Factor - 230 KV System 90.2

[redacted]

MANUFACTURING DEPARTMENT
PURCHASING AND STORES SECTION
MONTHLY REPORT FEBRUARY, 1955

I Responsibility - No change

II Achievement

Lumus Corp. is progressing satisfactorily on contract SO-5 for the design of an acid fractionator. Engineering calculations and recommendations were received February 2, returned with comments on February 18, and are now being incorporated into final design.

Action to purchase nickel-plated boron steel balls for 100-K area was begun on a rush basis February 21. Quotations have been obtained already, and are now being reviewed from an engineering standpoint. Total delivery, including production of basic steel, bearing manufacture and special nickel-plating will require from 16 to 20 weeks.

We have discussed with General Chemical, vendor of nitric acid and aluminum nitrate nonahydrate, the possibility of their furnishing and our accepting their certified analyses of material delivered by tank truck. If this works out, we will save an expensive sampling and analytical process here, the results of which usually are not known until after the material has entered our process.

Due to difficulties in handling Sodium Nitrite in barrels, the 200 Areas have requested, and Purchasing has secured bids for shipment in paper bags, with plastic liners. In order to ship this material in bags, it is first necessary to secure approval of the carriers involved. At the present time we are actively supporting an emergency application with the rail trans-continental carriers. If approved in time for the next order, the increased cost of rail transportation over the present method of shipment, ie: Inter-coastal Steamship, will be almost entirely offset by the reduced net weight of bags versus barrels. We are, however, also trying to secure approval for boat shipment in bags, which will reduce the delivered costs approximately $75 per shipment.

An experimental order for caps for 9-1/2" cans has been placed with Harvey Aluminum, Div. of Harvey Machine Co., Inc. This additional source is needed and we hope their product will meet our specification. This firm is now working on an order for cans also, so their progress is an item of great interest to us.

In this same line, Reynolds Metals company and Hunter-Douglas Corp. have informed us they are prepared to make caps and cans. We are now discussing with Metal Preparation Section and A.E.C. the advisability of placing experimental orders here also.

In working with the Central Stores Receiving Unit considerable work has been accomplished in the scheduling of commercial trucks which is enabling Receiving personnel to receive the material in an orderly fashion with the minimum of help and not delay the common carriers in unloading the vehicles.

Achievement - (Cont.)

A.E.C has requested that G.E. procure two additional concentrators for the Purex facility, as spares. Because these were built originally by Electric Boat Division and we have had specific showings of interest by three other firms, we have asked A.E.C. to make their letter of instruction more specific. This is required in order to keep the procurement position of G.E. free from criticism.

The Udylite Corp., manufacturers of the penetration etch machine, cap and can cleaning machine and sleeve cleaning machine, is not making a satisfactory offer to bring the machines up to specifications, and first phases of the work will be done by plant forces. The amount of back-charge necessary will be computed later. There is a possibility of litigation.

General Chemical has begun construction of a liquid aluminum sulphate plant at Hedges, near Kennewick. General now has a one-year contract for liquid alum, and we expect that our net cost will decrease after this plant is in production.

Status of Essential Material Contracts being processed:

a. Nitric Acid - Supplement No. 1 to Contract G-346 with General Chemical has been approved by A.E.C. and is in full force.

b. Liquid Aluminum Sulphate - Contract has been written for one year, signed by General Chemical, and ready for signature by General Electric and approval by A.E.C.

c. Dry Aluminum Sulphate - Records of purchase sent to A.E.C. for approval.

d. Sodium Dichromate - Record of purchase sent to A.E.C. for approval.

The results of a buyer's market is being felt in some lines. In Chemicals, for example, vendors are more anxious for our business and bidding is more spirited. We are getting the advantage of additional services (such as vendors' use of local, public warehouses for quick delivery), better adherence to shipping schedules and easier agreement with our terms and conditions of purchase.

A non-corrosion tested stainless steel yard was established adjacent to the 1168 Building within the Central Stores area yard. While the dollar value of this inventory is small at present, material has been requisitioned to build it up to a substantial work supply. This action should reduce the demand on corrosion tested stainless steel. A catalogue was issued showing clearly those materials carried in the four classes.

General Supplies catalogues, Class 37, Emergency safety equipment and apparel, and Class 38, Janitor supplies, were converted to the new numbering system and catalogues released. We have converted 16 classes of material with nine remaining.

Area stores are being closed as scheduled. The four 100 area stores have been closed and materials moved to Central Stores. The 200 West area store in 274 Building was closed on February 28, 1955 except for corrosion tested stainless steel materials and safety shoes. Remaining open, as of March 1, 1955 will be 222-S, stainless steel in 200 West, 3717 in 300, and Technical sample room in 300 area.

Achievement (Cont.)

The screening of Blaw-Know inventories is complete with approximately 1,600 orders written for material.

There have been numerous occasions in Receiving when call-in time was required to receive and deliver emergency orders. A policy has been established for Purchasing to indicate orders requiring special handling. As shipments are received on these orders, priority treatment will be given to insure immediate delivery.

Three additional Spare Parts catalogues covering 4 different classes of material were distributed. Typing of those for the Reactor Section has been completed and those for Separation Section are under way. Although this program is a few days behind schedule, completion date of 4-30-55 is still expected.

Work orders have been issued for alteration of the space in building 2101 that is to be used as an office. There are no Hauserman partitions on project and none expected until April 1. Therefore, the date that the Spart Parts office force will move to this location has been moved back to April 15, 1955.

Effective March 1, 1955 a new procedure for the segregation of scrap metal will reduce the categories from twenty two down to only three and should result in savings in manpower and handling cost.

From contacts with the field it is indicated that a total of some 3400 requisitions will be issued in March compared to 2604 received in February. Of the March estimate a higher percentage will be emergencies with less than normal lead time because of Minor Construction's increased work as Kaiser and Blaw-Knox finish up. This upward trend, especially in emergency requisitions, represents high-cost effort in order to supply the material as required.

Listed below is a summary of emergency requisitions received for the months of January and February.

Source	January	February
Employee & Pub. Rel.		1
Engineering	5	24
Manufacturing	25	54
Medical	12	1
Minor Construction	38	118
Radiological Science	1	3
Stores	57	116
Total	138	317
Average per day	6.5	16.7

STATISTICS

Traffic Unit

Savings	February 1955	Sept. 1, 1946 to Date
Rate Reductions	$ 4,758	$ 1,791,735
Freight Bill Audit	1,767	137,482
Loss & Damage & Overcharge Claims	560	143,478
Ticket Refund Claims	596	45,008
Household Goods Claims	-	17,715
	$ 7,681	$ 2,135,418

Work Volume

Travel Requests	101
Reservations Made	313
Expense Accounts Checked	165
Shipments Traced	80
Quotations Furnished -- Rates & Routes	540
Freight Bills Approved	682
Amount	282,289

Carload Shipments	CMSTP&P	NP	UP	Total
Inbound	300	137	386	823
Outbound	-	-	-	-
	300	137	386	823

Stores Sub-Section

	Inventory Account: General Supplies	Inventory Account: Spare Parts
Store Orders processed	32,685	1,743
Value of issues by store order	$320,537	136,470
Value of cash sales	$ 275	
Value of payroll deductions	$ 1,716	
Value of free issues	311	
Total Value of Disbursements	$322,839	136,470
Line items in account	29,048	26,735
Back orders on hand	382	396
Out of stock items	241	273
Percent of line items out of stock	.8	1.0

Shipments received	6,251
Receiving Reports Issued	5,106
Excess Material & Equipment	
Received	$91,473
Issued for project use	$31,790
Shipped off-project	$17,401
Revenue from scrap & surplus sales	$136,899
Requisitions Screened	2,606
Items Furnished	374

Purchasing Sub-Section

Requisitions	On Hand 1-31-55	Received	Placed	On Hand 2-28-55
General Supplies Unit	569	2,010	1,996	583
Process Equipment Unit	239	567	481	325
Essential Material Unit	8	27	29	6
A.E.C.	271	530	510	291
Total	1,087	3,134	3,016	1,205

Number of Purchase Orders Placed	HW	HWC	Total
General Supplies Unit	1,259	318	1,577
Process Equipment Unit	316	76	392
Essential Material Unit	24	-	24
Local Purchase	35	1	36
Total	1,634	395	2,029

Value of Purchase Orders Placed	HW	HWC	Total
General Supplies Unit	$ 432,677.26	$122,742.08	$ 555,419.34
Process Equipment Unit	187,062.81	147,219.57	334,282.38
Essential Material Unit	488,797.83	-	488,797.83
Local Purchase	287.50	9.95	297.45
Total	$1,108,825.40	$269,971.60	$1,378,797.00

Purchase Order Alterations Issued	HW	HWC	Total
Number	109	73	182
Gross Value	$33,629.16	$62,604.93	$96,234.09

Expediting	HHW	HWC	Total
Orders on hand 1-31-55	1,752	462	2,214
Orders received	1,661	366	2,027
Orders completed	1,451	335	1,786
Orders on hand 2-28-55	1,962	493	2,455

III Organization and Personnel

Force Summary:	1-31-55	2-28-55	Change
Employees on roll	262	255	-7

TRANSPORTATION SECTION
MONTHLY REPORT
February 1955

Transportation Section personnel forces increased from 487 to 492 by two new hires, six transfers in, one transfer out, and two deactivations - personal illness.

Weather conditions were much more favorable throughout the month and overtime requirements for ice and snow control were substantially lower than in January. Transportation services were not significantly impeded and no major vehicular accidents were incurred.

Fiscal year to date costs through January were under the budget by $48,214 or approximately 2%. These expenditures were $2,582 or .11% less than those for a comparable period in FY 1954 despite a net increase in salary rates of 2% and expanded service requirements for the 100-K Area, 600 Area, contamination control, railroad process service, and additional delivery routes for Stores materials. The reduction in handling charges on repair parts and the acquisition of 22 new buses and about 200 other replacement units contributed to this accomplishment.

Completed budgetary schedules and required justifications for FY 1956 and FY 1957 on materials, inventories, personnel by functions, shop equipment, civil defense, office furniture and equipment, and construction projects.

Further discussions have been held with the Commission and the Financial Department relative to the establishment of the proposed consolidated equipment pool. Certain aspects of the program require action at the Washington level before proceedings can be accomplished beyond tentative planning. Six additional people were budgeted for this operation but later information indicates that a total of eighteen employees and $160,000 in repair parts may be required in FY 1956. This possible need has been injected into the budget narratives. The Commission has arranged to hold intact the Construction stock of repair parts.

The Commission has advised that the establishment of several pools has largely depleted the availability of heavy equipment from other locations for upgrading purposes. This will no doubt result in the purchase of new equipment in more instances than had been anticipated.

Maintenance costs on the heating plant in the 1171 Building have been reduced somewhat but are still much greater than had been expected. Additional information in this connection has been furnished to the Commission and negotiations are continuing regarding a work order to cover the above normal expenditures.

The annual physical inventory of Fuel and Lubricants (0450-950 thru 956) was completed on February 10 as scheduled. Reconciliations are still in progress.

Received the final status report covering the physical inventory of Automotive and Heavy Equipment Parts (0420-931), Railway Equipment Parts (0420-932), and Antifreeze (0420-933). Physical quantities were over the book value by $3,534. Variance to disbursements since the previous physical inventory averaged 4.2%. A number of recommendations were jointly developed with the Inventory Accounting Unit which should improve accountability, warehousing practices, and physical safeguards.

[redacted]

Transportation Section

Effective February 14 the Railroad Materials Inventory (0410-85) was changed to Railroad Track Materials (0420-934) in order to comply with the Commission's revised definition of spare parts.

Rental rates on light equipment were revised to be effective for February. Over-all reductions averaged about 8%. Actual costs are over liquidated for the fiscal year to date by $68,551. Expenditures have been lower than predicted because of the acquisition of new equipment, reduced handling charges on repair parts, and a reduction of 336,000 miles from last year.

After four months occupancy of the Consolidated Transportation Facility, it seems apparent that Section internal team work and correlation have made decided strides of improvement. This type factor is difficult to measure although in time it should reflect itself in savings and better service, plus providing improved employee relations and greater job satisfaction. A program of weekly safety and housekeeping inspections has stimulated considerable interest in keeping the shops clean and orderly.

Commercial rail traffic during February decreased about 2% over January. The following recapitulation indicates the distribution of commercial cars handled:

Carload Movements -	Loads In	Empties In	Loads Out	Empties Out
General Electric Company	942	13	6	940
AEC - Kaiser (cement	5	0	0	8
Blaw-Knox	10	0	0	8
Kaiser Engineers	13	0	0	11
Thorne & Marble	1	0	0	1
U. S. Army	24	0	0	26
	995	13	6	994

Railroad process movements during February increased by 56% over January and were near normal at month-end following production difficulties at the Redox Facility.

Special movements of vessels from the 272-East Shop to the Purex Facility were continued and are now expected to be completed in March. Switching service was also continued for the removal of equipment from the 221-B Building.

Railroad car movements including process service totaled 2,354 in February compared to 2,288 in January.

The Plant Bus System transported about 1% more passengers in February than in January. The following statistics indicates the magnitude of service rendered:

Passenger Volume	162,299
Revenue - Bus Fares	$ 8,114.94
Earnings - Transit Advertising (January)	$ 62.73
Bus Trips	7,380
Bus Miles - Passenger Carrying	203,751
Passenger Miles	5,324,996

[redacted]

Six additional drivers were added on February 28 for the Plant Bus System. These people were scheduled for the second quarter but the judicious use of overtime has been more economical and reasonably adequate to serve operating needs during this interim period. Passenger volume has been steadily increasing and is forecasted to continue until the new facilities are fully staffed. Overtime will continue to be utilized insofar as possible for fluctuating requirements and relief needs.

The Richland Bus System transported 8.8% more passengers in February than in January. The following statistics indicate the volume of service rendered:

Total Passengers Including Transfers	13,075
Revenue - Bus Fares	$ 858.25
Earnings - Transit Advertising (January)	$ 2.85
Bus Trips	1,062
Bus Miles - Passenger Carrying	5,629
Passenger Miles	32,656

Off-Plant chauffeured automobile trips (Company business and/or official visitors) totaled 205 which were rendered to the following locations:

Benton City, Washington	16
Grandview, Washington	1
Hinkle Oregon	11
Kennewick, Washington	33
Mabton, Washington	2
Pasco, Washington	84
Pendleton, Oregon	17
Portland, Oregon	1
Prosser, Washington	4
Richland "Y", Washington	1
Spokane, Washington	2
Sunnyside, Washington	7
West Richland, Washington	12
Yakima, Washington	14

The following tabulation indicates in gallons the volume of fuel distribution between December 27 and February 10:

	Gasoline	Diesel Fuel	50 Cetane	Kerosene	White Gas
Stock at Start of Month	50,485	17,105	2,300	2,600	340
Received During Month	160,650	30,700	52,600	9,705	0
Disbursed During Month	166,635	26,033	50,450	7,614	47
Stock at End of Month	44,500	21,772	4,450	4,691	293

Transportation Section

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

Motor Overhauls	55
Class A Inspections and Repairs	103
Class B Inspections and Lubrications	1136
Weekly Inspections - Fuel Trucks and Off Plant Vehicles	28
Semimonthly Inspections - Buses	173
Monthly Inspections - Railroad Rolling Stock	2
Visualiner Inspections	132
Routine Maintenance Repairs and Service Calls	1993
Accident Repairs and Paint Jobs	42
Tire Repairs	586
Wash Jobs	466
	4,716

Forty-seven 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 January and the utilization of each type:

Code	Type	No. of Units	Total Mileage
1A	Sedans	339	477,142
1B	Buses	141	208,447
1C	Pickup Trucks	434	207,291
1D	Panel,Carryall,Sta.Wagon	171	139,274
1G	Jeeps	3	645
1H	Power Wagons	50	21,935
68 Series	Trucks	221	93,220
		1,359	1,147,954

Completed the overhaul of the trucks and one engine on locomotive 39-3726. The overhaul of the number one engine on locomotive 39-3719 was started immediately following the completion of 39-3726. Lubricating Engineers from the Shell Oil Company thoroughly examined locomotive 39-3729 in an effort to determine the cause of sticking valves and unusual deposits on engine parts. Oil samples from all locomotives are being analyzed by the Shell laboratories. It is hoped that this investigation will provide information as to the cause and correction of recent engine failures.

Considerable difficulty has been experienced in recent months with the sticking of injectors in diesel buses. This condition has caused a great deal of additional work to maintain the required availability for Plant bus operations. Representatives of the Shell Oil Company are assisting in investigative action inasmuch as they supply the motor oils used. Oil samples are being analyzed as to the probably cause. In order to alleviate the problem the frequency for changing oil has been increased. In addition, cylinder heads and gaskets are being checked to ascertain if they are causing leakage of coolant into the crankcase. A treatment for the cooling system is being developed which would permit the early detection of any such leakage. If this proves successful it will allay the situation in that minor corrective repairs can be made immediately.

An investigation of bus tires now in use revealed that they are not of the high mileage category as had been assumed. This apparently resulted from a lack of understanding with respect to federal nomenclature and contract specifications. Subsequent to this disclosure six tires were requisitioned from each of the four major manufacturers for the purpose of making comparative tests and developing data as to wearing characteristics. Four buses have been so equipped and will be operated under like conditions for a test period of six months. It is believed that this undertaking will lead to the acquisition of the most economical tires for the bus fleet.

Operating procedures and safety rules for the visualiner, overhead cranes, and paint spraying equipment have been completed and posted.

Completed the clean-up of the 101 Building site at Hanford. This was requested by the Commission and required 450 man-hours.

Established additional delivery service to the 200 Areas for operating supplies concurrent with the closing of the area stores.

Maintenance of Plant railroad trackage and the relay of 1,714 lineal feet of rail required 7,269 man-hours.

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

	MC 3	MC 5
Stock at Start of Month	56.61	23,89
Received During Month*	7.03	0
Used During Month	0	0
Stock at End of Month	63.64	23.89

* Received during January

The following tabulation indicates the volume of mineral aggregate and pre-mix material handled in February 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	408	696	1,775	1,038	740
Made During Month	0	0	380	0	3,215
Used During Month	0	28	37	0	25
Stock at End of Month	408	668	2,118	1,038	3,930

ENGINEERING DEPARTMENT

FEBRUARY 1955

PILE TECHNOLOGY SECTION

A weight estimate of the uranium delivered to Radiometallurgy from Tube 4669-KW accounted for all but about six pounds of the metal. Included were several pounds of metal removed from locations outside the graphite stringer 4669 in the form of 1/8-inch thick plates which had been cast on the side of the tube blocks. One such fragment, estimated to weigh seven pounds, ignited during handling in the cell and burned completely. The material which burned was an alloy consisting of uranium and aluminum which had flowed through the 1/2-inch diameter weep-holes that existed in the tube blocks.

A uranium-plutonium alloy fuel slug was cast to determine if the as-cast surface finish and dimensional tolerance would meet the requirements for fuel elements for the Physical Constants Test Reactor. The as-cast surface finish and dimensional tolerances were acceptable, but further calculations are being made to determine if the 17-mil taper required on the magnesia casting mold is acceptable.

Production test fuel elements canned by hot pressing nickel-plated cores (solid and cored) in aluminum cans failed during the month. Solid cores failed at 550 to 625 MWD/T and cored elements failed at 700 MWD/T.

The program for high alpha phase extrusion was rescoped to a production of about 5 tons/Mo. of cored elements. It was found that shaping the butt ends of the extrusion billets will reduce the hole eccentricity experienced in prior production. A comparison of the physical properties of extruded and drilled hollow slugs has disclosed more uniform values in the extruded material of tensile strengths, elongation and reduction in area between samples removed from the inner and outer wall of each type of material.

In calculating temperature coefficients of piles, it is essential to know how ν, the number of neutrons emitted per fission changes with neutron energy (or temperature). Preliminary results of an experiment had shown that ν increased by about 3.5% when the neutron energy increased from 0.1 to 0.3 electron volts. This experiment has now been completed with measurements of ν at nine values of the energy in the range from thermal energy (0.025 electron volts) to 0.40 electron volts. The value of ν is constant in this range to within an experimental precision of 1%.

The D Pile, operating with increased helium concentrations, operated without incident during the month.

A production test was approved to operate the C Pile at graphite temperatures of 600 C over a five month's period probably beginning in March.

Increased attention was given to process tube measurements at the F Pile during the extended rod outage. As predicted tube curvatures are increasing and an analysis is being made to predict future trends and formulate remedial action.

Tests conducted at the 105-D Flow Laboratory and in the 105-F Pile have shown significant reductions in aluminum corrosion rates as pH is reduced from the normal range 7.5 - 7.8 down to 7.2 - 7.4. Further reduction in corrosion rates occurred in tests at 7.0, 6.6, and 6.2, with the lower pH's being especially effective at higher temperatures, between 120 and 150 C. A problem of steel corrosion exists as pH is reduced; test results to date indicate the rate of attack is not serious above pH 6.6. A compilation of all available information is being made to provide the basis for a change in process water quality specifications.

Analysis of the K Pile safety control system was completed, with the following action indicated:

1. Order boron-steel balls to replace the steel balls now in use.

2. Use the available spare boron-steel balls in discreet columns near the fringe enrichment ring to obtain optimum utilization.

The sub-critical pile neutron multiplication monitor has been demonstrated to be sufficiently well developed to warrant immediate installation on all piles.

Unexpected results were obtained from the first charge of an internally-externally cooled slug in the C Pile. The measured temperature change of the water flowing through the hole was considerably higher than expected and considerably higher than the temperature in the annulus. The reasons for this are presently unknown but further laboratory and in-pile investigations are planned.

SEPARATIONS TECHNOLOGY SECTION

Following the repair, replacement, and cleanout of equipment in the Redox Plant during January, operations were resumed on February 3 with 200 MWD/T fuel. Good process performance was achieved with three operating cycles, permanganate head end, and one-stage back-cycling. Process tests indicated that use of dichromate head end would have produced off-standard products. Sustained rates up to 9.5 t/d were demonstrated. Ruthenium emissions from the stack have been consistently below 0.1 curie per day. Series operation in the Metal Recovery Plant produced good decontamination for metal aged 31 to 84 months.

Further studies in the continuous calciner have demonstrated the feasibility of preparing UO_3 powder with reactivities in the range of 1.0 to 1.2 by the addition of sulfate ion.

Experimentally, nitrogen dioxide gas has been shown to be an effective substitute for nitrite salts in suppressing ruthenium volatilization in Purex nitric acid recovery.

DESIGN SECTION

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

	Fraction of Total Effort
Design Development Programs	27%
1952 Hanford Expansion Program	15
Reactor Plant Modification for Increased Production	17
4X Program	15
1706-KER Recirculation Facilities	4
Other Projects and Design Orders	22

Total design for Project CG-558 Reactor Plant Modification for Increased Production advanced to 63.5% complete. Scope design is complete and detailed design 57% complete. Major design effort for the month included acceleration of design for the 190-D Annex based on the decision to include the 190-B and 190-D Annex buildings in one lump sum construction contract. Design for the 190-B Annex was completed with the exception of "hold" items pending receipt of vendor information. A revised Project Proposal was prepared which reflects the project scope in accordance with the AEC project directive in addition to other approved scope changes.

Design of the 1706-KER Facility progressed to 92% complete, an advance of 6% during February. Detailed design is essentially complete with the exception of instrument drawings.

Design status on the 4X Program at month's end was as follows:

	Design Scope	Detailed Design
CG-559 - 4X Program - 100 Area	85%	65%
CG-603 - 4X Program - Bismuth Phosphate Plant	100	75
CG-613 - 4X Program - Metal Conversion Plant	85	7
CG-614 - 4X Program - 300 Area	95	14

Design for Project CG-600, 100-C Alterations is 72% complete, an advance of 6% during the month. An investigation was completed on the problem of 190 Building process pumps overheating under certain operating conditions, which may require revision to the present design scope for the project.

Tests being conducted with the mock-up facilities for the proposed Redox canyon ventilation system are continuing. Preliminary results indicate that air velocities required are not within practical ventilation capacity limits.

PROJECT SECTION

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

Project No.	Title	Completion Scheduled	Completion Actual
CG-496	Recuplex	96%	94%
CA-512	100-K Area Facilities		
	KW - Water Plant	100	99.9
	Reactor and Building	100	99.9
	KE - Water Plant	100	99.9
	Reactor and Building	100	99.9
	General Facilities	100	99.9
CA-513-A	Purex Facilities, Part "A"	98	97
CA-514	300 Area Expansion	63*	64*
CG-535	Redox Capacity Increase, Phase II	97	96
CG-539	Additional Waste Storage Facilities - Redox	87**	87**
CA-546	Fuel Element Pilot Plant	51	51
CG-558	Reactor Plant Modifications	5	4
CA-603	Hanford 4X - Bismuth Phosphate Plants	6	6

* Revised schedule.
** Based upon resumption of construction according to changed design.

The workload for off site inspection remained about level. Inspection was completed on 111 orders, and 128 new orders requiring inspection were received, leaving the total at 410. The monetary value of completed orders was about $1,150,000, of new orders about $1,100,000, and of total orders now assigned to inspectors about $11,200,000.

Forces of the labor service contractor increased by more than 30% to a total of about 975. Plans were completed for Minor Construction to maintain and service construction buses, effective March 1, 1955.

Rehabilitation of 105-KW Reactor occupied Project Section personnel at intervals until February 14 when responsibility for it was returned to the Manufacturing Department. 105-KE Reactor was transferred to Manufacturing on February 8. Following discovery of the failure of vanstone flange gaskets, the decision was made to replace gaskets on both reactors. Minor Construction forces are changing gaskets on both faces of 105-KE, and Plant Forces are replacing gaskets on 105-KW. It was necessary to place an emergency order for connectors to replace those which were rejected during the regasketing work. General completion of construction items was continued throughout the area. Acceptance testing was completed for 100-KE Water

Plants except ATP-1436, the 150 Building heat exchanger, and ATP-1451, emergency electrical system. Both depend upon operation of the 105 Building. Structural work at 1706-KER included placing of concrete, conduit, and embedded items.

Purchase of the two spare Purex concentrators is still delayed. All major operational equipment has been delivered to 202-A Building, and installation was completed in the cells. This equipment is being tested and run-in. Fabrication of process jumpers was 97% complete, and electrical 100%, with installation 91% complete for process jumpers and 80% for electrical jumpers. The Head End Control Room was accepted with exceptions on February 15, as was Phase I (Cells "A" through "E," of 202-A). At Redox - Phase II, the 233-S Building was given final inspection on February 8, 1955, and declared ready-for-use.

ORGANIZATION & PERSONNEL

Total on Roll, February 1, 1955	1,444
Accessions	18
Separations	31
Total on Roll, February 28, 1955	1,431

A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

ENGINEERING ADMINISTRATION SECTION

FEBRUARY 1955

The approved 1955 membership list was returned by the Subscriptions Committee in Schenectady. The matter of reimbursement of expenditures for memberships is being taken up with the AEC, and it appears that an answer will be forthcoming about March 7. At that time the 1955 membership dues can be paid.

The weekends of February 12 and 19 were spent in bringing the offsite reports into IBM control.

Handling of the daily activity in offsite reports by machine began on Monday, February 14, and proceeded reasonably smoothly.

The only major key punching jobs which remain in the backlog still to be completed are (1) the receipts for documents sent to the Schenectady Yellow File during a six months period; (2) incoming receipts for offsite reports added to the collection during the period June to October, 1954.

File copies of HAPO reports are now being prepared on translucent paper in the 300 Area, destroying the reproduction masters immediately. This procedure has greatly reduced the work in the 300 Area Files. This practice will be extended to the 100, 200, and 700 Areas shortly.

During the month the following major contract activities were handled:

1. Word was received from the University of California at Los Angeles that title to the seam welder, which was the subject of Special Agreement No. G-49, is vested in the U. S. Government, Department of Health, Education and Welfare, not the University. Appropriate steps are being taken to have accountability of the seam welder transferred to the Commission for subsequent delivery to General Electric.

2. Special Agreement No. G-50 between General Electric and General Telephone Directory Company at Long Beach, California, covering the printing of the Hanford Works Official Telephone Directory has been executed by the Contractor.

3. Special Agreement No. G-56 between General Electric and Everett A. Wheeler and Hugh H. Russell covering the appraisal of certain commercial and non-commercial properties in Richland was executed by General Electric February 2 and approved by the Commission February 23. The agreement was forwarded to the appraiser for execution February 25, 1955.

4. Special Agreement No. G-58 between General Electric and Stromberg-Carlson Company providing for instruction of General Electric telephone maintenance technicians was approved by the Commission and

sent to the Contractor for signature February 28.

5. Modification No. 2 to Consultant Agreement No. 110 between General Electric and Raymond E. Zirkle providing for extension of time of the contract was sent to AEC February 17.

6. Modification No. 1 to Special Agreement No. G-26 between General Electric and General Telephone Director Company providing for a change in the number of directories to be furnished to General Electric was sent to the Commission for approval February 24, 1955.

R. J. SCHIER, MANAGER
ENGINEERING ADMINISTRATION SECTION

[redacted]

PILE TECHNOLOGY SECTION

MONTHLY REPORT

February, 1955

VISITORS & TRIPS

N. E. Berry and W. M. Leaders from Mallinckrodt Chemical, St. Louis, visited HAPO, February 23-24, to consult on uranium fuel element technology.

W. M. Cashin and A. N. Holden from KAPL visited HAPO on February 28 regarding Hanford assistance program.

D. H. Cornell and T. G. Glasson from KAPL visited HAPO, February 17-18, to discuss KAPL-120 modification.

P. C. Daly from Westinghouse, Pittsburgh, visited HAPO, February 14-16, regarding the proposed Westinghouse loop.

A. Herrick from J. E. Hazeltin Company, Portland, and H. Long from General Electric, Seattle, spent February 4 at HAPO consulting on welding applications.

D. J. Holtslag from ANP, Evendale, spent February 7-18 at HAPO giving assistance on heat transfer calculations.

Messrs. Kratzer and Myron from Washington AEC Division of Production visited HAPO on February 1 for a discussion of isotopic composition limits for uranium metal.

P. Louewenstein and T. T. Magel from Nuclear Metals Inc., New York, spent February 8-9 at HAPO discussing zirconium fabrication.

R. H. Simon from KAPL spent February 28 and March 1 at HAPO consulting on reactor core instrumentation.

Joseph Singer from Bridgeport Brass Company, Bridgeport, Conn. visited HAPO, February 15-16, to discuss effects of various fabrication processes on crystallographic orientation of uranium.

K. R. Street, UCRL, Livermore, Calif. spent February 2 at HAPO regarding HAPO assistance on the Whitney Project.

Dr. P. L. Walker, Jr., Pennsylvania State University, State College, Pa. visited HAPO, February 10-12, for discussions on graphite oxidation studies.

[redacted] DECLASSIFIED

Fb-1

Pile Technology Section

J. M. Atwood attended the Planning Committee for AEC Corrosion Symposium at ANL, February 3-4.

L. P. Bupp spent February 1-4 at Oregon State College, Corvallis, and University of Washington, Seattle, recruiting technical personnel.

L. A. Hartcorn attended the Metallography Working Committee meeting at National Lead Company, Fernald, Ohio, February 23-24.

H. A. Johnson visited the National Lead Company, Fernald, Ohio, and Mallinckrodt Chemical, St. Louis, to discuss feed materials, February 21-26.

D. C. Kaulitz visited National Research Corporation, Boston, Mass. February 24-27, to discuss induction heating unit and tensile vacuum equipment; also, visited Hartford Instrument Company, Hartford, Conn. on February 28 to discuss neutron spectrometer.

M. Lewis spent February 28 at the University of California, Berkeley, recruiting technical personnel.

W. J. Morris visited Huntington Rubber Company, Portland, to discuss fabrication of special seals, February 9-10.

R. S. Paul spent February 5 at Radiation Counter Laboratory, Chicago, consulting on spectrometers, and attending a reactor instrumentation meeting at Chalk River Atomic Energy Installation, February 7-10.

J. W. Riches spent February 11-18 at Bridgeport Brass, Adrian, Michigan, and Nuclear Metals, Inc., Boston, Mass. consulting on metallurgy of uranium.

Pile Technology Section

ORGANIZATION & PERSONNEL

Personnel totals are as follow:

	January 31	February 28
Administrative	2	2
Pile Engineering	94	94
Pile Materials	59	58
Fuel Technology	109	108
Physics Research	36	38
Metallurgy Research	69	69
Contact Engineering	4	4
Total	373	373

Pile Engineering: K. J. Bell, Engineer I, reported for work on February 23; A. R. Jaqua, Tech Grad, permanently assigned on February 28; L. W. Morris, Steno-Typist, and M. D. Masters, General Clerk A, terminated on February 11.

Pile Materials: M. C. Caton, Secretary C, transferred to Design Section on February 21.

Fuel Technology: J. M. Zama, Secretary B, terminated on February 25.

Physics Research: J. B. Czirr, Engineer II, transferred from the Reactor Section on February 1 and W. Ketzlach, Engineer II, transferred from Separations Technology Section on February 1.

PILE ENGINEERING SUB-SECTION

PROCESS TECHNOLOGY

Power Level Limitations

The operating limit at DR Pile during February, 1955 was a 95 C outlet temperature, at C, F, and H Piles 100 C outlet temperature, and at B Pile 105 C outlet temperature. D Pile was limited by trip-before-instability limits.

Process Specification Changes

The following Process Specification changes have been approved:

22.02 Pre-oiling of tubes before discharging is no longer required because the present high corrosion rates make this an unnecessary refinement toward reducing tube rib wear.

22.03 Several values of yield strength have been changed to conform with values determined in recent tests by Fuel Technology.

22.04 Cocking of light metal slugs has required the seating to the rear of columns of light metal (other than uranium pieces).

22.04b The requirement for inclusion of special slug yield strength in Production Tests has been eliminated since the requirements for the formulation of Production Tests is not believed to be within the proper scope of Process Specifications.

22.05 Requirements for the operation of the poison column control system at K Reactors has been added.

22.06 A new requirement for the installation of an automatic interlock for the front elevator for all reactors has been approved. A photo cell type interlock installed at B Pile has been found suitable for preventing accidents which will cause tube "burnout". The effective date of this requirement has been delayed to allow time for procurement.

Replacement of C Columns with Enriched Uranium

A study of the use of enriched uranium as a substitute for the U-235 aluminum alloy used for spike enrichment indicates that a saving of as much as $5,000 per C column replaced can be realized. A rough draft of this analysis is currently being circulated for comments.

K Pile Pigtails and Gaskets

The nozzle gaskets originally installed on K Piles have required replacement because their softness resulted in their being slightly extruded inward when pressure was applied. This resulted in obstructing the tube inlet and outlet.

Pile Engineering Sub-Section

The performance of the aluminum pigtails on the K Piles leaves much to be desired. With normal maintenance practices the flared ends are frequently straightened on installation making them liable to failure during operation with a distinct possibility of complete loss of water supply to the tube. With inspection nearly completed at KW Pile, 20 per cent of the rear face and 15.5 per cent of the front face pigtails have been rejected.

Ruptured Slugs

Five normal uranium slug failures occurred during the month. A side failure and a uranium cleavage failure of Group 11 Metal slugs occurred at B Pile. At D Pile there was a side failure of a smooth surfaced, triple dip canned piece. A side failure occurred in a smooth surfaced, triple dip canned piece at H Pile, and an unclassified failure of a smooth-surfaced, slug transformed, lead-dip canned piece occurred at C Pile. These failures, with the exception of the one at C Pile, occurred at exposures between 717 and 953 MWD/T.

Another C Pile tube was discharged for a rupture on the basis of high filtered sample readings. The metal has not yet been inspected. The fact that this metal had been under irradiation for only two days makes the presence of a bona-fide in-pile rupture very improbable. However, a piece may have been defective as charged or might have been damaged in charging.

One side failure of a J slug occurred at DR Pile during the month.

Three failures occurred in experimental fuels at C Pile. These pieces were scheduled for irradiation to failure in order to determine the rupture resistances of slugs produced by the processes being tested. The three pieces of metal involved were:

1. An unbonded piece with a nickel coat on the uranium. This piece was charged under PT 105-578-A and failed at an exposure of about 325 MWD/T.

2. One piece canned by the hot-press method, with a diffusion bond between the uranium and the aluminum jacket. This piece was charged under PT 105-577-A and failed at an exposure of 650 MWD/T.

3. One piece with the jacket mechanically keyed to the core. This piece was charged under PT 105-584-A and failed at an exposure of 300 MWD/T.

None of these rupture pieces have yet been inspected.

Failure Mechanism for Cold-Canned Slugs

Results of a study of the J slug failures at DR Pile have indicated that, in addition to the penetration of a weld or jacket defect there is another failure mechanism involved. The demonstrated presence of substantial quantities of free gases in these slugs indicates that there are sizable voids, or pockets, between the jacket and core. These voids might be inherent to the cold canning processes and might be extended by the buildup of internal pressures by gas diffusion from the core. Heat

generated under such a void must escape through the jacket at its foundaries, temperatures will be increased in these regions, and corrosion will proceed at an accelerated rate. Eventually this corrosion may result in a penetration of the jacket. Such a mechanism would explain the J slug failures in which the only apparent damage was a corroding or a "burning" of the jacket. It would also be applicable to cold-canned uranium slugs.

PT 105-539-E

Under this test 118 tubes of A lot metal, smooth surfaced, triple-dip canned slugs, and 140 tubes of B lot metal, smooth surfaced, rod transformed, lead dip canned slugs, were being irradiated at H Pile until three failures occurred in each group, so that comparative failure rates might be established. The third A lot failure occurred this month and the remaining tubes of A lot metal were discharged. An analysis of the performance of this metal indicates that its failure rate is one-third to one-half that of the Group 11 metal. Since only one failure has occurred in the B lot metal, a firm failure rate cannot be established. However, experience to date shows that its performance is at least comparable with, and probably somewhat superior to that of the A lot metal.

Cored Slugs - PT 105-570-A - Irradiation of New Fuel Slugs

This production test authorizes the irradiation to failure of 4 tubes of cored-uranium lead-dip slugs and 4 tubes of standard control slugs in both high and low power tubes. The 4 tubes charged at C Pile have operated for seven months (880 - 1,000 MWD/T) without incident. The 4 tubes charged in F Pile September 14 have reached 620 - 720 MWD/T without incident.

Mechanically Bonded Slugs - Point Pressure Closure - PT 105-575-A

Two tubes each containing two four-inch, mechanically bonded, point-pressure-welded slugs centered with normal uranium pieces were charged in D Pile. One tube was discharged after an exposure of 271 MWD/T and an examination revealed no evidence of diffusion or interaction between can and core. The remaining tube was discharged after 577 MWD/T exposure but a post-irradiation examination has not been completed.

Powder Metallurgy Slugs - PT 105-576-A

This test authorizes the irradiation of 5 control tubes at C Pile, 10 control tubes at F Pile and about 40 supplementary tubes at F Pile. Two ruptures will be incurred in C Pile. All slugs at F Pile will be discharged at normal goal exposures of 675 - 775 MWD/T. The C Pile tubes have operated without incident for 5 months and have reached exposures of 650 - 675 MWD/T. Those loaded at F Pile have operated for 4 months without incident. One tube was discharged after 180 MWD/T and a preliminary inspection reveals no abnormalities. A second tube was discharged after 369 MWD/T but no inspection has yet been made. A third tube was discharged after 584 MWD/T irradiation.

Unbonded Slugs - PT 105-578-A

This test authorizes the irradiation to failure of "C" process - canned solid and cored uranium slugs, and of nickel-plated "C" process - canned solid uranium slugs.

Pile Engineering Sub-Section

A total of 16 tubes were charged, 5 to go to rupture. One rupture of a cored slug occurred after an exposure of 206 MWD/T and one rupture of a solid slug occurred after an exposure of 161 MWD/T. All cored slugs (4 tubes) were discharged when the rupture occurred. A second rupture of the solid slugs occurred on 1-31-55 after an exposure of 221 MWD/T. All solid slugs were then discharged. A nickel-plated slug ruptured on 2-25 after an exposure of 326 MWD/T and all nickel-plated slugs were discharged at this time.

Hot Press Canned Slugs - PT 105-577-A

This production test authorizes the irradiation of solid slugs with fusion and diffusion welds, cored slugs with fusion welds, and control slugs. Fifteen tubes were charged and four of these will be irradiated to rupture. One solid slug with diffusion weld failed after 556 MWD/T and one solid slug with fusion weld failed after 603 MWD/T exposure. A cored slug ruptured on 2-27 after an exposure of 686 MWD/T and the three tubes of cored slugs were then discharged.. Exposure of control slugs is 750 - 800 MWD/T.

Unbonded Slugs - Point Pressure Closure - PT 105-580-A

A total of 8 four-inch pieces, spaced with normal slugs, were charged in three tubes during September and are to be irradiated to 200, 400 and 675 MWD/T for metallurgical examinations. A fourth tube, containing four unbonded, cored, enriched slugs centered in 18 unbonded cored pieces and solid aluminum dummies, was charged on January 19 and will be irradiated to rupture. Post-irradiation examination of the tube irradiated to 200 MWD/T showed the slugs to be in good condition. A second tube was discharged at 352 MWD/T.

Development Tests 105-583-A, 105-581-A and 105-592-A, Irradiation of IQS-7,8, and 9 Metal

The metal under these tests came from rods which were rolled from ingots which differed slightly from the ingots from which standard production metal rods are rolled. Pre- and post-irradiation measurements will be obtained. No ruptures are anticipated. Present exposure levels are about 360 - 400 MWD/T.

Production Quantities of Cored Slugs - PT 105-591-A

This test authorizes the charging and irradiation of production quantities of cored slugs (both extruded and drilled) until 100 and 300 Area process specifications have been issued. The first cored rods arrived in October. Loading will be in the near future.

Unbonded and Mechanically Bonded Point-Closure Slugs - PT 105-584-A

This test authorizes the irradiation of three tubes each of standard lead-dip slugs, unbonded point-pressure-closure, and mechanically bonded point-pressure closure slugs. The slugs are loaded at C Pile and are scheduled to go to one rupture for each type. A rupture of one of the mechanically bonded slugs occurred on 2-27-55 at an exposure of 301 MWD/T and all this type of slug were then discharged.

Pile Engineering Sub-Section

Extruded Cored Slugs - Evaluate Process Development - PT 105-598-A

This test authorizes charging three control tubes for metallurgical examination from each month's supply of cored slugs received at HAPO during the development period of cored slug production. One tube of extruded cored slugs, already available, was charged Nov.5. Equal numbers of drilled cored slugs, when available, will be charged in the same tube. Exposure will be limited to 900 MWD/T and no slug failures are expected.

Extruded Cored Slugs - Evaluate Performance by Irradiation to Rupture - PT 105-590-A

This test authorizes four tubes of extruded cored slugs and four tubes of standard production metal to be charged in C Pile to be irradiated until two ruptures occur in each type metal. (The four tubes of standard production metal will probably be dropped from the test to spare two ruptures.)

Uranium Silicon Alloy - PT 105-586-A

This test authorizes the irradiation of silicon alloy solid slugs from ingots (1 tube) and from Dingots (4 tubes), and silicon alloy cored slugs (3 tubes). The four tubes from Dingot stock will be irradiated to two ruptures. Standard production metal (4 tubes - 2 ruptures) will serve as control. The cored slugs will be irradiated to 900 MWD/T. One tube of preliminary metal was charged into B Pile on December 6 and will be irradiated to 900 MWD/T.

Internally and Externally Cooled Slugs - PT 105-587-A

This test authorized irradiation of 7 tubes of I and E slugs in C Pile. All tubes were discharged on 2-8-55 after an exposure of about 135 MWD/T because of high temperature of the water flowing through the core. It is intended to resume this test using a larger diameter core.

Manufacture of Other Products

Preliminary Irradiation of J-Q Columns - PT 105-567-A: The irradiation of the block loading of J-Q slugs in H Pile has proceeded without incident. Three tubes have been discharged, two of which have been shipped to ORNL for special separations. Because of AEC and duPont interest in high exposure thorium the target exposure of the remaining columns has been extended to 175 - 200 MWD/tube. Upon completion of this test the resulting separations data will provide four points for a curve of product yield vs. exposure in the 50 - 200 MWD/tube range.

Quantity Irradiation of J-Q Columns - PT 105-579-A: This test as originally planned has been revised and the revised details are covered in HW-33170. C Pile has 156 tubes and H Pile 106 tubes of J-Q slugs. Goal exposure is 200 MWD/tube. Eighteen tubes in H Pile will be exposed until 2 ruptures occur. To date 162 J-Q columns containing about 5.4 tons of irradiated thorium and 4.3 kg of U-233 have been discharged. No ruptures have occurred during the past month. No graphite heating problems have been encountered. A recent revision of this PT will result in the production of more U-233 than was originally planned.

Pile Engineering Sub-Section

PILE PHYSICS

K Pile Safety Control Capacity

Extrapolation of the full pile control system measurements at the KW Pile to the full system indicate a capacity of approximately 1400 inhours for the 51-channel steel ball 3X system, and an independent check by P.F. Gast using single-rod test data as the basis for performing theoretical calculations predicts a slightly greater strength of approximately 1500 inhours; both of these values are considerably lower then expected. More control capacity is desirable, particularly in enriching the K Piles as required in order to attain goal power levels. A study showing the status of the K Pile safety control capacity relative to reactivity and enrichment demands and the increase in control capacity which may be expected as a result of replacing the steel balls in the Ball 3X system with boron-steel balls will be completed and published shortly; an independent calculation by P.F. Gast indicates that this replacement would increase the control effectiveness of the Ball 3X system in an unflattened-unenriched pile about 60 per cent. A formal request will be made shortly requesting the procurement of these boron-steel balls; funds for such replacement had been left in the project budget until startup test data would become available upon which to base a final decision.

Calculations of the control of the enriched pile indicate that optimum utilization of the boron-steel balls presently on the plant as spares, sufficient for about 14 ball channels in each K Pile, may be made by maintaining them separate from steel balls and using them in channels near the fringe enrichment ring. Appropriate recommendations for use of the spare boron-steel balls have been forwarded to Manufacturing Department; specific tube power will not be limited by safety control considerations prior to the procurement of the full boron-steel supply, but the enrichment ring will be restricted during this period to its present location.

Although preparations for the KE Pile startup tests were completed earlier in the month, the above control capacity difficulties makes more exact information desirable, particularly in the case of the enriched pile. Thought is currently being given to designing tests for KE startup which could provide meaningful information upon which to base further enrichment control calculations.

K Ball 3X Channel Drain Valves

Recommendations were forwarded through the Process Technology Unit to include the channel drain valves in the #1 safety circuit so that it would not be possible to operate with the VSR's out if the ball channels were not prepared to retain the balls if they dropped. It was also recommended that procedures be designed to prevent opening more than one channel drain valve at a time during shutdown conditions; the latter is necessary to insure that the pile cannot gain reactivity at a rapid rate without having scrammable safety elements simultaneously available for every channel.

KW Startup Wet Temperature Coefficient Test

Results of an analysis of the data taken in the wet temperature coefficient test during the KW startup experimental program are given below. The pile was held

critical at a level of a few watts while undergoing heating by the hot water recirculation system from 12 C to about 85 C. The results given below have been corrected for front-to-back and side-to-side temperature variations. Lattice cell temperature distributions during the test were essentially flat; this must be kept in mind in attempting to apply the coefficients listed.

Uniform Temperature Metal Coefficient, C_M = -1.28 ih/°C (± 0.11)

Uniform Temperature Graphite Coefficient, C_G = +1.1 ih/°C (uncertainty range not yet established)

Because the overall temperature effect was very nearly zero and because heating and chilling steps did not occur as rapidly as would be hoped, it was rather difficult to separate the two effects finely. A document outlining the test and showing the calculations and results will be prepared.

Proposed Operational Graphite Coefficient Test

The rough draft of the production test to measure the graphite coefficient in the KE Pile has been circulated for comment among the appropriate Manufacturing and Technical personnel. The final draft will be ready for signature circulation after some minor wording changes and the addition of a section on instrumentation.

Product Yield and Quality Studies - PT 105-598-A

The above production test which is circulating for signatures calls for 12 columns of high exposure material irradiated under the corrosion studies PT 105-539-E to be set aside for shipment to the hot semi-works plant. Production Scheduling will supply exposure data, and Separations Technology personnel will supervise the product separation and quality measurements.

U-235 Depletion Calculations

Document HW-35508, "U-235 Depletion Factors for J Slugs and C Slugs" was prepared for publication as a basis for plant accountability. A breakdown of the apparent heat of fission into all of the contributing pile reactions was made. Using a value of 200 Mev. per fission as determined from natural uranium accounting in the Hanford lattice, a value of 1.28 gm. U-235 depletion per MWD produced in "C" columns was obtained, whereas a value of 1.25 gm. U-235 depletion per MWD produced within the J-N portion of a J-N column was calculated. The previously applied values were 1.21 gm. U-235/MWD in J-N charges and 1.25 gm. U-235/MWD in "C" material. Recent Arco separations results indicate a burnout in Hanford J slugs irradiated in the 11-pair per column DR loading of about 11 per cent greater than Hanford shipping weights indicated; a part of this discrepancy can be assigned to an uncertainty in the division of heat between natural uranium and the J-N portions of the column. An extension of these calculations will be made to develop corresponding depletion factors for J-Q columns in which the U-233 fissions may cause a significant effect at high column exposures.

Pile Engineering Sub-Section

Thorium Irradiations - PT 105-567-A "Preliminary Irradiation of J-Q Columns"

Results from the first shipment from this production test have been received from Oak Ridge in HAN-57654-1, "23 Extraction Data for Hanford". The yield data from this single column has since been analyzed to yield the preliminary conversion information at 50 MWD per column exposure given below. Previous Hanford predictions are shown for comparison; the Hanford values still appear valid for estimating purposes.

	ORNL Values	Comparable Hanford Predictions
Gm 23/Col MWD	0.7064 at 50 MWD/col	0.64 at 100 MWD/col (HW-30854, R.O. Gumprecht)
Atoms 23/Atoms 25 depl.	0.5845 "	0.61 cold at 0 MWD/col (SRD - R.L. Dickeman to O.H. Greager)
Gm 23/ton Th/MWD/AT of U 2.23	"	2.02 for flattening cols. (HW-26729 - A. W. Halliday)

Results from a second column exposure irradiated to approximately 74 MWD should be received soon. A third column of material with an exposure of about 120 MWD per column will be shipped from Hanford shortly.

A detailed study of isotopic buildup in thorium as a function of exposure is again underway. It is intended that the document resulting from this study in which the latest half-life, cross section, and yield information are being utilized will replace HW-26729.

Depletion of Reactivity and Heat Output with "C" Column Exposure

Calculations performed on a slug-by-slug basis show a greater difference in reactivity drop-off with U-235 depletion relative to that expected in "C" columns on the basis of averaging the burnout over the length of the column. An approximate method expected to be correct to within 10 per cent has been developed for predicting the reactivity effects of enrichment additions or deletions as functions of exposure and of existing and expected local reactivity weightings. A report outlining the method will be issued as soon as the material can be suitably arranged.

An additional study was made on the heat generation of "C" columns relative to surrounding columns as a function of "C" metal exposure. The expected heat generation rate drops off nearly linearly to about 20 per cent less at an exposure of 200 MWD per column.

Shield Deterioration Studies

An approximate analysis of the operating history of the various pile shields has been made to ascertain their present masonite condition and shielding effectiveness. The calculated radiation figures given below represent the biological dose due to neutrons and gamma rays penetrating the central point of an imperforate shield face as of the end of 1954.

Pile	% Wt. Loss of Masonite	Radiation Leakage at 1000 MW	Leakage Rate Doubling Time
B, D, F,	8 - 9	9 m rem/hr	1 1/2 yrs. (at 1000 MW)
DR	6	7 "	1 yr. (at 1000 MW)
H (5th LU enriched)	12	13 "	1 yr. (at 1000 MW)
C (Biol. Shield Cooled)	1	3 "	10 yrs. (at 1500 MW)

A report is being prepared covering this study and discussing implications at higher power levels.

Samples of masonite large enough to permit compression and density determinations were obtained from the inner cycle of masonite at H Pile during the D hole test facility removal on 2-26-55.

Shield Attenuation Reports

An unclassified report, HW-33122, "Two Techniques for Fast Neutron Detection Using the S^{32} (n,p) P^{32} Reaction" was issued during the month as a formal document.

Work is continuing on final reports covering the concrete attenuation measurements made in the DR test wells and the iron-masonite facility calibration measurements made in the 36" Shield Plug Facility at the C Pile.

Shielding Instrumentation

A Hurst type fast neutron dosimeter is being fabricated by the 300 Area Instrument Shop in accordance with prints furnished by ORNL. The use of a polyethylene liner and ethylene gas in this chamber is intended to approximate tissue-equivalent dosage. The chamber is intended to operate in the proportional counting region; the circuitry initially contemplated would consist of a linear amplifier, a pulse height analyzer, and a count rate recorder.

HEAT TRANSFER

Cooling-by-Boiling Studies

A test was performed with the 1500 psi system at 500 psi. The tube power was 600 kw and a 0.250" annulus was used. Although precise data could not be obtained for the reasons indicated in the following paragraph, it was determined that the burnout quality was in excess of 25 per cent. In addition, it was concluded that the burnout quality in a 0.250" annulus is not radically different from that in a 0.100" annulus.

Tests at 1500 psi have been attempted, but no results have been obtained yet. Positive displacement pumps are being used for these tests since they are the only ones available which will withstand the pressure. Such pumps necessitate the use of accumulators to dampen pressure and flow fluctuations. Although accumulators supplied by the pump manufacturer are being used, excessive flow fluctuations have been encountered and these have prevented accumulation of data. There are various methods to alleviate this difficulty and these methods are being pursued.

Pile Engineering Sub-Section

Continued study is being given to determine a method for correlating burnout. It appears that past data can be correlated reasonably well by plotting quality versus mass flow rate with power, pressure and inlet temperature held constant. This study is being continued.

Equipment Procurement and Installation

Preparations for installation of the equipment necessary to modify the mock-up to withstand pressures of over 2000 psi are continuing. This work is being performed by Minor Construction forces.

A workable combination of a heater tube and a process tube capable of withstanding 1500 psi has been developed. The process tube consists of a 1-1/2", schedule 40, stainless steel tube mounted inside a 2" tube. Insulating pins are inserted through the walls of the inner tube to support the heater tube, and the outer tube prevents leakage from the annulus past the pins and out of the system. The heater tube consists of a thin-walled aluminum tube drawn on to an insulated core. The core is necessary to prevent collapse of the heater tube at high pressures. Other workable combinations probably exist, but the one described above is the only one that has actually been tested.

K Pile Instability Limits

Tests were performed to determine the effect of misalignment of the K Pile temperature monitor element on tube flow rate and instability limit. It was found the rate and limit were relatively unaffected when the element profile was changed from being parallel to the flow to being perpendicular. The effect of reinforcing wires on the element was also found to be small.

Instability Limits for Short Charges

The temperature at which unstable flow is established in a tube is a function of several factors including tube pressure drop. Consequently, the instability temperature will change if less than the standard number of slugs is charged in a tube. In order to provide flexibility in loading, limits were calculated for short charges and these will be incorporated in Specifications.

Dependability of Panellit Gages

Surveys were made which showed (a) an average of three Panellit scrams per pile resulted in calendar year 1954 from abnormal flow rates and (b) at C Pile an average of nine Panellit gages with non-fail safe, inoperable trips may have been installed at any one time during the past six months. More than three scrams occurred per pile per year but it is believed that the others were due to causes other than abnormal flow. One result of these data is that a recommendation has been made that two Panellit gages be used on any tube where abnormal flow is expected. For example, two gages should be used on any tube where slug rupture is deliberately sought. On such tubes the probability of pile damage is much higher than for a normal tube, and the use of two gages will bring the probability back down to a reasonable value.

Pile Engineering Sub-Section

Raising Outlet Water Temperatures

Studies are being made of the problems involved in raising the bulk outlet temperature to about 100 C. Some of the problems involve the tube instability limit, the tube and slug corrosion limit, the graphite limit, the strength of the effluent piping, tube expansion and sticking gum barrels and leakage around the van stone flanges. However, many different people are working on these problems and it is believed that the outlet temperature for at least one pile can be raised in two or three months.

I and E Slugs

Measurements were made of the Δt across the hole and the annulus for an internally-externally cooled slug charge in C Pile. It was found that the Δt across the hole

Pile Engineering Sub-Section

Heat Output After Shutdown

HW-33876, "Heat Generation and Total Heat Output from the Pile after Shutdown," S. S. Jones, was issued. Its purpose was to disseminate the results of experimental heat output measurements which have been made in the past. The data are valuable in sizing water plants, in establishing cooling specifications for shutdown conditions and in evaluating the effects of emergency loss of cooling.

PHYSICS DEVELOPMENT

Prototype Physical Constants Test Reactor

The construction of the prototype Physical Constants Test Reactor in Building 305-B progressed during the month. The graphite and vertical safety rod systems were moved from 189-D to the 300 Area. The rails upon which one face of the reactor moves have been placed and the graphite will be stacked early next month. The details of control room layout, electrical and instrument wiring and conduit runs have been developed and this phase of the installation should also be completed next month. About six weeks will be required to complete the fabrication of the moveable face and flux leveling devices; however, performance tests on other mechanical and instrument components will proceed.

The castings have been prepared at Oak Ridge from which the Al-U-235 fuel elements for the control rods and flux leveling systems are being extended. Carbide and Chemicals personnel give a firm March 15 completion date for these elements. Impact extrusion techniques are being developed by Metals and Controls Corporation personnel to fabricate the lead-U-235 matrix elements. The techniques have not yet been demonstrated and no firm delivery data have been established.

Slug Rupture Detection

The prototype gamma spectrometer slug rupture detection continues to operate satisfactorily at H Pile. One of the turret assemblies provided for projects CG-578 and 579 - the project replacing the beta systems with the gamma monitor - is installed and operating very satisfactorily.

Radiation Counter Laboratory was visited to ascertain the extent of progress in providing the gamma spectrometer units for the above projects. In our opinion, progress is unsatisfactory and RCL is not sincerely striving to provide an excellent product; this condition has been discussed with Design and Projects Section personnel. The initial unit is due on site March 5 with four more due April 5.

Delayed neutron detection systems for slug rupture detection in the KE Pile recirculation loops have been designed using existing commercial instrumentation where possible. It is expected that the performance of these systems will have been tested in the KAPL-120 loop which will be monitored with a similar delayed neutron detection system. The pronounced buildup of background radiations in recirculating coolant systems, especially Na^{24}, is the basis for using neutrons for slug rupture detection in this application. Document HW-34875, "Slug Rupture Detection Problems in the Design of Pressurized Recirculating Cooling Systems," R. S. Paul, was issued.

The slug rupture detection problems in recirculating systems were discussed in a meeting at Chalk River by duPont and Canadian personnel. Work these groups have been doing in this field is discussed in document HW-35491, "Trip Report - Chalk River Meeting on Rupture Detection and General Instrumentation," R.S. Paul.

The performance of ion exchange resins in a slug rupture detection application is being determined; some recent work by Reactor Section personnel indicates that such resins may be promising under some conditions in a single pass coolant system. The program underway has the three-fold objective of determining (1) resin performance under rupture conditions by installing a few systems on the piles, (2) if the use of ion exchange resins in the gamma monitor will further improve its performance, and (3) the basic parameters contributing to the satisfactory concentration of fission products under various operating conditions. Of particular importance is the rate at which impurities and fission products are concentrated in the resin as a function of the respective concentrations in the effluent.

Reactor Safety - Nuclear Instrumentation

The sub-critical pile neutron multiplication detector at DR Pile has continued to operate reliably during pile startups. This system employs a U-235 fission chamber with standard electronic components to monitor low neutron levels in the presence of intense gamma fields.

Adequate response to neutrons is observed in the 0.02 to 0.04 watt range, i.e., the sub-critical pile power generated by direct fission with the control and safety rods inserted. The neutron flux is increased about a factor of one hundred at critical and then rises at a rate determined by the excess reactivity of the pile. Repositioning of the instrument permits the pile power to be followed on this system to about one megawatt, i.e., until well after the Beckman amplifiers have become active. Thus the actual neutron level is observed continuously under all reactor conditions which will contribute substantially to safety of operations.

The system can now be specified in detail and efforts are underway to effect early on-pile installations at all piles. The low level period trip function will be combined with the sub-critical monitor functions to yield a dual purpose system in one installation. It has been recommended that the installation at KE and KW be performed with project CA-512-R monies; the installation at the remaining piles will be with miscellaneous projects funds.

Reactor Safety - Temperature Sensing Instrumentation

Twelve point prototype of the K Pile outlet water temperature monitoring system was placed in operating condition at H Pile. The resistance thermometers will be moved to a one-in-twenty-five tube pattern on the near side to ascertain the extent of protection afforded by a spot monitor system during severe shifts in pile power distribution.

A cooperative effort is underway with Design Section personnel to evaluate the capabilities of components now developed in industry in an attempt to specify an adequate temperature monitoring system without extensive development work on other than a temperature readout device. The objective of a "spot type" temperature

monitor is (1) to provide trip before flow instability protection in the event of power surges by having an outlet water temperature from each block of 25 tubes continuously in the safety system, and (2) to display an outlet water temperature from each block of tubes continuously to assist the pile operators in controlling both the magnitude and distribution of pile power. It is hoped that a basic system can be chosen and specified by the end of next month.

Lattice Neutron Economy

Slugs containing forty volume per cent E metal in a magnesium matrix (E metal is uranium with 1.75 per cent U-235) were tested relative to natural uranium in the Test pile in support of a 100 Area production test. The matrix slugs are six times as reactive as natural uranium in the standard slug test. The proposed loading of 4 inch matrix slugs in a 105 pile having 10 E matrix slugs and 12 normal U matrix slugs contributes approximately an inhour. The power generation in the enriched matrix elements will be slightly higher than in an equivalent length of normal uranium.

A study was made to evaluate the decreased annual production which would result if uranium with varying U-235 content were used at Hanford. The major cost results from uncertainties in the reactivity absorbed in control rods during or near equilibrium operation; departure from an optimum investment detracts from the ability to efficiently control power distributions and results in a lower total output for a fixed operating cost. The results are:

U-235 Content (Per Cent)	Annual Cost (Dollars)
0.7115 ± 0.001	--
0.7115 ± 0.003	120,000
0.7115 ± 0.005	300,000
0.7115 ± 0.008	600,000

The above are based on a 10,000 MW plant capacity and on operating cost of eight dollars per megawatt day. They are minimum values and do not include allowance for important accompanying effects such as poor data regarding the behavior of temperature coefficients, fission product poisoning, and long term gains under present operating conditions; these data are important in pile operation as well as in evaluating rather small present effects which may become of major importance as operating conditions, e.g., exposure, neutron temperature, are made more severe. The general conclusions are that substantial facilities are justified if required to insure a well controlled U-235 content in the uranium received at Hanford.

ANP Fuel Irradiation Experiment

Measurements made previously on a complicated fuel cartridge for the ANP Aircraft reactor were repeated in the Test pile to refine certain of the data which define the operating characteristics of an experimental assembly proposed for installation at C Pile. The results show that the proposed assembly will generate about 160 KW per foot when located at the center of C Pile with about nine per cent of this energy, or 14.5 kw per foot, escaping into the graphite. The assembly which was studied contained 360 grams of U-235 per foot of length.

Pile Engineering Sub-Section

Test Pile - Routine Tests

Currently all metal received from Fernald contains a portion of material from the gaseous diffusion plant; Mallinckrodt metal is virgin uranium. The Fernald material has been blended approximately one part cascade product to three parts virgin uranium. The specifications on the U-235 content of the cascade product have not yet been tightened beyond the 0.71 ± 0.02 per cent, but the TDS values obtained during February indicate that the U-235 content has been held within smaller tolerances. A summary of the billet egg test results is given below:

NUMBER OF LOTS FALLING IN TDS RANGES

TDS Range	Fernald	Mallinckrodt
5-10	7	0
11-15	16	20
16-20	3	2

Both canned and bare slug tests continue to show erratic behavior in Fernald material.

Test Pile - Special Tests

Three groups of eight inch uranium slugs, submitted by the Mallinckrodt Chemical Works, were measured for reactivity in the test pile. The groups consisted of five slugs each and were obtained from (1) regular production ingot M-1779, (2) contaminated ingot 946, and (3) dingot 3609. Thus the groups were considered representative of the average, worst, and best respectively, of the production type metal.

The results of the tests are summarized below. The values tabulated as dih refer to the reactivity changes which would be experienced in the test pile in the standard slug tests, i.e., eleven slugs tested relative to our standard slugs. The per cent absorption is defined as

$$\text{Per cent absorption} = \frac{(\text{cm}^2 \text{ of impurities})\ 100}{\text{cm}^2 \text{ of uranium plus cm}^2 \text{ of impurities}}$$

Here the data are normalized so as to arbitrarily assign the dingot zero absorption.

RELATIVE PURITY OF METAL SAMPLES

Group No.	Type Production	dih	Per cent Absorption
946	Contaminated Ingot	- 0.400	0.20
M-1779	Production Ingot	+ 0.012	0.016
3609	Dingot	+ 0.048	--

These tests indicate there is little practical difference between the production ingot and dingot material from a pile reactivity standpoint.

Pile Engineering Sub-Section

EQUIPMENT DEVELOPMENT

Charging and Discharging Studies

The rubber impregnated nylon spline for use on segmental discharge was tested during the month and found to be unsatisfactory. The metal strip running the length of the spline was found to be too soft and did not permit the spline to be inserted under the column of slugs. The metal spline fabricated by the Precision Tube Company was also tested and found inoperable. The softness of the material caused the spline to retain its inflated shape and become stuck in the tube. The third spline made of beryllium copper by the Superior Tube Company operated satisfactorily for seven discharges, each with increasingly higher flushing pressures. The spline finally failed at a flushing pressure of 400 psi. The special agreement under which this tube was fabricated contains provisions for its modification. The company has been contacted and will supply us with a spline of greater hardness.

The problem of cocked slugs at K Pile was considered during the month and different methods of determining the existence of cocking were developed. A visual examination method employing a small beam of light at one end of the tube provided a means of detecting cocked slugs with a high degree of accuracy. The system was employed on 600 tubes at KW Pile and results of the examination indicated very few cocked slugs.

Horizontal Rod Studies

The remainder of the revised seals for the rod replacement program were tested in the laboratory early this month and found to be very satisfactory. Very low leakage rates were measured, the maximum not exceeding 0.1 cubic feet per hour for 50 inches of water pressure.

The entire order of ribbed sphincter seals for the C Pile horizontal rods were received and tested early this month and found to be satisfactory.

Vertical Rod Studies

Test work was performed during the month to evaluate the effect on rod drop times of various system component failures. Particular attention was given the effect of plugging the air inlet and outlet ports. Several undesirable conditions were found to exist. System modification recommendations are being formulated which will insure safety of operation.

Supplementary Control

The electrically heated mock-up for experimentally determining heat transfer conditions from process tubes to graphite for a K Pile configuration was assembled in the 189-D Laboratory and preliminary test runs completed. The objective is the determination of the maximum heat energy which may be removed by cooling means external to the process tubes. This information will have particular application to the analysis of disaster control graphite wetting or flooding systems. Additional tests are contemplated.

Pile Engineering Sub-Section

The seals received from the Huntington Rubber Company for application on the poison spline supplemental control system were found to be fabricated of a material having high frictional resistance to sliding. This made it difficult to remove the splines and created some leakage. The company is now fabricating additional seals of the material originally used in our laboratory which we found to be satisfactory. Additional spline samples are being exposed to determine shielding requirements.

Additional discussions were held with Design Section personnel to assist in the preparation of cost estimates for the four disaster control systems recommended in document HW-33924.

Process Tube Assembly and Piping

The experimental double Venturi assembly planned for installation in the small boiling mock-up for the Heat Transfer Unit is ready for assembly in the shop. This device is the first one of a series being evaluated to provide instrumentation under boiling conditions. A special test program was conducted during the month for the evaluation of gasket material for nozzle-to-van stone application. The program was necessitated by the failure of the Felpro gasketing material originally installed at the K Piles. The various types of gaskets which have been in use at Hanford were evaluated and after some confusion as to proper nomenclature it was determined that the Johns-Manville 61-S gaskets were superior to the other types tested. A document outlining these tests in detail and discussing the results obtained is being prepared.

Additional attempts were made during the month to obtain some measurements of the vibration of the K Pile thermohm elements to assist in the stress analysis problem. All attempts to interpret the signal from the element were unsuccessful. It appears that the element when used as a strain gage is too insensitive and that the amplifier used does not have sufficient isolation shielding to be used with an oscilloscope.

The welded samples for procedure and performance qualification tests associated with the high pressure-temperature thermal loop were completed during the month. Several of the specimens have already been tested and have passed the A.S.M.E. code specifications.

The Stresscoat equipment is being installed in the 189-D Laboratory. A special fireproof booth has been obtained and an exhaust fan is being installed according to safety requirements. A mechanism for accurately deflecting pigtails after being coated with Stresscoat is being fabricated.

The shop work on the new flexible connector testing facility is now complete and the equipment is being installed in the laboratory.

Physical Constants Testing Reactor

All of the components for the Physical Constants Testing Reactor were transferred from the 189-D Building to the 305-B facility. Final lay-up and assembly of the reactor has started. At month's end, the rack and rails for the moveable face had been installed. The base for the moveable face and its drive mechanism have been completed and are being transferred to the building. Additional stress calculations were made on the flux leveling support rods to determine the affect of structural modifications made during fabrication.

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Other Engineering Development Work

The development of underwater equipment for irradiated process tube examination work is nearing completion. A report is being prepared discussing the equipment and its application. One new saw has been installed in the DR basin, and the slug rupture removal saw is in the process of fabrication.

The television equipment continued to operate satisfactorily at the 221-B Building where it has been installed to assist Minor Construction on some remote work at that facility. Some maintenance problems have arisen with the use of equipment but these are nothing more than should be expected with continuous operation.

Work was performed during the month on the evaluation of various high temperature cements for strain gages for use above 500 F. Several of the TransSonics and Sauerisen cements were evaluated. These gages will be used on the flange bolts for the design test of the high temperature-high pressure thermal loop.

SPECIAL IRRADIATIONS

It has been determined that Minor Construction forces will fabricate and install the modified loop for KAPL. Estimated costs for this phase of the loop modification is $140,000. This estimate is higher than originally planned upon and requires that we submit a new estimate for the overall modification. It has been determined that the removal of the in-pile tube of the old loop will not await the horizontal rod removal at H Pile but will be performed at an extended shutdown about the middle of March. Installation of the new facility is contingent upon the work load of Minor Construction forces and the delivery of components at HAPO. It is estimated that a delay in the delivery of piping for the loop has already set the completion date back one month to August.

Information has recently been received from GE-ANP to the effect that their facility is to be considered primarily for development work instead of for testing of production specimens. The size of the specimens has also been increased to the point where it will be necessary to consider coring out the graphite in the test channel to accommodate the facility. The problem of heat generation in the graphite by radiation from the ANP specimen has been worked on jointly with members of the Experimental Physics Unit and Heat Transfer Unit. It has been determined that 9 per cent of the energy generated in the element will be dissipated in the graphite. Design personnel are now working on the method for cooling graphite along with other mechanical problems involved. A set of specifications in rough draft form have also been submitted to Design.

Pile Engineering Sub-Section

Design specifications for the WAPD high pressure-high temperature recirculating loop have been issued to the Design Section for design scope, cost estimate and scheduling. Current plans call for this facility to be installed at DR Pile. A separate building outside the 105 building would house the high pressure loop and its accompanying components. The KW crises have delayed the publishing date of the final report on the WAPD proposal until the middle of March.

Requests for exposure of more materials for isotope production have been received from the Oak Ridge National Laboratory. Studies are in progress to determine the feasibilities of these irradiations. A high percentage of cobalt samples received for the ORNL-183 request was found to leak upon testing at HAPO. All samples are now being recanned in HAPO shops.

The experimental assemblies for studying the in-pile reaction between pile gas impurities and potential process tube and slug jacket materials (HAPO 105) were charged into tubes 3474 and 3469 at F Pile on February 10. No data has been obtained from this experiment as yet due to the fact that F Pile is still down for an extended outage.

A guillotine type tube cutter and accompanying equipment are being readied for use in cutting up zirconium tubes being discharged from a pile. Progress on the experiment to study the interaction between zirconium and certain gases (HAPO 110) is currently static pending the on-site arrival of zirconium process tubes.

The experimental assemblies for studying the interaction between graphite and selected gases (HAPO 140) were discharged from H Pile February 25. Two assemblies are to be recharged to obtain additional information on CO, CO_2-graphite reactions.

Five neptunium samples have been irradiated and counted to date as a portion of the experiment to determine the cross-section of neptunium-240 (HAPO 143). Difficulties are still being experienced in separating impurities from neptunium.

Experimental equipment is being readied to study damage to graphite samples maintained under conditions identical to those in-pile but with the absence of pile irradiations (HAPO 158). The experiment will be performed at C Pile in conjunction with the high graphite temperature tests at that pile.

A second experimental assembly for studying the effect of pile radiations on thermocouples at high temperatures is being prepared. The charging of one assembly already completed continues to be delayed by work in progress in the Snout I facility.

An investigation is in progress to obtain a satisfactory material for pneumatic rabbits. To date no material has been found which has the required mechanical properties and which will exhibit but little radioactivity following in-pile exposures. Tests have shown that the thermal shield plugs in the test holes in the K Piles will become unusually radioactive. Replacements for those plugs in empty test holes are being fabricated and will be installed before the K Pile startup. Test data for the water flow in the KW Snout facilities were obtained in the 189-D mock-up.

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

PILE MATERIALS SUB-SECTION

PILE GRAPHITE STUDIES

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

Since January 6, when test conditions of 460 to 500 C maximum graphite temperature and 60 ± 5 per cent helium were obtained, D Pile has continued to operate under test conditions without serious incident. At present, difficulty is being encountered in the control of start-up reactivity transients. This situation is primarily the result of two events: (1) Loss of #8 HSR due to a leaky thimble. (2) Large metal pushes resulting in a lowering of the plutonium inventory in the pile. In order to best accomplish the objectives of the production test, it has been necessary at start-ups to permit the use of high helium concentration for longer periods of time than permitted by Process Specification 32:00. It is expected that the reactivity cycle and the control problem will improve after the next operating period.

It has been agreed by Pile Technology and Process Sub-Section that enriched metal will not be used to enlarge the flattened zone because the present zone appears to be adequate for the purpose of this test.

Maximum outlet temperature continues to be approximately 109 C. While maximum tube powers remain essentially constant, the smaller flattened zone has resulted in a lower total power level than previously obtained. Total power level is about 1090, approximately 10 per cent higher than would be obtained under present specifications.

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

This test was approved during the month and should begin following a shutdown early in March. Graphite temperature will be a nominal 600 C, with certain regions of the pile at higher temperatures. Samples will be exposed in three process channels and full size bars will be loaded in the D test hole. Duration of the test will be five months.

Graphite Burnout Monitoring Program, PT 105-532-E

Samples exposed in channel 3478-D for a five and a half month period ending February 3 show maximum oxidation rates of 0.3 per cent per 1000 days. During the exposure period, maximum temperature in the pile varied from 400 to 500 C.

Alternative Pile Atmosphere Study, PT 105-535-E

Samples of graphite, aluminum and steel have been exposed at 450 to 500 C to dry and moist nitrogen atmospheres for six months in H Pile. These were discharged on February 27 and replaced with graphite samples exposed to 95 per cent CO_2 - 5 per cent CO and 75 per cent CO_2 - 25 per cent CO. Results from the discharged samples will not be available until their radioactivity decays sufficiently to permit handling.

Tube Curvature Trends

Difficulty in charging eight inch slugs in the top far corner of F Pile during December and January shutdowns precipitated extensive probing and tube bowing measurements during the extended shutdown. Vertical height traverses indicate that tube curvature is continuing to increase in the region approximately 9-1/2 feet from the front Van Stone flange. This coincides with the location where probes become stuck. Probing done by the Process Sub-Section indicates that the top far corner has more curvature than other upper regions of the pile.

It is expected that tube curvatures will continue to become worse as the central zone graphite contracts and fringe graphite retains its expansion damage. This condition may require the return to use of four inch slugs at a future date.

PILE COOLANT STUDIES

Production Tests

A production test, PT 105-549-E, to study the effects of aluminum grain size on corrosion rates has been approved. The slugs for this test will be charged into a PT 105-519-E tube at 105 C Reactor when the next tube under this test is discharged.

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

Corrosion Monitoring

Eight process tubes were examined during the month. Six of the tubes examined had been removed because of stuck ruptured slugs; evidence of cocked of misaligned slugs were found in all of these tubes. One hundred fifty rear Van Stone flanges were inspected at F Pile during the extended outage. Of the flanges examined, four (2.6 per cent) were found to be badly pitted, 14 (9 per cent) exhibited medium pitting, and 13 (8 per cent) were lightly pitted. Sixteen other flanges showed cracks or other mechanical damage.

Both clearwells at 183-F Building were inspected and found to be in good condition except for several cracks in the floor of the east clearwell. These cracks do not present a serious problem at this time. No serious corrosion was observed when the No. 1 and No. 4 tanks at 190-F Building were inspected. However, there were more tubercles in the No. 1 tank than in the No. 4 tank. The No. 1 tank has operated with low pH (7.3) water for ten months.

Laboratory Corrosion Studies

Flow laboratory tests of the effects of aluminum grain size on aluminum corrosion have been concluded. The second of the two tests is considered the only conclusive test and results from this test showed no significant difference between the corrosion rates of the large grained aluminum jackets and the small grained aluminum jackets.

The slugs used in the second test were canned by the hot-pressing method. Canning conditions were appropriately changed so that half of the slugs used in the test had large aluminum grains in the jacket and the other half had small aluminum grains. These slugs were exposed to process water at 110 C. The unusually high corrosion rates are characteristic to unautoclaved aluminum jackets. The following table summarizes the data from this test:

Grain Size in Jacket	Exposure Time, Days	Corrosion Rate @ 110 C (mil/mo)
Large	27	3.00
Small	27	2.99
Large	40	2.45
Small	40	2.49

The slugs used in the first laboratory tests were obtained from two different canning lots. The slugs having large grains in the jackets were aluminum dummy slugs that were autoclaved in the 189-D laboratory steam autoclave. The slugs having small grains in the jackets were uranium slugs and were supposedly autoclaved in the 300 Area. The following table is a summary of the results from the first tests:

Grain Size in Jacket	Corrosion Rate @ 110 C (mils/mo)
Large	0.08
Small	0.88

Because of the mixed history of the slugs used in this first test, the results are not considered indicative of the corrosion behavior of large and small grain aluminum jackets.

The tests to determine the corrosion rate of aluminum in pH 7.65, 2 ppm dichromate process water is nearing completion. The following table lists the results which are available to date. These rates may change as more data become available. The initial corrosion rate lasts about 20 to 40 days, and steady state rates have been run up to 120 days.

Temperature	Corrosion Rate, Mils/Mo	
	Initial	Steady State
70	.045	.045
95	.26	.059
110	1.1*	.13
125	3.63	.39

*Estimated

The corrosion testing in the minitube apparatus of various aluminum alloys that hold promise as possible tube materials was continued during the month. A portion of the test, at 115 C in process water, was concluded this month. Corrosion rates for the aluminum alloys in process water at 115 C are: M257, 63-S and 2-S -- .3 mil/mo; M276 and 65-S -- .5 mil/mo; 61-S, A54S and Lurium 5 -- .8 mil/mo; Lurium 10 -- 2.8 mil/mo. Weight losses for 66-S were high and erratic.

Investigations of "C" metal slug cocking and chattering were concluded during the month. The use of bismuth pieces dispersed in a "C" metal column did not reduce the tendency of "C" metal slugs to cock when washed downstream. Double-length slugs (two "C" metal pieces fastened together) exhibited more flow stability from a cocking standpoint than the single "C" metal pieces. The use of a perforated dummy slug in place of the heavy metal slugs upstream of a "C" metal column did not reduce slug cocking. "Floating" of the upstream "C" metal pieces was observed at high water flow rates (40 gpm and up) when a perf was placed upstream of the charge. A detailed report will be issued shortly on the "C" metal cocking and chattering problem.

A mock-up designed and built to study the effect of heat transfer on aluminum corrosion rates is now operating. The corrosion samples are internally heated by steam and can operate at an equivalent slug specific power of about 55 kw/ft.

Six eight inch slugs etched until the AlSi was exposed in local areas, were exposed to 120 C process water for 20 days. No ruptures occurred. This is in agreement with observations made by Fuel Technology which indicate that only certain specific regions in the AlSi bonding layer are subject to rapid penetration by water.

WATER PLANT DEVELOPMENT

Recirculation Studies

The in-pile loop at 100-H operated at 200 C outlet temperature. Slugs discharged from the previous run after 14 days' exposure under similar conditions showed some pitting attack. To date, the aluminum corrosion rates encountered under in-pile conditions impose a severe limit on the exposure time. The system is modified to provide a test run at reduced pH. The initial run will be made using dummy slugs at a temperature of about 100 to 110 C and a pH of 5. A low pH test was conducted in ELMO-3 to determine procedures for pH control. The by-pass ion exchanger was saturated with acid and the loop operated at low temperature (60 C). Over a two week period, pH and specific resistance increased from 3.0 to 4.5 and 3,500 to 53,000 ohm-cm, respectively. Iron concentrations up to 20 times normal were observed.

ELMO-2 was discharged after 41 days operation at 175 C. Results show a slight increase of aluminum slug jacket corrosion rates in a zirconium tube as compared to an aluminum tube (0.40 mils/month as compared to 0.32 mils/month). This difference is probably within the experimental accuracy.

Modification of ELMO-4 for slug rupture testing was nearly completed. A variety of fuel elements is scheduled for rupture testing at temperatures to 285 C. Qualifications of a welder for ELMO-5 fabrication was initiated for the second time, after failure to pass the first test. Construction prints were approved for ELMO-7, the high temperature loop being fabricated by the Byron Jackson Pump Company.

Construction of the 1706-KER Building proceeded. Kaiser Engineers is expected to complete the building by April, 1955. Minor Construction will complete installation of the recirculation test facility.

Boiling Studies

A mock-up aluminum process tube and slugs have been operating for eight weeks at 40 per cent steam quality, 110 fps velocity, and 190 C. Slugs discharged after three and six weeks exposure have average penetration rates of 0.21 and 0.25 mils/month respectively.

Calculations are being performed to determine the capability of the KER facility for boiling studies, in view of the possibility that the available dynamic head in the loops may be reduced from the scoped value of 450 psi to 150 psi. Under the following conditions: 1000 psi outlet pressure, 160 KW tube power, and 0 to 50 per cent quality, it has been determined that boiling, from a pressure-drop standpoint, is feasible at 250 F inlet, but not at 350 F inlet. In the latter case, boiling is feasible when tube power is reduced from 1600 to 1200 KW. Further studies are being made to determine the suitability of the control system for boiling tests.

Flow Laboratory

Operation of the five in-pile tubes at 105-D Flow Laboratory continued. The tests of pH 7.0, 6.6, and 6.2 are scheduled for discharge at the D rod outage. Examination data was obtained from one in-pile tube at pH 7.3, 0.2 ppm dichromate. The tube had operated at 445 KW for 203 days for an exposure of 920 MWD/T. The familiar corrosion rate reduction of about 50 per cent was observed. The out-of-pile aluminum corrosion tests at pH 7.0 and 6.6 and 120 and 150 C were completed; the test at 6.2 is continuing. Continued reduction of corrosion rates in this range is indicated. Steel corrosion data at 90 C and pH 6.6 and 6.2 showed rates of 0.18 mils/month and 1.6 mils/month, respectively.

Construction of 1706-KE Water Studies Semi-Works proceeded. Some acceptance tests are being performed this month, although completion of the facility is not expected until April 15, 1955.

Plant Tests

The low pH test at 100-F continued. The decision concerning change of the pH specification (to the range 7.2 to 7.4) was delayed pending examination of two tubes of metal discharged from the test in January.

GRAPHITE AND MATERIALS DEVELOPMENT

Relationship Between Distortion and Thermal Expansion

An empirical relationship has been formulated between the average coefficient of thermal expansion of pile grade graphite and its physical distortion in water cooled test facilities. Because of variation in physical properties from sample to sample of the same type of graphite, it was necessary to measure thermal expansion on the same samples that were used for distortion measurements. Samples were measured for physical distortion after 850 MD/CT exposure in a cold test hole. A plot of distortion against the average coefficient of thermal expansion form 25 C to 400 C indicated the existence of a linear relationship. The data utilized is tabulated below:

[redacted]

Type of Graphite	Orientation	Per Cent Distortion After 850 MD/CT Cold Test Hole Exposure	Average Thermal Expansion Coefficient 25 C to 400 C
TS	Transverse	0.35	4.1×10^{-6}/oC
	Parallel	0.12	2.3
WSF	Transverse	0.52	5.2
	Parallel	0.05	1.7
CSF	Transverse	0.61	5.4
	Parallel	-0.05	1.2
KC	Transverse	0.48	4.3
	Parallel	-0.07	1.1

The relationship is significant because it may provide a method for the determination of the initial rate of distortion under low temperature irradiation by a simple laboratory measurement of thermal expansion. Through this medium, many months could be saved in the evaluation of the graphites for future piles. Also, it is through empirical relations of this nature that the proper approach to the fundamental understanding of radiation damage will be indicated.

It should be noted that a similar relationship has been postulated for transverse cut samples in the past. However, this is the first experimental work to indicate such a relationship applicable to both transverse and parallel samples.

Thermal Annealing of Damaged Graphite

Laboratory studies of the rate of annealing of irradiated graphite as measured by the change in C_o spacing are continuing in the temperature range up to 500 C. Equipment is being modified and assembled to reach higher temperatures. One successful run has been made at 650 C. Activation energy spectra from different runs on samples with the same irradiation history agree satisfactorily.

Considerable difficulty was experienced in getting the X-ray spectrometer to operate continuously when helium was used as an inert gas around the graphite sample. The machine often overloaded and shut off. It was finally concluded that helium was partially replacing the air somewhere between the high voltage lead and ground, resulting in a breakdown of the dielectric with subsequent trip of the overload circuit. It is expected that this trouble will be eliminated by preventing the helium from entering the spectrometer or by using a different inert atmosphere.

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

All of the graphite samples have been removed from the D test hole in the 100-H Pile; the magazine will be removed rendering this facility unavailable for future graphite irradiations. Operations in the test holes at 100-F and 100-D Piles were routine.

A loading of graphite samples has been prepared for the 2-B test hole in the 100-KW Pile in anticipationoof its startup. These samples will provide information on flux conditions of the test hole as well as on graphite damage.

Graphite samples and flux monitors have been prepared for irradiation in tube 1960 during the projected high temperature test of 100-C Pile. The samples, both virgin and pre-irradiated (in cold test holes), will indicate physical distortion and thermal conductivity damage and annealing under high temperature exposure.

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

The graphite-containing sample cans which were irradiated in the 100-H Pile recirculation loop are being machined open. The high radiation level of these samples has prevented prior action on them. The sample radiation rate has decayed to 2 r/hour and further investigation of the graphite is now possible.

C Pile Uncooled Test Hole

The sample retrieving cask for use in conjunction with this facility is being finished by Technical Shops. After an assembly mock-up and successful trial run at 189-D, installation in the Y test hole at the 100-C Pile will begin.

High Temperature Irradiation Facility

Drafting of the revised prints of the controlled temperature facility for the Materials Testing Reactor continues. These prints will incorporate the design changes agreed to in discussions at the MTR in January, plus minor additional changes which will improve the ruggedness and reliability of the installation.

A review was made of bids submitted for control instrumentation for the facility, and recommendations were submitted as to the suitability of the vendors' products for use in this installation.

FUEL TECHNOLOGY SUB-SECTION

FUEL ELEMENT DEVELOPMENT

Alpha Phase Extrusion of Uranium

Production Test 313-105-31-M

Six tubes of solid eight-inch slugs machined from rods which had been alpha phase extruded in copper jackets by Nuclear Metals, Inc. were irradiated in F Pile under this production test. Two tubes were discharged at exposures slightly below 300 MWD/T and the remaining four were discharged at exposures in excess of 700 MWD/T with one tube reaching an exposure of 805 MWD/T. The irradiated material from all but one of the tubes has been given a cursory visual examination. Warping was noted in some pieces from all examined tubes. The incidence of warp was random as concerns position in the tubes and ranged in severity from light to heavy.

Tubular Extrusion

Evaluation of uranium alpha phase extruded in the form of tubes continues. Results of mechanical properties tests on the extruded material are essentially the same regardless of whether the specimen was taken from the center of a solid piece or from the wall of a tubular piece. However, specimens of metal taken from the wall of a drilled alpha rolled piece have considerably lower elongation than specimens taken from the center of the solid piece (8.5 to 14.0 percent, respectively). This decrease may be the result of non-uniformities caused by rolling practice which are indicated by the presence of the cruciform pattern. These indications of non-uniformities are not exhibited by extruded metal.

A study of comparative yields of metal from tubular extrusion and from rolling and drilling was made. Available data show that a 30 percent ingot to final good slug yield is realized in extruded metal as compared to a 47 percent yield for rolling and drilling of comparable MCW metal. The largest single cause for this decreased yield from extrusion is eccentricity of the hole. A self centering billet was designed and tested during February and preliminary examination indicates that this practice will decrease rejects for eccentricity.

Tubes extruded in the January development have been received at HAPO. These tubes, containing holes nominally .250, .800, and 1.000 inches in diameter, were extruded to study the effect of reduction ratio and extrusion speed on the pressure to extrude and the structure of the as extruded tube.

Induction Heat Treating of Uranium

Preliminary measurements and calculations were made for the induction heat treating of uranium rods. Studies conducted in 1948 and 1949 (PT 313-109-M)

using 300 Area melt plant equipment for heat treating short rod sections showed favorable results from properly controlled treatment; this was the principal justification for purchasing the TOCCO unit now being used for "Woodsplitter" experiments. Later heat treating experiments, using this TOCCO equipment, also gave favorable results. In view of the troubles frequently arising from the use of salt bath heat treated uranium, it appears desirable to resume studies of induction heat treated material. Accessory equipment for this purpose is being designed and procured.

Salt Bath Beta Heat Treating of Uranium

Two tests have been made in an attempt to determine the optimum period for delaying uranium in air, prior to quenching in 50 C brine, after removal from the beta transformation bath.

Preliminary results of these tests indicated that the optimum air delay is 45 - 50 seconds and that the variation of salt content of the brine has only minor effects; however, the data are not yet complete.

Hydrogen Analysis Technique for Production Uranium Slugs

For adequate control on the hydrogen content of FMPC heat treated uranium rods, it is necessary that a quick, efficient technique for hydrogen analysis be developed. A vacuum extraction apparatus using induction heating has been constructed; trial runs are scheduled to start on March 2, 1955.

In this apparatus the surface of a uranium slug will be heated to 600 C for a few minutes and the pressure of the gas evolved will be measured and related to bonding layer porosity (during lead dip canning) and total hydrogen content.

Melt Plant Modifications

A project proposal ("Melt Plant Modifications - 314 Building (C9-620)" D. L. Ballard, 1-14-55) requesting $24,000 was submitted to the AEC, February 3, 1953. Project preparation, scoping, and preliminary design work are complete. This money is to defray the cost of installing a tilting crucible, a mechanism for adding alloys to the molten metal, and associated improvements to the existing "A" furnace. Centralized controls and pressure and temperature recording devices are also included.

Preliminary to beginning this work, an extensive effort was made to restore the high vacuum portion of the system to its specified performance. This work included the cleaning of all pumps and flanges, replacement of gaskets, and necessary descaling of badly rusted components. The overhauling work having been completed, data were collected on the vacuum performance of "A" furnace, which is the one to be modified. Some significant figures are shown below:

1. Ultimate vacuum of complete system 4 μ (Hg)
2. Ultimate vacuum of high vacuum system 1 μ

Fuel Technology Sub-Section

3.	Pumping time to 1000 μ (roughing pumps)	7 minutes
4.	Pumping time to ultimate vacuum	1 hour
5.	Rate of pressure rise (furnace isolated)	2.08 μ /minute

It is felt that the performance demonstrated by these data is satisfactory, even though the shapes of some curves plotted indicate the presence of both appreciable water vapor and several small leaks in the system.

Zircaloy-2 Tubing Material Tests

Because of the difficulty experienced by Superior Tube Company in their tube reducing operations with zircaloy-2 process tubes, tests were made to determine the best possible method of annealing the material. Tests were also conducted to determine if cold working zircaloy-2 at temperatures up to 100 C would make possible greater reductions and/or reduce the risk of cracking.

Average values of the readings taken indicate that the greatest reduction in hardness was obtained with an anneal at 820 C for 7 1/2 hours and furnace cooling for which process a hardness value of 84.8 R_b was obtained. A graph of the hardness vs. time at temperature shows that the hardness decreases with increasing time. No obvious gain in ductility (as interpreted from hardness readings) is obtained by rolling at temperatures of up to 98 C. Additional work including tensile tests, gas analyses of the specimens, and micrographs of the grain structure obtained is being conducted.

Aluminum Can Studies - Lurium 5 and Lurium 10

The lurium 5, which is 99.99 percent pure aluminum with a .5 percent magnesium added, and the lurium 10, which is 99.99 percent pure aluminum with a 1.0 percent magnesium added, were used as cans in the regular "F" process. The reject rate at canning was two out of 112 for the lurium 5 and 43 out of 115 for the lurium 10. Forty of these rejects for lurium 10 were Al-Si slop-overs. Some of the sleeves were found to be a little over-size; however, according to Production, not enough to cause Al-Si slop-over.

The lurium 10 alloy failed in the water autoclave in much the same way as the 63S alloy. Failure appeared to be from intergranular corrosion. However, in the case of the lurium 10 there was no evidence of the white oxide that accompanied the 63S.

The lurium 5 had some reaction take place on the surface while in the autoclave. The surface was rough like sand paper and had a crease effect running longitudinally on the surface. Samples have been submitted to the metallurgical laboratory to determine the cause of this phenomenon.

FUEL ASSEMBLY DEVELOPMENT

Status of Production

About half of the uranium cores canned this month were from Fernald metal heat treated in slug form on site, a quarter rod-treated Fernald metal, and a quarter MCW metal both slug and rod treated.

Fabrication of Dip Canned Cored Slugs

Cored slug production in February was limited to about 1300 extruded cores from experimental extrusions and 4200 drilled cores recovered from canning rejects; there were no shipments of drilled cores received from Fernald.

Trial fabrication of cored pieces with the core ends closed by crimping in an uranium plug instead of welding were continued. The dimensional tolerances for the core components and process limits have been established for a final trial. Variations in the original laboratory technique have been largely to permit two practical recovery cycles in production in which the plugs are bored out and the counterbore deepened for the subsequent crimping operations.

A manually controlled hydraulic press complete with crimping die and centering device has been built for use in one of the manufacturing lines. The unit, which is currently under test, has been used to make about 100 closures using random size plugs and counterbores. When closed with 18 tons pressure, no Al-Si penetrated to the core of the test pieces during subsequent dip canning.

Canning tests of cores closed with pressed-in aluminum plugs indicate a satisfactory seal can be made. Several hundred cores have been prepared and will be canned to test the new technique in which the aluminum plug is locked in the undercut counterbore.

Weld Defects in Lead Dip Canned Slugs

The reject rate for Al-Si "spikes" continued at a level of about six percent. Al-Si spikes are thin fingers of Al-Si extending from the braze layer through the fusion zone of the weld to the weld exterior where they are manifested as a depression or "dimple". Based on continued data indicating the strong influence of the welding operation on the formation or impression of the spikes, Manufacturing is making a very detailed study of welding conditions. It is noted, however, that although correlations based on observations of short duration have in general only indicated the variability associated with different welding equipment and operators, analysis of data since March, 1954, shows a close, long term association with lead content of the canning baths. The lead content (and other impurities) of the canning bath has varied widely during studies relative to increased service life of metal baths. A plan to run a low impurity canning line for at least several months as a control measure is under consideration.

Hot Pressed "C" Alloy Slugs

About a third of January's production of "C" slugs were rejected for unbondedness. This high reject rate was not anticipated although it was realized late in January that processing had proceeded outside the specified limits of operation. Canning was suspended and trial canning of dummy aluminum cores instituted to establish the effect of drying of components by methanol, the timing of subsequent processing steps, and the use of contoured punches to produce the Tru-line feature. It is planned to use Tru-line end contour on subsequent hot pressed slugs in an effort to alleviate C slug chattering in the pile until the joining of two finished slugs base to base by welding can be established as a production practice.

Hot Press Canning Uranium

The two hot-pressed, nickel plated, diffusion bonded, solid fuel elements which failed in C pile during January at exposures of 558 and 623 MWD/T have been visually examined and appear to be jacket failures. A program has been initiated to determine what caused the jacket failures, e.g., closure, can processing subsequent to canning, can material quality, bond deterioration, mechanical damage in charging, etc.

A hot-pressed, nickel plated, diffusion bonded, cored fuel element failed in C pile on February 27 at an exposure of about 700 MWD/T. The cause of the failure has not been determined. The three lead dip control tubes have reached exposures of about 800 MWD/T.

The single tube of hot pressed, nickel plated, diffusion bonded, internally and externally cooled fuel elements being irradiated at C pile was discharged at an exposure of approximately 150 MWD/T because of the unbalanced cooling water temperatures between the hole and annulus. Exit water temperature from the former was about 125 - 130 C whereas the latter was 85 - 90 C. Three partial tubes of internally and externally cooled material with inside flow passages of 3/8, 7/16, and 1/2 inch diameter will be charged next.

Additional experience has been obtained with the two piece hot-working punch for producing high integrity hot-press closures. Examination of thirteen hot-worked closures made with the modified punch and limited travel showed the closures to be welded the entire depth of the can-cap interface, (0.395 inches) with one exception. The top sixteenth inch of one closure could be peeled over a portion of the circumference. Additional evaluations of the hot work closures are continuing.

Several uranium cores with the 0.1 mil nickel over 1 mil of iron plate were hot-press canned. Ultrasonic bond tests substantiated by chisel tests indicate a consistent bond between the components. Tensile specimens made from uranium wafers coated with 0.1 to 1.1 mil nickel plates show that strengths in excess of the yield strength of aluminum can be obtained from thin plates. Upon metallographic examination of the tensile specimens to determine the extent of diffusion, full size uranium cores will be plated to study canning characteristics. Secondary corrosion resistance and undercutting resistance tests are planned as an additional evaluation.

A limited investigation of the applicability of the hot-press process to canning uranium - silicon alloy core material was carried out with four nickel plated U-Si wafers. Tensile specimens made from the wafers and aluminum plugs diffusion bonded to them showed bond strengths in excess of the ultimate strength of aluminum.

Cold Closure Process

Drilling and machining operations have been started on the preparation of approximately 500 four-inch long uranium cores for a production test of unbonded and mechanically keyed cored fuel elements prepared by the cold closure process.

Sizing and closing dies, and handling equipment have been designed and are being built for use on two existing presses to prepare the fuel elements for the cold closure process production tests of eight-inch cored uranium slugs.

Uniskan Process

A firm overall design for the development of the uniskan process has been completed. A 200 ton Rodgers press will be used to move the uniskan rolls along the work. A spindle and drive mechanism for rotating the uniskan mandrel is being designed.

Dip Canned Zirconium Jacketed Fuel Elements

Two zircaloy jacketed, uranium core fuel elements have been prepared as part of a development program to produce zirconium jacketed, bonded fuel elements for use in the H pile high temperature water loop. Using uranium electroplated with 1 mil of iron and a flash coat of nickel, uniform bonds were obtained by Al-Si canning the uranium in zircaloy jackets which had been previously coated with molten zinc chloride to insure wetting of the zircaloy by Al-Si.

Fuel Element Pilot Plant

The pilot plant was occupied during the month of February by technical personnel. Standard operating procedures for building operation and control, evacuation procedures, fire, safety, security, and radiological control were prepared. At the end of the month equipment from 3730 Building was being moved into the pilot plant.

FUEL EVALUATION

Slug Irradiation

About 1100 tubes of rod-heat-treated (B-lot) slugs are now in the 600 to 1000 MWD/T exposure range. Of these, 250 tubes are above 800. Of the three B-lot failures; the PT-105-539-E, Supplement A charge failing at 810 MWD/T was a typical 25-M type cap rupture, and the two non-production test charges failing at 190 and 670 MWD/T were can sidewall ruptures.

During the past three months there have been about an equal number of jacket failures and core-cleavage failures, at exposures of 700 MWD/T and greater, indicating a corrosion limitation as maximum allowable water temperatures are increased.

Slug Distortion

Measurement data on warp of triple-dip and rod transformed slugs were extended to include exposures from 800 to 1300 MWD/T.

Four tubes of rod transformed slugs were measured at average tube exposures of 968, 978, 1193 and 1262 MWD/T. The following observations are made for these and previous data:

1. At 730 - 800 MWD/T, 26 percent of the slugs warped between 30 and 78 mils: the average warp was 24 mils.

2. At 970 - 980 MWD/T exposure, 42 percent of the slugs warped between 30 and 64 mils: the average was 27 mils.

3. At 1200 - 1260 MWD/T, 49 percent of the slugs warped between 30 and 88 mils: the average was 34 mils.

Both the incidence and degree of warp increased markedly with exposure. Triple dip material did not show a significant increase in degree of warp with exposure. Two additional tubes were measured; one at 1010 MWD/T and one at 1294 MWD/T. At these exposures, 10 percent of slugs warped between 30 and 38 mils as compared with 6 percent at about 800 MWD/T. The average warp at 1294 MWD/T was 17 mils as compared to 15 mils at 800 MWD/T.

It would appear from these data that at increasing exposures above 800 MWD/T, warp of rod transformed eight-inch slugs would cause an increasing incidence of stuck charges in pile process tubes. However, it is not known whether the warping of subsequently manufactured slugs will be consistent with these observations. Observations will be continued for quality and process control data.

Breaking Tests of Irradiated Slugs

Fourteen tubes of eight-inch triple-dip slugs (from PT 105-313-10-M) exposed to 400 to 835 MWD/T were broken in the prototype breaker to determine breaking strengths and to gain test experience. Breaking strengths varied from less than one-half ton to 13 tons of force. Tube averages of breaking strength decreased from 9.3 tons at 400 MWD/T to approximately eight tons at 800 MWD/T. The incidence of slugs that broke at less than one-half ton increased with exposure from zero percent at 400 MWD/T to approximately ten percent at 800 MWD/T. These pieces had been located in the central third of the process tubes.

Woodsplitter Expansion

Design has been completed for the five work station test facility. Installation is approximately 30 percent complete.

TESTING METHODS

Ultrasonic Bond Test

For a better comparison of the ultrasonic bond test and the frost test, a total of 1858 slugs were run through the two tests in series. About 152 of these were rejected by the ultrasonic bond test, but only 10 by the frost test. There were no frost test rejects which were not also ultrasonic rejects. Of the 142 on which there was a disagreement, 88 have been autoradiographed and a preliminary examination of the films show 3 to 4 pieces with single voids greater than one square centimeter not detected by the frost test, 3 to 4 with no visible flaws, and a large number having small voids in clusters. The characteristics of the latter pieces indicate that the reject rate can be lowered still further by adjusting the controls already built into the instrument. A new run will be made in search for a more optimum operating point. Stability of the instrument appears to be adequate; and in its present form it would serve as an adequate unbond test on the basis that, if the reject rate is not tolerable, ultrasonic rejects will be run through the frost test.

Uranium Quality Test

No large scale production tests of the uranium quality test instrument were made this month because of interference of construction activities in Manufacturing buildings. The problem of altered instrument readings on transformation was investigated. It appears there is no grain size effect, but there is definitely an effect of orientation, such that orientation of 200 poles along the axis of the slug increases the circumferential conductivity while the orientation of 020 poles decreases it. The minimum change in conductivity on heat treatment occurs for those slugs heat treated by a procedure giving the most nearly random orientation. That an orientation effect should exist is by no means surprising since uranium is anisotropic and should be expected to be so with respect to its electrical properties as well as other physical properties.

Can and Plating Thickness Test

A bread board eddy current device operating at 1000 cps for testing the can thickness on cold canned nickel plated slugs was built and used to test 23 slugs. Built on somewhat the same principle as a previous can thickness testing device, this one was stable within about three mils for a two hour period. Some of the 23 slugs checked had nominal 1/2 mil and some nominal 1 mil nickel coats. The instrument divided the slugs into two groups according to these nominal values. On further investigation it appears that both the nickel thickness and the aluminum thickness on these slugs can be measured with the same instrument.

Fuel Technology Sub-Section

COATINGS AND CORROSION

An electroplating procedure for depositing multiple plates is being studied. Successive plates of nickel, tin, and nickel are deposited and the composite layers are heat treated. During this heat treatment, the tin blocks the pores in the nickel plate.

Nickel-plated hot-pressed fuel elements with excellent undercutting resistance have been obtained. All nickel plated pieces which had been hot-pressed previously showed extensive undercutting after relatively short exposure in the autoclave. The pieces hot-pressed during the past month have shown little or no undercutting even after long exposures in the autoclave and compare favorably with the best of the Al-Si dip pieces. The relative importance of all conditions is being assessed; probably the most important variable is the temperature of pressing.

From the standpoint of bond strength, less than 0.0005-inch layer of nickel is satisfactory for the electropolished slug. Uranium pieces were electropolished, plated with 0.0005-inch of nickel and hot pressed. These pieces had a stronger bond than the Al-Si standard fuel element, and had no unbonded areas. For comparison, the standard etched hot-pressed slugs contain 0.001-inch of nickel. The thinner plates are possible on the electropolished uranium because a more even plate can be deposited on a smooth surface.

A promising alloy of aluminum, 142-T471 (4% Cu, 2% Ni, 1.5% Mg), is being corrosion-tested at high temperatures. After 200 hours at 350 C, there is no sign of intergranular attack and only negligible general corrosion. The test is continuing.

Some fuel elements received from KAPL were tested for bond strength and undercutting resistance. These pieces had been plated and pressed by the most recent techniques and represent the best done at KAPL. The resistance to undercutting was excellent; only localized pitting and no extensive swelling occurred. However, more than half of them were partially or completely unbonded.

Some uranium pieces were coated with zirconium by the decomposition of zirconium iodide and sent to HAPO for testing. The coats were porous. Hot-pressed pieces showed marked tendency to extensive undercutting. A large amount of research is evidently needed before a satisfactory zirconium plate can be deposited on uranium by this method. Some uranium pieces were shipped to KAPL for final plating and testing to complete this project.

PHYSICS RESEARCH SUB-SECTION

Lattice Physics

The installation of the Lattice Testing Reactor is going forward in the new 305-B Building. The tracks on which the movable face will move, and the reactor base, are essentially complete. Work on the electrical instrumentation is proceeding. No final word has yet been received from the Metals and Controls Corporation on the feasibility of manufacturing uranium oxide-lead fuel elements. However, the Oak Ridge National Laboratory has agreed to produce aluminum alloy fuel elements if the lead-uranium oxide ones are found difficult to fabricate.

Some measurements have been made in several lattices to determine the fraction of the fissions in U-235 that are caused by epi-thermal and higher energy neutrons. Neutron counts were made at the edge of a lattice cell with a boron trifluoride counter and with a fission counter. Both counters were then covered with cadmium and the counts repeated. The variation of the boron cross section with neutron energy is well known (it is a so-called 1/v cross section). Thus if one compares the ratio of the counts in the two counters before and after the insertion of the cadmium, it is possible to interpret the change in terms of the departure from the 1/v law of the U-235 cross section. This analysis has been made and it is found that only about 10 to 15% of the cross section is not 1/v. Stated differently, the result is that the epicadmium fission of U-235 can be calculated to within 10 to 15% by assuming that the fission cross section follows the 1/v law.

Lattice measurements are continuing on the effect of removing a 1/2" axial core of uranium from the standard slug. Such a measurement was completed this month with the dry 7" lattice. The results are: 79.5×10^{-6} cm^{-2} with no core and 84.5×10^{-6} cm^{-2} with core. There is thus an increase in reactivity accompanying the coring which amounts to 5×10^{-6} cm^{-2} or about 110 inhours.

Reactor Physics

Calculations on the contribution to the temperature coefficient of plutonium in graphite-uranium lattices were continued. A new technique, called β-weighting, was worked out to take account of the fact that neither the space nor the energy distribution of neutrons is uniform over the volume of a Hanford-type slug. It is found that the plutonium effect is about one half of the result previously obtained. It is also found that although the plutonium contribution increases as the neutron temperature increases, most of this increase (ca. 90%) has made its appearance at a temperature of about 1100°K. Thereafter, this contribution rises very slowly with temperature. A detailed report with curves is given in document HW-35211.

A set of new calculations on the start-up bucklings of Hanford piles has been completed and a report is being written. One interesting result concerns the K-E Pile. Its buckling should be 1 to 1.5 ($\times 10^{-6}$ cm^{-2}) higher than K-W Pile if the graphite "quality" of these two piles is correctly given by the Test Pile measurements. If, however, the diffusion length measurements carried out at the two piles are correct, then the K-E buckling will be higher than K-W by about 3 to 3.5 $\times 10^{-6}$ cm^{-2}.

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Physics Research Sub-Section

Nuclear Physics

In calculating temperature coefficients of piles, it is essential to know how ν, the number of neutrons emitted per fission changes with neutron energy (or temperature). Preliminary results of an experiment had shown that ν increased by about 3.5% when the neutron energy increased from 0.1 to 0.3 electron volts. This experiment has now been completed and the results are shown in the short table below.

Variation of ν for U-235 with Neutron Energy

Neutron Energy in Electron Volts	ν (U-235) (Arbitrarily normalized to unity)
0.0253	0.9840 ± 0.005
0.050	0.9960 ± 0.0063
0.10	0.9967 ± 0.001
0.15	1.0068 ± 0.004
0.20	1.0040 ± 0.0025
0.25	1.0034 ± 0.0059
0.29	1.0004 ± 0.0027
0.35	1.0052 ± 0.0061
0.40	1.0039 ± 0.009

It will be seen that ν is constant in this energy range at least to within an accuracy of 1%.

Plant Problems Associated with Critical Masses

A survey is being made of the methods of handling enriched materials in the 300 Area slug preparation facilities. With the cooperation of Fuel Technology personnel, revised process specifications will be prepared as a result of this survey.

The problem of the interaction of two slab-like configurations of multiplying media has been formulated mathematically and is being worked out. The solution of this problem has application in a wide variety of critical mass problems in the separations plants.

METALLURGY RESEARCH SUB-SECTION

Irradiation Effects

To provide a basis for the planning of an experimental program aimed at the determination of the effects of the fission products on the performance of high temperature, high exposure fuel elements, a study of the fission product chains and yields has been undertaken. The present aim of the study is to develop expressions which will permit calculation of the concentration of the individual fission products as a function of exposure for a wide range of operating conditions. The study is being made from the metallurgical point of view in contrast to the approach taken in similar studies where the aim has been either to estimate reactivity changes with fission product buildup or to determine radioactivity levels for radiochemical purposes.

Long term, elevated-temperature exposures of uranium test specimens have been planned employing the facilities at the Materials Testing Reactor. Six Zircaloy-2 capsules, containing uranium tensile specimens surrounded by NaK, have been successfully canned and autoclave tested. Four of these were shipped to the Materials Testing Reactor and were charged during February. The requested irradiation conditions will provide samples at integrated flux levels of approximately 4×10^{20} nvt ($\sim$1600 MWD/T), with the maximum core temperature in the gage section calculated to be 420 C (790 F) and the uranium surface temperature 355 C (670 F). Additional samples have been prepared, and capsules are being fabricated to provide four more samples for exposure at the same flux level to a total integrated flux of approximately 2×10^{20} nvt (800 MWD/T).

Metallurgical Techniques

Design and subsequent laboratory evaluation of a new type of Zircaloy-2 capsule for in-pile diffusion studies is continuing. The capsules are 0.9 inch in diameter and will contain two 0.5-inch diameter diffusion couples. Experimentation has demonstrated that an ironing operation will satisfactorily size the capsule onto the couples and that the initial slip fit is reduced to a press fit. Such contact between capsule and couple is essential for good heat transfer and more accurate temperature calculations. The capsule wall thickness is established so that temperatures within a 200-300 C range are attained within the couple during irradiation in a moderate neutron flux field. Metallographic examination of the first capsule after sizing showed good surface contact at the diffusion interfaces of the couples and between the couples and the capsule wall. The initial experiment will be repeated in order to permit an evaluation of the effect of such an enclosure on the diffusion rates of U-Al couples. Eutectic alloy temperature monitors having melting points in the range 183-382 C (360-720 F) will be incorporated into the final in-pile capsules in order to define the maximum temperature reached during irradiation. Laboratory tests indicate that some of the monitors may give erroneous indications of temperature as a result of surface oxidation films.

The preparation of precharacterized metallographic specimens for irradiation in NaK-filled capsules has begun. Beta heat treated dingot uranium, which has been vacuum annealed, will be used to determine the nature and extent of microstructural changes during low temperature pile irradiations. The use of a Bierbaum Microcharacter hardness tester for marking selected areas has been particularly useful. In order

to establish the feasibility of high temperature metallographic irradiations, laboratory studies at temperatures of 600, 700, and 800 C (1110, 1290, 1470 F) have begun on Zircaloy-2 capsules containing NaK and metallographic uranium specimens.

It has recently been observed that aluminized Faxfilm replicas of cathodically vacuum etched uranium specimens show polarization effects similar to those obtained with uranium specimens viewed under polarized light. Since the reasons for such an effect are not known as yet, it is being investigated further. If the polarization of aluminized Faxfilm replicas is a direct function of the parent specimen, Faxfilm replicas would be of increased value in the study of either irradiated or non-irradiated specimens.

Fuel Elements

Insulated slugs have been canned by the room temperature point closure technique. The slugs are insulated with one to four mils of Al_2O_3 on the interior can wall. Irradiation of these slugs will provide data on the behavior of uranium under irradiation at elevated temperatures. One cored natural uranium slug insulated with a four-mil layer of Al_2O_3 has been shipped to the MTR. The slug is scheduled for charging in the MTR Fuel Element Testing Facility in March. This slug will operate with a uranium surface temperature of 400 C and a maximum uranium temperature of 860 C. A production test, now being circulated for signature, authorizes irradiation of 12 slugs in C-Pile with uranium surface temperatures during irradiation from 170 to 460 C and maximum temperatures from 490 to 950 C.

Unbonded slugs, canned by the room temperature point closure technique, are being irradiated to determine their rupture resistance and to check the hypothesis that an unbonded fuel element should give improved performance under Hanford conditions. Under PT-105-580-A two solid slugs were irradiated to 200 MWD/T tube exposure in C-Pile, the specific power of the slugs having been 47 kw/ft and 9 kw/ft. A second pair of solid slugs was discharged from H-Pile January 20, having been irradiated to 490 MWD/T at a specific power of 38 kw/ft. The slugs showed no evidence of preferential corrosion at the closure or of non-uniform heat transfer and are scheduled for Radiometallurgy examination as soon as time permits. Four solid unbonded slugs are operating normally in H-Pile in a tube scheduled for discharge at a tube exposure of 725 MWD/T. The slugs are operating at 42 kw/ft, and current exposure on the tube is about 450 MWD/T. A tube charge of 36 unbonded cored natural slugs and four unbonded cored enriched slugs was charged in C-Pile January 20. Maximum specific power of the enriched slugs is 80 kw/ft. This tube charge is operating normally and will be irradiated to rupture.

The fabrication and autoclave testing of 13 enriched and 13 natural uranium chip-magnesium matrix fuel elements for 105 pile testing have been completed. The normal uranium matrix slugs are slightly denser than the enriched uranium matrix slugs whose densities are 35.5. The normal slugs average about 39.5 volume percent or 87.5 weight percent uranium. Twelve of each type will be charged in HAPO piles when the production test, which is now being processed by Pile Engineering, is completed.

A preliminary investigation has been made to determine the feasibility of fabricating a duplex slug by wrapping an aluminum-uranium sheet around the thorium core, inserting it into an aluminum cup and canning by the point closure canning technique. One

such assembly was fabricated using a steel core and a 50-mil sheet of aluminum - 25 weight percent uranium alloy. An uneven gap in the sleeve after canning indicated non-uniform deformation had occurred during the sizing operation. Such a gap is not desirable but should be eliminated by using an alloy sleeve fabricated from a tubular section rather than a rolled sheet.

A number of fuel element configurations, such as single rods or slugs, rod clusters, or flat plates, can conceivably be utilized in a process tube of circular cross-section. The ultimate choice of fuel configuration is, however, dependent upon a large number of factors including nuclear, metallurgical, and heat transfer requirements. A comparison of the volumes and cooling areas involved in the various geometries has been made. The three-rod cluster provides the greatest volume available for fuel of any of the clusters. The fuel space available is progressively lower for the four and five-rod clusters and increases again for the seven-rod cluster. The surface to volume ratio progressively increases from the three-rod cluster to the seven-rod cluster. Flat plates do not provide as much fuel volume as the seven-rod cluster, however, the four-plate assembly does provide a high surface to volume ratio. It appears, therefore, that the seven-rod cluster is the most geometrically desirable configuration. The temperature drop from the core to the coolant for the seven-rod cluster will be about one-third of the corresponding temperature drop in an externally cooled slug operating at the same specific power. An attempt to fabricate a prototype spider for supporting a seven-rod cluster has been made by cold pressing annealed 2S aluminum into a mild steel die. Although the die filled with aluminum, the die deformed during pressing giving an unacceptable spider. Further work is planned using higher strength dies.

Fuel Materials

The prototype uranium-magnesium slug that failed in the MTR after an exposure of about 280 MWD/T has been examined in the HAPO Radiometallurgy facilities. The fuel material, i.e., uranium shot embedded in a magnesium-silicon alloy matrix, was badly oxidized and crumbled when the aluminum x-basket was removed from the slug. Closer examination of the ruptured piece showed severe radial cracks in the 0.100-inch thick base end of the can, and it appeared as though molten magnesium had flowed out through these cracks and solidified. This end of the can also fell apart when the x-basket was removed. The weld end of the can was in good condition, and nothing was apparent to indicate that the weld had failed. Metallography and hardness measurements will be made on the can material. The prototype slug that did not fail in the pile has been sectioned and no effects due to irradiation are visible. It is possible that the magnesium core of this slug was also molten, however, visual examination does not show any physical change in the material after irradiation to 280 MWD/T. A wafer will be polished and examined to determine if any microscopic change has occurred.

Two new matrix type fuel elements have been fabricated for irradiation in the MTR. Uranium shot which packed 64 volume percent uranium was used, and this was embedded in a magnesium-silicon alloy matrix. They are similar in geometry to the slugs discussed above except that the fuel element is 1.000 inch in diameter and 4.0 inches long. The slugs are canned in Zircaloy-2 and have a 0.060-inch can wall. These slugs are scheduled to begin irradiation on March 7, 1955, and will be placed adjacent to the active lattice of the MTR where they will be subjected to an effective

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flux of 5.45 x 10^{13} nv. At this flux, the slugs will be generating about 42.5 kw/ft with the uranium operating at a specific power equivalent to a Hanford slug generating 120 kw/ft. The slugs will accumulate exposure at the rate of 26 MWD/T per day and will be irradiated to about 5000 MWD/T at which time they will be examined. If the examination indicates satisfactory performance, one slug will be irradiated for a longer period. At the end of the exposure, the samples will be examined metallographically and also for dimensional stability.

Irradiation of the twelve 0.40 x 1.50-inch capsules has been completed. Four capsules irradiated to 5000 MWD/T have been received at HAPO and are awaiting examination. The external appearance of the capsules is unchanged except for the blue oxide which has formed on their surface. The four 10,000 MWD/T capsules have also been discharged from the MTR, and a request has been made to irradiate two of them to 15,000 MWD/T exposure.

The notched slow bend test that is used to detect embrittlement in zirconium also reveals brittleness in uranium according to preliminary tests. Strips of uranium containing about 35 percent cold work 0.12 inch wide by 0.056 inch thick were tested at temperatures ranging from 25 to 450 C (75 to 840 F). The ductility as measured by fracture angle of the notched specimens increased from 18 degrees at room temperature to a maximum value of 52 degrees at 175 C (350 F), then it dropped to a fracture angle of 25° at 300 C (570 F) followed by an increase with higher temperatures.

MTR Fuel Element Testing Facility

No work has been done by Phillips personnel on the B-block containing the notched slug charge which was removed from the MTR in December. It has been requested that the top of the block be sawed off so that an attempt to remove the upper two slugs can be made. The nature and cost of a tool to open the block depends on whether all three or just one of the slugs are stuck. Work on the venting of the contaminated water storage tanks at the MTR has not progressed to the point where a definite statement can be made as to when operation of the testing facility can be resumed. The work will not be completed in time for the March 7 shutdown. The design and fabrication of the basket B-block is progressing. Testing of the block should begin during March.

Zirconium Metallurgy

Reaction rate studies of zirconium and Zircaloy-2 in dry air have been continued. Data on weight gain and length increase at 500, 600, and 700 C (930, 1110, and 1290 F) confirm previously reported results. Specimens of rod and sheet show no weight gains after 750 hours at 300 C (570 F). At 400 C (750 F), however, Zircaloy-2 specimens have gained about 0.3 mg/cm^2 in the same time.

Uranium Reduction Studies

Studies have been continued on the reduction of uranium oxide with calcium to produce particulate uranium metal which will be satisfactory for use in the magnesium matrix slug. The best results to date on a small scale 20-gram reduction have been obtained using 1.5 moles of iodine-calcium booster per mole of uranium with sufficient calcium chloride to form a slag of 41 percent calcium oxide in calcium chloride. The calcium

chloride was dried prior to loading in the bomb which could then be hermetically sealed during firing without excessive pressures developing. The charge was fired in a pot furnace held at 1000 C. After firing, the bomb was soaked at 900-1000 C for five minutes. A 72 percent recovery yield of spherical pellets - 50 + 200 mesh was obtained. Total reduction yield was approximately 100 percent. The majority of the uranium which was sent to waste was -325 mesh.

One charge containing 200 grams of uranium oxide has been reduced. A charge identical with that which proved most successful on small scale was employed except that the iodine-calcium booster was reduced from 1.5 to 1.0 moles/mole of uranium. The charge was thoroughly mixed and packed in a magnesia crucible which was hermetically sealed in a steel bomb. The charge was fired by induction and soaked 15 minutes at 900 C after firing. Recovery yield was 41 percent uranium - 50 • 200 mesh. A satisfactory crucible material for use with calcium chloride has not been found. The magnesia crucibles are dissolved partially by calcium chloride which then flows through the crucible cementing it to the bomb wall. The same problem exists with graphite to a lesser extent. However, with graphite some carbide formation would be expected. Several more large scale charges will be fired under varying conditions in the hope of minimizing the amount of -325 mesh uranium produced.

Radiometallurgy Examination

Examination of the slugs and process tubing from Tube 4669 KW continued. A weight estimate of the uranium delivered to Radiometallurgy from this tube accounted for all but about six pounds of the metal. Included in the weight estimate were several pounds of metal removed from locations outside the graphite stringer 4669 and was in the form of 1/8-inch thick plates which had been cast on the side of the tube blocks. One such fragment, estimated to weigh seven pounds, ignited during handling in the cell and burned completely. The material which burned was an alloy consisting of uranium and aluminum which had flowed through the 1/2-inch diameter weep-holes that existed in the tube blocks. The alloy left the tube channel in the liquid state and apparently under considerable pressure because it penetrated the space at the top and bottom of the block as well as the side.

The tube charge between slugs 16 and 24 had fused with the tubing and filled the graphite channel completely. A section through this material revealed a cast uranium core full of voids surrounded by uranium-aluminum compounds. The graphite surrounding this material was penetrated by aluminum or an aluminum alloy to a depth of 3/8 inch in a fine dendritic pattern observable without magnification. The most probable process indicated is a migration of the aluminum as a liquid under pressure into interstices in the graphite.

Aluminum alloy containing about 5 w/o uranium and having a cast structure was found at the joints between the trunnion block and tube blocks four and five.

Slugs from the front and rear of the tube in regions where total melting did not take place were sampled for observation of the slug components. Most of the jacket material which was affected had been altered by diffusion of uranium into the aluminum. The predominant compound formed is UAl_3. Lesser indications of UAl_4 and UAl_2 were found. There was some melting of the jackets before the high-melting compounds were formed, which is an indication that the melting temperature was approached fairly rapidly, possibly in minutes, rather than over a long period.

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Metallurgy Research Sub-Section

In support of an understanding of the metallurgical phenomena associated with the KW startup, experiments have been conducted to determine the structural effect of heating one end of a bare uranium slug into the gamma phase while maintaining the opposite end of the slug in the alpha phase. That portion of the uranium which achieved temperatures of 660 C or higher for periods varying from three minutes to two hours developed large columnar grains oriented parallel to the lines of heat flow. That portion of the slug which was heated to temperatures not exceeding 660 C for periods as long as two hours showed no visible evidence of structural change. In slugs in which the material heated to gamma phase temperatures was cooled below the alpha-beta transition temperature in less than two minutes, the columnar grain appearance of that material was nearly identical to that appearing in the material heated only into the beta phase. When the gamma to alpha cooling period was increased to ten minutes, the grains of the material heated into the gamma phase were still columnar but noticeably smaller than those of the material heated only into the beta phase. Cooling rates within these limits did not appear to affect the structure of material heated only into the beta phase. Tensile properties will be determined on a specimen containing the boundary between material with normal beta quenched grains and material with columnar grain structure.

Diffusion studies on AlSi bonded canned slugs are being carried out by boring a half-inch longitudinal hole in the center of canned slugs, using a graphite resistance heater in this central hole to heat the slug and helium to cool the exterior of the slug. The slug is heated with the longitudinal axis vertical. When a slug was heated to a surface temperature of 700 C in five minutes by this method, the can wall melted and slumped down to the center of the vertical surface. A slug heated to 600 C developed diffusion blisters 1/4 inch in height within three minutes after reaching temperature. A third slug heated to 400 C and held at temperature for two hours showed no external evidence of diffusion. The time required to produce massive diffusion at 500 C will be checked. The experimental pieces will be sectioned and the nature of the diffusion products determined.

Various uranium-aluminum and uranium-silicon alloys have been prepared to compare with those alloys found in the damaged tube after the K-Pile incident in order to facilitate the determination of conditions existing during the incident. Small amounts of UAl_2, UAl_3, UAl_4, USi_2, USi_3, and $U_{10}Si_3$ have been prepared in a vacuum furnace. A mixture consisting of uranium, aluminum, and various uranium-aluminum compounds was prepared by dropping a piece of cold uranium into molten aluminum at 700 C and cooling the mixture rapidly to prevent all of the uranium from diffusing into the aluminum. The product was a piece of uranium embedded in aluminum with a layer of diffusion products around the uranium. All of the alloys have been turned over to the x-ray laboratory for comparison with alloys produced during the K-Pile incident.

An eight-inch, ruptured, unbonded uranium slug canned by the "C" process and irradiate under PT-105-578-A was received for examination. This failure was discharged from Tube 2686-C on January 31, 1955, after an exposure of 250 MWD/T. The entire slug, with the exception of the base and cap ends, was swollen, and a 1/8-inch diameter hole was found in the jacket approximately 1-1/4 inches from the cap end and directly opposite the rib marks. The area surrounding this hole appeared to be slightly more swollen than the remainder of the slug. The top surface of the slug, from base to cap, was covered with heavy, white scale, while the bottom half was

covered with brown film. This indicates that the swelling had forced the slug against the top of the tube, thereby producing localized boiling between the top of the slug and the tube. Preliminary examination of the cap assembly has revealed no evidence of water penetration through the weld. Examination of transverse cross-sections in the immediate vicinity of the jacket hole revealed numerous small voids in the uranium. In addition to the voids, a network of very fine cracks, visible only with a microscope, covered the entire cross-sectional area of the uranium except for a crescent shaped area located at the bottom of the slug. The line of demarcation between the cracked and uncracked areas was very sharp. This network of cracks may account for the escape of fission product gas from this slug while it was stored in the 105-C basin.

Examination of three samples sectioned from a Nichrome V (80 Ni, 20 Cr) clad GE-ANP direct cycle fuel element has been completed. The fuel element was irradiated at the MTR for 100 hours at 1800 F with air as the cooling medium. The number of oxide stringers penetrating into the cladding ranged from 250 to 582 per linear inch with an average of 380. The maximum observed depth of oxide stringer penetration was 0.0022 inch. Average sample thickness measurements indicate a cladding loss of 0.00012 inch. Metallographic examination of the cladding showed no change in structure or grain size. A group of interconnected voids, deformation of the element, and an increase in element thickness of seven percent were observed at one section of one of the samples.

Porous alundum filter plate samples were tested to evaluate the effect of four typical non-radioactive process solutions and radiation on their physical properties. Bend test results indicated a decrease in bend strength of approximately 27 percent regardless of immersing solution and immersion time. Izod impact tests failed to reveal any changes in impact strength. A decrease of 10 percent was measured in the bend strength of alundum exposed to 7.5×10^6 roentgen gamma radiation.

The uranium macrostructure obtained on a transverse section of the cored "Ike" rupture from PT-105-513-SI was analyzed, and it was concluded that the uranium within 1/4 inch from the core had been subjected to beta-phase heating. Hardness surveys indicate pronounced suppression of radiation hardening in this area. By a comparison of the metallographic results on this wafer with previously obtained results on the other three slugs of the test, it was concluded that beta-phase operation had occurred in all of the slugs.

A rear face Parker Fitting from Tube 2783-B recently failed while being tightened to stop a leak. This fitting has been received by Radiometallurgy for examination to determine the cause of failure. The assembly received consisted of a brass nut, a type 304 stainless steel sleeve, the flanged end of the pigtail, and the threaded portion of the type 304 stainless steel stub which is welded to the cross-header. The nut was frozen to the stub, and consequently, the fitting could not be disassembled until it had been longitudinally sectioned. The stub fractured at the root of the last thread and had the appearance of a brittle failure. Approximately, one-half of the fracture surface was covered with a brown film, indicating that it had been exposed to pile cooling water for some time. It did not appear that any leaking had occurred between the mating surfaces of the pigtail and the stub. Observation of the cross-section revealed that the brass nut and stub had been cross-threaded and that enough torque had been applied to completely shear off all of

Metallurgy Research Sub-Section

the brass threads. Metallographic examination of the stub revealed that the fracture was almost entirely intergranular with no evidence of intergranular corrosion. There was no evidence of the plastic deformation which would be expected to occur in a ductile material such as this when subjected to shear stress.

Radiometallurgy Facilities

The metallographic cell has had only three days of full-scale operation during February. The overhaul started in January was not completed until February 7. A leaking "hot" waste line was responsible for two days' loss of operation and a great many more man-days of burnout time spent decontaminating the cell and repairing the line. The cathodic vacuum etcher failed because of bearing trouble which required complete removal of the unit from the cell and several days of "hot" machine work. One of the lap-masters was adapted for use of gritcloth during the January 20 to February 7 overhaul. Metal removal rate was found to vary from negligible with no added weight to better than 0.001 inch per hour with a contact pressure of about 150 grams per square centimeter. A 400 KC barium titanite ultrasonic transducer assembly was installed in the cell on a trial basis during last shutdown. New objectives were installed in the remote metallograph replacing those darkened by previous exposure to radioactive samples. A comparative test was worked out whereby the light absorption by the old lenses could be compared with that of the new. The comparison showed that in two passes through the objective, the irradiated lenses absorbed 39 to 88 percent more light than the new lenses.

Two 300-watt lights were attached to removable cell plugs and placed in the walls of the slug examination cell B to facilitate visual and photographic examination.

Design of the cutoff lathe for cell E was completed, and preparatory work for the installation of motive power for the cutoff lathe and milling machine for cell E was begun.

Modifications to the x-ray diffraction cell are being made to increase the angle of rotation of the goniometer arm, allow increased sample scanning, increase drive ratio on crystal holder, provide better lighting and repair coolant lines to x-ray tube. A new x-ray tube holder is also being designed to hold the tube in a horizontal position and to provide additional positioning of the x-ray target.

Separations Plant Corrosion

In line with the continued search for a suitable bearing material to be used in process lubricated submerged rotating equipment, tests have been made to evaluate the corrosion resistance of several "pile" graphites. The Gulf Cleves Coke or CSGBF coke exhibited sufficient corrosion resistance in boiling concentrated nitric acid to warrant further investigation. A specimen of SCSGBF graphite which had received an irradiation of 1200 md/ct was obtained for testing to determine the presence or absence of effects of irradiation on the corrosion rate of the material in nitric acid. The specimen was exposed to boiling concentrated nitric acid for two 48-hour periods and was then removed from the test because of excessive decomposition and crumbling. The graphite bulk had become very soft and porous, and the surfaces were crumbling, particularly at the edges. It is concluded that although the SCSGBF graphite may serve quite well in applications where there is no irradiation, this material is damaged severely by exposure to nitric acid after exposure to irradiation and thus is unsuitable for bearing applications.

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A program to determine the corrosivity of 2WW Purex waste acid concentrate by quantitative, semiquantitative, and qualitative methods upon types 304L, 347, and 312 stainless steel and A-55 titanium under heat transfer conditions is in progress. Preliminary quantitative data showing the effect of corroding surface temperature upon the corrosion rate of as-welded type 347 and 308L stainless steel weld metal exposed to boiling snythetic 2WW solution, have been collected. These data show that the corrosion rate of the type 347 weld metal appears to be an exponential function of the temperature within the range of 110 C to 160 C. The corrosion rate of type 308L weld metal appears to be less than or equal to that of type 347 within the temperature range of 110 C to 160 C. However, within the temperature range of 140 C to 160 C type 308L has a significantly lower corrosion rate than type 347 weld metal.

Sintered type 318 stainless steel filters used in one of the product concentration and purification operations in 231-Z Bldg., have shown a service life ranging from two weeks to six months. The filter assembly consists of a 12-inch x 10-inch x 3-inch semi-circular 1/8-inch thick, sintered type 318 stainless steel. The filter is welded to a one inch deep box with the same dimensions as the filter, usually fabricated from type 347 stainless steel. A one inch stainless steel pipe is welded to the box, and the entire assembly is immersed in the process solution. After product precipitation, vacuum is applied to the pipe to remove the supernate, resulting in a solution velocity in the pipe of about 1.5 ft/sec. Assuming that the flow through the filter is uniformly distributed over its surface, the velocity effect on corrosion is expected to be negligible. Types 304 and 309 sintered stainless steels have been submitted for testing as replacement materials. Corrosion tests on the suggested replacements, types 304 and 309, and on the material currently in use, type 318, are being performed. As yet, no significant differences in corrosion rate on the three steels tested in simulated process solutions are apparent although this investigation is still in the initial stages.

Metallographic examination has been started on the damaged section from the second stainless steel calcining pot to fail by cracking in the 222-U Bldg. The damaged section was photographed and sectioned. Microscopic examination of the sample disclosed the cracks to be of an intergranular nature.

Welding Development

In an effort to eliminate the crevice corrosion associated with the tube-tube sheet joints in heat exchangers which have the corrosive media outside the tubes, a joint has been developed which can eliminate the crevice. Back welding and/or rolling have been unsuccessful in eliminating the crevice. The proposed joint provides for an annulus around the tube in the tube sheet to allow free passage of solution, eliminating one of the conditions for crevice corrosion. The tube is welded to a shoulder at the face side of the tube sheet. Full penetration of the weld eliminates any crevice at the bottom of the annulus. It is necessary in evaluating the worth of the proposed joint to investigate its physical and metallurgical properties and to see how they compare with conventional joint properties. A series of tensile tests have been initiated to determine the joint strength of the proposed joint in various pipe sizes. Tests have been made using one inch diameter 11-gage type 304L extruded tubing and 2 1/2-inch thick type 304L tube sheets. Four joints embodying the proposed design were made leaving 1/16 inch annulus around the tubing and 1/16 inch to 3/32 inch shoulder to which the tube was welded. Two of the specimens broke in the

weld heat affected zone and two broke in the tubing about four inches from the tube sheet. The two specimens that broke at the weld broke at a stress of about 64,000 psi in the tube. The pipes elongated 19 percent and reduced in diameter eight percent before the welds broke. The stress to break the tube in the other two was about 70,200 psi in the tube. The tube at the tube sheet reduced in diameter about 16 percent during testing. Similar tests using different sizes of pipe are in progress.

CONTACT ENGINEERING UNIT

PROJECT REPRESENTATION

Project CA-512-R

K Pile problems pertaining to pigtails, nozzle gaskets, and temperature sensing elements caused no changes in scope and thus required no representation action. The only scope change considered during the month was the request for installation of a sub-critical meter in place of a proportional counter. Early consideration of this by the Project Representatives is scheduled.

Project CG-558

A proposal by the Manufacturing Department to use combination strainer-check valves on the front face was not approved. It was believed that the proposed devices had not been adequately tested for use in this critical installation. Consideration was given to the need for total flow recorders in the 190 control rooms, with Project Representatives unable to reach unanimous agreement. Agreement was reached on providing steam pump rotation indicators in the 190 control rooms to verify the availability of these pumps for emergency service, and on providing means for preventing ice formation in the intake of the 181 pumps.

PROCESS STUDIES

A study was made to establish the economic effects of gross changes in allowable maximum heat transfer rates and lattice spacing on power production costs in dual purpose reactors. Preliminary results indicate power production costs to be quite insensitive to lattice spacing, and to increase by about ten percent when the allowable heat transfer rate is halved from a base of 660,000 BTU/hr-ft^2.

Study of the economic incentives for pressurizing B, D, F type piles continued, with the goal of identifying the cases of pressurization with greatest potential.

SPECIAL STUDIES

Work continued on compiling the history of the removal of contents and restoration of process channel 4669 KW. Assistance was rendered to design planning personnel in preparing construction budget data sheets for the fiscal 1957 budget.

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

Inventors	Title
W. B. Kerr	A Solution for Electrolytic Etching of Uranium and Some Other Metals. (HW-35194, 2-14-55)
W. B. Kerr	Process for Recovery or Regeneration of an Electrolytic Etch Solution Used to Etch Uranium and Possibly Some Other Metals. (HW-35195, 2-14-55)
G. A. Last	Point Closure Technique for Jacketing of Reactor Fuel and Target Materials. (HW-33981, 2-9-55)

O. H. Greager

Manager - Pile Technology
ENGINEERING DEPARTMENT

VISITORS AND BUSINESS TRIPS

R. C. Regier, Phillips Petroleum Company, Idaho Falls, Idaho visited Hanford on 2/1 and 2/2/55 to discuss analytical problems.

Myran Kratzer, AEC, Washington, D. C., visited Hanford on 2/1/55 to discuss Thorex processes.

N. E. Berry, W. M. Leaders, Mallinckrodt Chemical Works, St. Louis, Missouri visited Hanford on 2/23/55 to discuss continuous calcination.

M. R. Fenske, Pennsylvania State College, State College, Penn. visited Hanford on 2/14, 2/15 and 2/16/55 to discuss methods of determining flash point of volatile materials.

Homer Lowenberg, Vitro Corporation of America, visited Hanford on 2/28/55 to obtain information for the revision of the Reactor Handbook.

M. B. Andrew, J. R. La Pointe and Dr. R. L. Geddes, Westinghouse, Pittsburgh, Pa., and Stone and Webster Corporation, Pittsburgh, Pa., visited Hanford on 2/24/55 to discuss means of cleaning up process waste solutions.

J. L. Daniel of Hanford attended the Pittsburgh Conference for Analytical Chemistry and Applied Spectroscopy on 2/28/55.

F. J. Leitz, Jr. of Hanford visited the California Institute of Technology, Pasadena, California on 2/28/55 to recruit technical personnel.

A. E. Smith of Hanford visited the Los Alamos Scientific Laboratory, Los Alamos, New Mexico on 2/28/55 to discuss fabrication of plutonium and the Dow Chemical Company, of Rocky Flats Plant, Boulder, Colorado on 3/5/55 to discuss fabrication of plutonium.

ORGANIZATION AND PERSONNEL

	January	February
Separations Technology General	2	2
Plant Processes Sub-Section	46	48
Chemical Development Sub-Section	82	82
Chemical Research Sub-Section	64	60
Contact Engineering Unit	4	4
Analytical Laboratories Unit	32	32
Technical Shops Unit	29	29
	259	257

Plant Processes Sub-Section: N. Ketzlach, Engineer II transferred from the Sub-Section to the Physics Research Sub-Section effective 2/1/55.
J. M. Cornwell, Steno-Typist, terminated "personal illness" effective 2/11/55.

C

Chemical Development Sub-Section: Louise C. Neil, Lab. Asst. A was hired into the Sub-Section 2/14/55.
J. L. Bradford, Engineer II was granted a "leave of absence" from March 1, to April 1, 55.

Technical Shops Unit: Margaret K. Filley, General Clerk B, was transferred out of the Unit to the SF Accountability Section effective 2/28/55.

PLANT PROCESSES SUB-SECTION,

REDOX PROCESS TECHNOLOGY

Summary

Following the repair, replacement, and cleanout of equipment during the January shutdown, operations were resumed on February 3, with 200 MWD/T fuel. Although startup was complicated by a series of difficulties such as leaks, equipment failures, etc., good process performance was attained for most of the month. Three uranium and plutonium cycles were used with one stage waste backcycling and permanganate Head-End (but without scavenging; data indicated that neither uranium nor plutonium would have met specifications if the dichromate Head-End had been employed). Sustained rates up to 9.5 tons per day were demonstrated. At ten tons per day, an apparent flood occurred in the IA Column (the IS Column was not operated in parallel). Waste losses averaged approximately 0.2 to 0.3 per cent and 0.4 to 0.5 per cent for uranium and plutonium, respectively.

Feed Preparation

Pile exposure of metal charged to the dissolvers averaged 202 (189 to 209) MWD/T. The age since pile discharge decreased steadily to a minimum of 75 days at the end of the report period. This resulted in significant concentrations of U^{237} in the uranium product, and also gave high (average 2.8 curies/day) emissions of I^{131} from the stack. Plans have been made to sample the off-gas downstream from the sand filter to determine how much (if any) of the iodine reaches the stack via the vessel vent system.

Complete dissolution of the MnO_2 in Head-End treatment has resulted in an apparent decrease in gross gamma decontamination by a factor of two, but no evidence of IA Column flooding or emulsification has been seen. The nitric acid-hydrofluoric acid flush of the dissolvers made during January was apparently successful in reducing the silica content of metal solution as shown by a series of H-7, H-1, and IAF samples in which silicon was reported to be "not detectable".

Capacity in excess of ten tons per day has been demonstrated in the dissolvers by (a) eliminating the scheduling of dissolving and jacket removal, (b) eliminating the acid rinse following jacket removal, (c) increasing the concentration of the starting acid from 48 to 52 per cent, (d) dissolving to a higher free acid concentration in the final solution (increased from 0.05 to 0.5 M), (e) increasing the rate of continuous acid addition from 30 to 40 pounds per minute, and (f) increasing the steam to the dissolver coils by partially bypassing the steam PR valve. Tests of other potential means of increasing the capacity still further are pending.

Solvent Extraction Performance

Decontamination performance was fairly uniform throughout the month. The following table presents representative data:

Cycle	Gamma Decontamination Factors, dF Uranium	Plutonium
Head-End and First Cycle	4.4	4.8
Second Cycle	2.1	1.7
Third Cycle	0.4	1.0
Over-all	6.9	7.5

Uranium and plutonium recoveries averaged 99.7 and 99.5 per cent, respectively, and showed a slight upward trend at the higher processing rates. A sustained production rate of 9.5 tons per day was demonstrated, disclosing no inherent process limitations. A test at ten tons per day was discontinued after 1.5 hours due to an apparent flood in the 1A Column. Normal operation was quickly reestablished at 9.5 tons per day with no apparent ill effects.

Uranium Cycle Flowsheets

The flowsheet for the uranium cycles was, for the most part, the same as that in use at the end of December. A reduction of about five per cent in the 2DFS flow was made as a result of the change in 3A flowsheet, discussed below. A corresponding increase of about five per cent in 2DFS uranium concentration was required to maintain a minimum concentration of 1.1 M $Al(NO_3)_3$ in the 2DW stream.

In order to decrease volume velocity in the 1A Column and to reduce the load on the solvent recovery system at rates above 9.5 tons per day, on February 23, the 1AF uranium concentration was raised from 2 M to 2.1 M, the 1AF flow was reduced from 100 to 97, and the 1AX flow was decreased from 400 to 385.

Plutonium Cycle Flowsheets

Because the acid concentration in the 3BP stream would have been excessive while processing 200 MWD/T material on the December flowsheet (for 600 MWD/T fuel), the acidities of 2AF and 3AF were lowered and the 2AX flow ratio was reduced by about three to four per cent. In order to reduce aluminum nitrate consumption, the 3AS (and thus, 3AX and 3BX) flows were decreased, being changed from 3AF:3AS:3AX:3BX = 14.9:14.9:23.9 to 14.9:7.45:14.9:4. Aluminum nitrate solution for the 2BP butt was used as received (-0.25 M HNO_3) instead of bringing it up to stoichiometric neutrality with HNO_3. The net acidity of 3AF was thereby reduced from ca. 0.3 M to ca. 0.1 M.

On February 17, the third plutonium cycle flowsheet was changed to 3AF:3AS:3AX:3BX = 14.9:14.9:19.8:4, in an attempt to obtain improved decontamination with the higher scrub section L/V. No effect was observed, and the original flowsheet was re-established on February 21.

Stack Emission

With the attainment of excellent vacuum in the H-4 Oxidizer and the elimination of scavenging, a marked decrease in activity entering the sand filter has been noted, and ruthenium emissions from the stack have been consistently below 0.1 curie/day. The dissolver vent jets were routed directly to the stack breeching on February 11, and although "coats" and "cuts" have been coming off simultaneously since February 14, no ammonium nitrate deposition has been noted.

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The processing of metal cooled an average of 70 to 75 days has resulted in an average iodine emission of 2.8 curies/day for about the last week.

Waste Processing

After the replacement of the D-8 to 241 transfer pump with a jet on February 9, intermittent difficulty was experienced with waste transfer due to jet and/or line plugging. The plug approached totality on February 25, resulting in shutdown of operations. Plans are under way to route the waste to Tank 104-SX while attempting to determine where the plug is located, i.e., between the diversion boxes and the farm or between the diversion boxes and the 202-S Building. When its location has been established, high pressure water will be used in an attempt to dislodge it.

241-SX Waste Storage Tank Farm

Bumping of the intense, short-lived type formerly observed in Tanks 241-S-101 and 241-S-104 occurred in Tank 241-SX-101 for the first time on February 12. Between then and February 22, eight more such pressure surges were recorded. Maximum tank pressures for these were between 25 and 35 inches of water. In addition, a number of pressurizations with maximum tank pressures of two to seven inches of water (associated with the supernatant's sudden breaking into a boil) also were observed.

A test of February 17 demonstrated that operation of the one foot diameter auger-type agitator in Tank 241-SX-101 could produce bumping. Since February 23, this agitator has been operated on a regular once a shift schedule. Each operation of the auger has resulted in a pressure surge which was short (four to seven minutes) but intense (25 to 33 inches of water maximum tank pressure).

The average temperature at the bottom of Tank 241-SX-101 has dropped from 318 F (range 307 to 339) on January 24, to 299 F (range 291 to 313) on February 24.

The temperature of the sludge layer in the test tank in Tank 241-SX-101 has continued to climb slowly. The temperature at the bottom increased from 280 F on January 23, to 294 F on February 23. During the same period, the temperature of the supernatant rose from 222 to 224 F.

URANIUM RECOVERY PROCESS TECHNOLOGY

Metal Removal

A summary of feed source, age, and irradiation history of metal removed from the tank farms is given below:

Tank	Fraction	Age(a)	Ave. MWD/T(b)
105-BX	0.026	41	371
111-112-BY	0.562	34	582
104-107-TX	0.363	31	582
204-C	0.049	84	201

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

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

Feed Preparation

The capacity of the feed evaporators was eliminated as the bottleneck for the TBP Plant by (a) replacement of the 6-5 condenser which was reported last month to be limiting with a high differential pressure, and (b) completion of repairs to Section 7, including replacement of the 7-5 condenser.

Inspection of the 6-5 condenser through holes cut in the condenser shell in the vent and condensate outlet lines has failed to reveal the cause of the reduced capacity of the condenser. However, a large quantity of scale was observed on the vapor side of the tubes, estimated to be about 20 mils thick at the inlet end and gradually tapering off to nothing at the outlet end. Samples of the scale have been removed to determine a suitable solvent for use in cleaning other condensers removed under similar circumstances and, if possible, to determine the cause of scale formation under this service.

The composition of the concentrated first cycle feed was changed significantly after the feed evaporator repairs were completed, and supernate sluicing was used in the tank farms. Average RAF compositions were:

	Composition, M				Na/U,	Per Cent	RAW $K^{1/2}NO_3$,
	U	$PO_4^{\equiv}$	Na^+	H^+(1)	M/M	ANU Gamma	M
1/21 to 2/4	0.16	0.16	2.2	2.2	14	6.5×10^6	4.8
2/4 to 2/18	0.27	0.44	5.5	3.5	20	9.6×10^6	4.3
HW No. 6	0.27	0.27	4.1	2.7	15	---	5.5

(1) "Titratable" acid.

Intercyclic Concentration and Stripping

Waste losses from the stripper tower (T-8-4) averaged about 2.0 per cent of the new feed uranium. Recommended corrective action, to incorporate the lowering of the stripper feed point, and the provision of drainage for the top four plates, has not been initiated but is planned to be partially carried out at month's end by draining the top two plates.

With the chest pressure limited to 30 psig, and with the condenser vent vacuum limited to 30 inches of water to minimize air in-leakage, and consequent excessive condensate entrainment from the 8-5 condenser, the Section 8 evaporator unit is limited to about eight tons per day at 75 per cent of flowsheet RCX.

Waste Handling

Scavenged waste, amounting to approximately 9,500 gallons per ton of feed uranium at an average pH of 9.0, was returned to storage for settling in 106 and 108-BY. Approximately 400,000 gallons of scavenged waste supernatant from Tank 110-BY were transferred to an open ditch on a specific soil retention basis (100 gallons of waste per square foot of crib area). The supernatant contained an average of about 0.05 M $PO_4^{\equiv}$ and 0.1 and 0.5 microcuries per ml Cs^{137} and Sr^{90}, respectively. Recent Earth Sciences laboratory data indicate that at least 0.1 M $PO_4^{\equiv}$ ion is necessary in the waste supernatant to insure satisfactory soil retention of Sr^{90}.

Nickel sulfate consumption during December, 1954, and January, 1955, was about 22.5 per cent below the amount necessary to give 0.005 M in the scavenged waste. The effect of the lower nickel sulfate concentration on waste scavenging has not been fully determined, but the addition of nickel sulfate has been adjusted to the flowsheet value.

Solvent Extraction

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

		Extraction-Scrub Column			Stripping Column	Organic Scrub Streams	
Cycle	Feed	Water Scrub	Intermed. Scrub	Extractant	Extractant	First Stage	Second Stage
First	90 to 200	150 or 180	100	120	65 to 75	100	0 or 100
Second	100	100	100	115	90	100	0

Other departures from flowsheet conditions included the use of RCX and REX heated to 55 C and 0.4 M sulfamic acid (vice 0.2 M) in the RDIS.

The average solvent extraction performance data are:

Waste Loss, Per Cent of the Feed Uranium				Logarithmic Gamma Decontamination Factor	
RAW(1)	RCW(1)	RDW(2)	REW	First Cycle	Second Cycle
0.5	0.3	0.07	0.03	3.8	1.5

(1) RA losses are commensurate with operating and process variables, and may be reduced by adjustment of feed compositions to increase $K^{1/2}_{NO_3}$ values, while using higher RAX flows to reduce L/V values (cf. HW-32097, 32377, 33114).

RC losses are reducible by operating at maximum temperatures attainable at L/V values above 0.64 (cf. HW-32097, 32377).

(2) This uranium is not lost from the system but is backcycled to the RA Column.

Nitric acid concentrations in the RCU and REU averaged 0.14 and 0.09 pounds per pound of uranium, respectively. The use of RAS (first cycle water scrub) at 180 per cent of the flowsheet rate prevented the increase in feed acidity from causing a corresponding increase in the RCU acid concentration.

Organic phase treatment consisted of one or two in-tank continuous contacts with three weight per cent sodium carbonate solution. The second wash was discontinued in both lines to decrease the waste volume. It was resumed in the first cycle, however, because of the high RCW losses. Following the return to two cycle RCW washing, and a coincident increase in RC Column operating temperature from 42 to 45 C, the RCW losses decreased from 0.5 to 0.1 per cent of the feed uranium.

RCU stored as long as 96 hours in the 224-U Building UNH Receiver Tank, X-2, was concentrated and processed through the second cycle with no observable deleterious effects caused by the long storage period.

URANIUM CONVERSION PROCESS TECHNOLOGY

Summary

Total metallic impurities, fission product gamma activity, and plutonium in product UO_3 averaged 207 parts per million parts of uranium, 64 per cent of aged natural uranium gamma, and < 5 parts per billion parts of uranium, respectively. The average reactivity was 1.14, using 0.05 weight per cent sulfamic acid as an additive.

Off-Standard Product

During the production of carload 257, significant caking difficulties were experienced as a result of rerouting large quantities of sump-collected UNH solutions through the UO_3 Plant concentration-calcination operations, without prior repurification in the TBP Plant. Out of specification UO_3, with total metallic impurities at 490 parts per million parts of uranium, resulted. On the other hand, the high sulfur value of 248 parts per million parts of uranium, equivalent to the addition of about 0.07 weight per cent sulfamic or sulfuric acid, gave a reactivity ratio value of 1.21 for the carload.

One carload, No. 260, processed with the inclusion of some Redox UNH at gamma ratio of ca. 3, exceeded fission product gamma specifications with a value of 127 per cent of ANU, as determined by the HAPO method.

Reactivity

Based on UO_3 product analyses, reactivity improvement, using sulfuric acid, was equivalent to that obtained with sulfamic acid additions. During these tests and subsequent tests using sulfamic acid (0.05 and 0.08 weight per cent), reactivity varied with the sulfur content of the UO_3 product ranging from approximately 1.1 for 124 to 1.3 for 313 parts per million parts of uranium. In general, hard cake formed in the pots when total sulfur in the product exceeded approximately 270 parts of sulfur per million parts of uranium.

Anti-Caking

Anti-caking tests using 0.01 and 0.05 weight per cent "Petro AA" and 0.01 weight per cent "Silene EF" indicated that these additives were ineffective in eliminating or reducing pot caking under the conditions tested.

Equipment

Major down time was caused by plugging of the pot feed loop header. Pluggage was attributed to the freezing of overconcentrated UNH solution in the loop header. This overconcentration in the X-19 tank occurred while PX-19 pump was being repaired.

The ED-2 final product concentrator developed the first process leak in this equipment since the initiation of operation in late 1952. It will be dismantled for corrosion inspection. The cracked portion of Luckey pot 20 bottom was removed, and a new section was welded in place.

Absorber Tests

A recycle line, whereby the gas cooler acid can be sprayed back into the cooler, has been installed. With cooler acid feeding the sixth plate of the absorber tower and a recycle of one gallon per minute, 50 per cent nitric acid has been produced during limited periods of steady state operation.

PUREX PROCESS TECHNOLOGY

Effective February 1, the Purex Plant Process Unit was organized. During the month, five men have devoted their efforts to the initial work of the Unit. Rough draft operating procedures for the continuous portions of the plant (and also the new dissolving technique) are approximately 30 per cent completed. The first of a series of training discussions on the Purex process have been presented to Separations Section supervisors and operators.

BISMUTH PHOSPHATE PROCESS TECHNOLOGY

Extraction Section

A survey of the waste losses in the extraction sections indicates a definite correlation between the waste loss and the particular batch of metal solution used

to prepare the run. On the other hand, for the standard flowsheet, no correlation between acidity, UNH concentration, and waste loss has yet been found.

Concentration Building

Reductions in the lanthanum fluoride by-product step time cycle have been achieved by (a) oxidation at ambient temperature (vice 60 C) without affecting waste losses, and (b) elimination of the rework step (re-oxidation, re-precipitation, and re-centrifugation) with only a small increase in waste losses from 0.24 to 0.31 per cent. The latter step also reduces process volumes from 49 per cent to 38 per cent.

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

Segregation of coating waste and first cycle waste continued throughout the month. Analysis of the 103-TT (First Cycle Waste) indicated the total radioactive strontium (mixture of Sr^{89} and Sr^{90} with reported Sr^{89}/Sr^{90} ratio of ca. 22) to be 0.3 to 0.8 uc/ml and cesium^{137} to be .004 to .008 uc/ml. Previous data had indicated the separation of coating waste and first cycle waste would allow the first cycle waste supernate to be scavenged to 0.1 to 0.3 uc/ml for total radioactive strontium and cesium^{137} to .002 uc/ml. It is believed that the high radioactive strontium content has resulted from variations in the pH control.

Equipment

A leak of 140 pounds per hour developed in the cooling coils of the 3-5L dissolver. A leak of 30 pounds per hour was also found in the condenser off-gas coils. The heel is being removed from this dissolver, and it will then be replaced by a spare unit.

Isotopic Content of Flush Solutions

Special equipment flushes made in January resulted in higher than normal amounts of plutonium recovery. Isotope 240 analyses obtained from these runs indicate that the runs contain up to 40 grams of high n/g-s plutonium. Thus, recovery of plutonium which has been held up in T Plant for a long time is indicated.

Since this material will not meet the 20 n/g-s specification when fabricated but will meet a 25 n/g-s specification, it has been recommended that the seven sample cans of this material be shipped as a lot having a neutron emissivity of less than 25 n/g-s.

IN-LINE INSTRUMENTATION

Redox

The installation of a vacuum chamber in the Redox 1BU gamma monitor sample line resulted in improved sampling performance, and the instrument readings are reportedly within 30 per cent of corresponding laboratory determinations on F-1 samples.

During the month, the 1BU monitor was used to evaluate the effect on decontamination performance of a series of 1A Column dual scrub pilot runs. Transient upsets, time interval between flowsheet change and steady state, and over-all activity variations were graphically depicted on the monitor recorder. For example, it was possible to show, in a short duration run and without waiting for laboratory analytical results, that increase in gross 1BU gamma activity of less than 100 per cent accompanied a 63 per cent reduction in normal 1A scrub section L/V.

Bismuth Phosphate

The need for increased emphasis on turbidity monitoring investigations was indicated during the month when it appeared that the availability of a satisfactory in-line turbidimeter would permit the installation of Gilmont dilution samplers at B Plant, thereby eliminating the need for hot sample facilities in the Purex analytical laboratory after B Plant startup. Turbidimeter circuit diagrams, laboratory test results, and models and drawings of tested sensing units were submitted for study by Chemistry Sub-Section personnel. Successful plant demonstration of such a device would negate the need for slower and more costly, but more certain, sample handling and analytical procedures.

Moderate contamination of the internal surfaces of the pH buffer and flush tanks in the T Plant operating gallery was discovered during the report period. The source of this activity is not known, but a study of the installation indicated that either air blow-back resulting from a plugged sampler-jet discharge or contaminated canyon air flowing into the apparatus vent system could have been responsible. Proposed preventive modifications include the installation of a flush-line check valve and a vent-line air filter.

Metal Recovery

Electrode failures at the Metal Recovery Plant have complicated pH control during the month. Seven electrode assemblies have required replacement. In addition, five units were discovered to be defective prior to canyon installation. Electrode life varies from two days to two weeks, and the most recent causes of failure appear to stem from the cracking of glass and resin as the Scotchcast assemblies are allowed to age and harden. These cracks appear to damage the glass electrode, open parallel salt bridge circuits, and cause loss or dilution of KCl in the salt bridge. The use of resin fillers and modifications of casting and curing techniques are being tried to improve the performance of the probes.

Lately, the pH assemblies have shown a tendency to buffer correctly at pH 7.5 but show open circuit phenomena in the presence of pH 10 buffer.

The remote, two point pH buffer and flush system was installed at the Metal Recovery Plant and has performed satisfactorily. This eliminates the necessity for canyon entry to check the pH assembly performance.

Preliminary testing and calibration of the UO_3 Plant pipeline gamma absorption photometer was performed in the 325 Building during the report period. Shielding

of the high intensity Cs-Ba^{137} gamma source is adequate, and the intensity of source radiation transmitted through the two inch pipe filled with molten uranyl nitrate hexahydrate produces sufficient ion chamber current for accurate readings, but high temperature (100 to 110 C) operation of the monitor caused failure of the resin-bonded glass tape which was used to insulate the ion chamber. Teflon insulator rings and cups have since been fabricated for this purpose.

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

Operation of the 231 Building was routine. All tasks of the purification and fabrication building were shut down during this period. Task I (wet chemistry) installation and Task III (reduction) replacement constituted the major activity.

Equipment drawings for the fabrication, inspection, and shipment of 190 assemblies have been issued.

234-5 DEVELOPMENT

Plutonium(IV) Oxalate Precipitation in the Task I Prototype

Plutonium(IV) oxalate has been precipitated satisfactorily in the Task I prototype, from both AT solution and concentrated Redox product solution. Plutonium waste losses were 4.5, 3.0, 1.1, and 0.6 per cent for the four runs. It appears that, with good filter boats, the losses should not exceed one per cent. The bulk density of the best precipitates was only 0.35 g/cc. This is low enough that filter boat capacities will be strained for a 600 gram batch. Although the demonstrated process time was four hours, a total process time of three hours appears feasible. Recommended operating procedures for Task I shakedown will be given in a forthcoming report, along with a summary of the experimental work done to date in the prototype.

Continuous Task II

A series of five runs was made in the continuous fluorinator, using plutonium (IV) oxide prepared from product from the Task I prototype. The majority of this feed

material was below standard quality, because of difficulties in the precipitation process, and did not fluorinate well. The last two runs, however, were made with feed which was normal in appearance and produced normally pink fluorides. Greater than 97 per cent conversion to PuF_4 was obtained in these runs at rates which would permit the processing of 14 kilograms of plutonium per day. The resultant fluorides were reduced to plutonium metal with yields greater than 98 per cent.

Nickel Carbonyl Coating

A total of eleven uranium pieces were coated with an average one mil thick coating of nickel. These pieces are to be used for fuel element canning studies.

Control of the application of the nickel coat at a near uniform rate has been made possible by locating a thermocouple at the base of the tripods, outside the intense induction field. Under these conditions, the good control is evidenced by the nearly constant rate of pressure rise in the system. The improvement in control is attributed to the placement of the thermocouple, since thermocouple temperature data obtained from within the intense induction field are unreliable.

Recuplex: Laboratory Studies

In recent studies of alpha particle damage to tributyl phosphate in the Recuplex system (15 per cent TBP in CCl_4), the following was observed:

(1) Solvent decomposition, expressed in terms of plutonium losses to the organic effluent from the stripping column (CCW), was directly proportional to the plutonium concentration in the solvent and to the exposure time.

$$g/l\ Pu\ in\ CCW = 0.003 \times g/l\ Pu\ in\ CCF \times days\ exposure$$

(2) "Fish egg" emulsions (aqueous globules in organic film) were formed in the aqueous phase when stripping the plutonium from aged solvent, in separatory funnels. Disengaging times increased ca. three per cent per day with increasing exposure time, but could not be correlated with plutonium concentrations in the aging solvent.

Recuplex Construction

Construction of the Recuplex facilities in Rooms 221 and 337 of the 234-5 Building is approximately 96 per cent completed. The Slag-and-Crucible hood, the Reception-and-Blending hood, the RB-SE and SC Chemical hoods, and the Chemical Preparation room have reached beneficial use status. The majority of equipment associated with the Reception-and-Blending hood, the RB-SE Chemical hood, and the Chemical Preparations room have been accepted from the construction forces. Calibration of the accepted vessels will be started February 28, 1955.

CHEMICAL DEVELOPMENT SUB-SECTION.

PUREX DEVELOPMENT

On February 23 the preparation of the Purex Technical Manual was approximately 85% complete.

Process Studies

Purex HW-No. 4 Flowsheet. A study has been made to determine the modifications which might be made in the Purex HW-No. 3 Flowsheet to increase the processing capacity of the Purex Plant. The results of this study are currently being issued as Document HW-35225, entitled "Increased Purex Plant Capacity: Purex Chemical Flowsheet HW-No. 4." Briefly, the document indicates that by incorporating the modifications to the HW-No. 3 Flowsheet listed below, and by making minor equipment changes and revisions (an approximate total of 100 rotameter, orifice-meter, and valve changes; and replacing the internals of the IBX and IO Columns) the instantaneous processing capacity of the Purex-Plant solvent-extraction equipment may be increased to at least 23 ton U/day.

Process modifications incorporated to achieve the increased capacity include the following:

(1) Increasing the "C"-type column extractant temperatures to approximately 60°C. and reducing the "C" Column extractant flows to approximately 60 to 70 per cent of the HW-No. 3 Flowsheet flows. This change provides about a 40 to 50 per cent increase in the processing capacity of the previously limiting uranium concentrators.

(2) Increasing the uranium concentration in the feed to the "A"-type columns from 1.35 to 1.5 M UNH to reduce aqueous waste volumes.

(3) Reducing the scrub flow rate to the IBS Column approximately 60 per cent to provide a more stable IBS Column capable of operating at higher processing rates.

(4) Reducing the 2B Column extractant flow to 65 per cent of its HW-No. 3 value to reduce the load on the plutonium concentration equipment.

(5) Backcycling the bottoms from the No. 2 Acid Waste Concentrator (the 2WW stream) to the Dissolvers where the acid is used for "butting" HAF solution. This routing was shown as the preferred of two possible routings of the 2WW on the HW-No. 3 Flowsheet.

(6) Reducing the extractant flow rates to the 1A, 2D, and 2A Columns slightly (10 per cent for the 1AX and 2DX and 30 per cent for the 2AX) to improve column decontamination factors and decrease organic flow in the plant.

All of the above modifications have been demonstrated experimentally, except back-cycling of the 2WW, and this one is scheduled to be piloted in the Hot Semiworks in the next few months. This demonstration and the exploitation of modifications 5 and 6 would raise the estimated instantaneous plant processing capacity to about 25 tons of uranium per day.

Process Chemistry

Evaporation of Acid Waste Streams. Recent Chemical Research Sub-Section studies revealed that ruthenium volatilization during evaporation of Purex acid waste streams (1WW and 2WW) may be retarded by the addition of nitrite compounds or sulfamic acid. This effect would enable greater concentration of the acid waste, perhaps to the extent that solubility rather than ruthenium volatilization would be limiting. The solubility limitation was determined by evaporating synthetic 1WW and determining the crystallization point as a function of the degree of concentration. The results indicate that a two-fold concentration above the HW-No. 3 Flowsheet 1WW concentration is feasible. Crystallization at the boiling point occurs after a 2.5-fold concentration.

Chemical Engineering Development

Pulse-Column Performance with Non-Sinusoidal Pulse. Sixteen "cold" uranium Purex pulse-column studies were made during the month with a 3-inch-diameter column and a hydraulic pulse generator. The hydraulic pulse generator, similar to the ones used in the Hot Semiworks, developed time-displacement wave shapes which were of a non-symmetrical near-triangular form. Column performance characteristics were sufficiently similar to those exhibited with a Purex-Plant-type near-sinusoidal pulse to permit proper evaluation of the forthcoming Hot Semiworks Purex-process studies.

Equipment Development

Pump Development. An Allis-Chalmers centrifugal pump equipped with fluid piston bearings was inspected after pumping water at 7 gal./min. against a 42-ft. head for 228 hr. The period between the 191 hr. and 228 hr. inspections consisted of 1195 cycles during which the pump was on 2 min. and off 2 min. Absence of wear during the start-stop test -- which is a severe test because there is metal-to-metal contact between bearings and journals during periods of no flow -- indicates possibilities for the fluid piston bearings. The pump has been put on life test.

Pulse Generator Development. The Purex-Plant pulse generator installed on the 321 Building prototype HA Column has accumulated 677 hr. of operation pulsing simulated Purex HAX at various pulse frequencies. The piston leakage rate was reduced from 0.5 to less than 0.1 gal./min. by plugging the weep hole in the piston face.

Teflon Bellows Pulse Generators. The following informal report was issued:

HW-35284 "Flexure Tests on Irradiated Teflon Bellows", by P. B. McCarthy, dated February 1, 1955.

A spare Purex Plant agitator installed in the 321 Building Tank Farm has been operating for 2469 hr. in 60% nitric acid. The operating period includes 56 cycles of draining and refilling the tank. There have been no apparent changes in either the agitation or the mechanical operation.

HOT SEMIWORKS

All construction work for the conversion of the Hot Semiworks equipment to the Purex process has been completed. Operations at the Hot Semiworks during the past month have included the following: (a) completion of the water calibration of flow instruments, (b) preliminary shakedown of the acid recovery system including operation of the vacuum fractionator, (c) complete flushing and testing of all equipment with 1 M nitric acid, (d) simultaneous operation of all equipment using 3 M nitric acid and solvent (30% TBP in Shell Deodorized Spray Base), (e) dissolving of 560 lb. of unirradiated uranium from jacketed, reject slugs, and (f) calibration of flow instruments and testing of equipment on process solutions. The latter is approximately 60% complete.

REDOX DEVELOPMENT

Process Chemistry

Thiosulfate Feed Pretreatment Process. Laboratory experimental work has developed a feed pretreatment which gives promise of providing adequate ruthenium decontamination when combined with Redox solvent extraction. The procedure has few of the disadvantages associated with either ruthenium volatilization or ruthenium scavenging with copper sulfide. Sodium thiosulfate is added to acid-deficient dissolver solution which is then digested for one hour at about 70°C. A precipitate which forms carries most of the ruthenium present. Ruthenium not carried by the precipitate appears to be changed to a form less readily extracted by hexone than that present in untreated dissolver solution.

Further development testing of this new procedure is in progress.

Continuous Calcination

The 16-in.-diameter by 8-ft.-long semi-plant scale agitated trough-type denitration unit continued in operation. Between January 7 and February 19, 15 tons of UO_3 were produced.

At an agitator speed of 42 rev./min., feed-point temperatures of 270 to 325°C. and a 50 to 70-lb./hr. production rate, the reactivity of the UO_3 was between 0.46 and 0.70. The addition of 1000 parts of $SO_4^=$ per million parts of uranium (330 p.p.m. S) to the UNH feed increased the reactivity to 1.02. No caking or lumping on the agitator or reactor walls was experienced during the sulfate runs. Further development objectives will be to demonstrate increased capacity of the semi-plant scale unit, and to demonstrate a reactivity ratio of 1.2 to 1.3 for the UO_3, relative to the current standard.

CHEMICAL RESEARCH SUB-SECTION,

PUREX

Nitrogen dioxide gas has been shown to be an effective substitute for nitrite salts in suppressing ruthenium volatilization in Purex nitric acid recovery. Such addition of "nitrite" in gaseous form rather than as a solid salt or solution is of interest, as it may be more convenient in continuous plant operation. The logarithmic ruthenium decontamination factor for acid distilled from 8 M HNO_3 - 1.5 M $NaNO_3$ bottoms rose from 2.0 in the absence of nitrogen dioxide to 4.1 within four hours after applying one atmosphere of nitrogen dioxide to the Othmer equilibrium still.

In initial continuous distillation experiments, nitrogen dioxide again proved effective as a ruthenium volatilization suppressant. Logarithmic beta decontamination factors increased from 4.4 in the absence of nitrogen dioxide to 5.4 with nitrogen dioxide added to the feed at room temperature. Addition of nitrogen dioxide directly to the hot distillation pot was much less effective. The substantially higher decontamination factors obtained in the continuous distillation as compared to the earlier equilibrium operation are not unexpected in view of the short holdup time, viz., 2 hours, used in the continuous case. Additional experiments planned include evaluation of nitric oxide, a cheaper gaseous "nitrite" source.

Poor ruthenium decontamination has been obtained recently on addition of urea to the nitric acid distillation system, in unexplained conflict with earlier results. This, coupled with the frothing difficulty previously reported, indicates little promise for urea as an alternate ruthenium volatilization suppressant.

Direct comparisons of radiation and chemical stability of diluents have been made and again show a slight superiority of Soltrol over Spray Base. Various 30 percent TBP solvents prepared from different diluents were contacted with an aqueous phase 0.09 M UNH, 5.2 M HNO_3, and 0.02 M $NaNO_2$ for extended periods of time. Differences in solvent stabilities were then measured by means of the "C" contact (dilute uranium distribution test). Soltrol 170 and Amsco 125-90 W resisted chemical attack at 50 C four times better than Shell Spray Base in the absence of a radiation field and also resisted attack better in the presence of radiation. Amsco appeared to have enhanced radiation stability ($\sim$ eightfold).

When chemical damage experiments of the above type are conducted with periodic stripping and solvent washing during the course of exposure (simulating the repeated cycling of solvent through process and clean-up as occurs in the plant), the differences between diluents tend to disappear; Soltrol and Spray Base are found to deteriorate at the same rate. This result indicates that a secondary reaction in Spray Base is responsible for its poor behavior under extended exposure without periodic cleanup. The intermediate material is removed when

PUREX

intermittent carbonate washing is performed. The same mechanism is believed operating in the case of radiation damage. Thus, a sample of Spray Base-TBP exposed to irradiation and then subjected to chemical damage deteriorates at a rapid rate. However, if a similar sample after exposure is carbonate washed before chemical attack, a normal rate of deterioration is observed.

The effect of various exposure factors on the radiation damage to a Spray Base-TBP solvent has been clarified. Thus, no effects are attributable to uranium, nitric acid, or an aqueous phase at room temperature. Temperature has a strong effect; the radiation effect is two times greater at 50 C than at 20 C.

The chloride vapor-liquid equilibrium data under acid recovery conditions are nearly complete. At the high nitric acid concentrations material balance calculations indicate partial loss of chloride as Cl_2 or NOCl. Experiments are under way to determine the rate of oxidation or volatilization by nitric acid and the oxidation states involved. Preliminary evidence indicates a first order reaction and a chloride half-life of about one hour.

Calculations, using the new data, indicate 90 percent of the chloride from the Number 2 concentrator will appear in the feed to the vacuum fractionator. Assuming four trays, 86 percent of the chloride will be lost overhead and 14 percent follows the recovered acid. However, reflux results in a 17,000 percent concentration of chloride in the 10 to 20 percent acid region. Of greater concern is the behavior in the actual fractionator which will contain seven theoretical trays sufficient to absorb all volatile chloride. With this condition the chloride impurity will quantitatively follow the recovered acid. Possible solutions to this problem would be to feed to a higher tray or reduce the reflux.

The recent commercial availability of the trialkyl phosphorthioates, $(RO)_3P = S$, prompted a brief check of their solvent properties since literature surveys had indicated that strong complexes existed with inorganic salts and the physical properties of the phosphorthioates were nearly identical to those of the phosphates. Samples of triethyl, tributyl, and triisooctyl phosphorthioate were tested as solvents for both uranyl nitrate and thorium nitrate; their solvent power compared to the alkyl phosphates were found to be low. Further, although their chemical reactivity was reported to be low, precipitates formed after four days when the triethyl and triisooctyl phosphorthioates were saturated with uranyl nitrate and stored in brown bottles. The precipitates were not identified but may be the result of isomerization-hydrolysis reactions which are known to occur with some metal complexes. These reactions suggest a potential use of the phosphorthioates as precipitants or scavengers for cations which form strong sulfide bonds, e.g., ruthenium.

REDOX

Investigation has been initiated on a nitrite pretreatment of Redox second uranium cycle feed which has been shown to improve ruthenium decontamination in both the "25 Process" (CF-54-1-156) and Purex (ORNL-1343) processes. The pretreatment consists of simmering the 2DF at 85 C for three hours with 0.05 M sodium nitrite. A preliminary experiment using a six-months-old F-1 solution at 50 percent activity level gave a ruthenium decontamination factor of 270 with pretreatment as compared to 180 without. After simmering, which was conducted in a close reflux system, the residual nitrite concentration was 0.024 M. The batch solvent extraction consisted of one extraction and two scrubs. Volumes were small and activities low in the final solution, thus limiting demonstrable decontamination factors. This experiment will be repeated shortly with full level, fresh F-1 solution.

THOREX

Renewed interest has developed recently in developing a Thorex flowsheet which would be operable in the Redox plant in order to minimize required capital investment. A survey of project literature on hexone extractability of thorium revealed that available data are insufficient to establish definitely the feasibility of such a Thorex flowsheet. In fact, on occasion, dangerously vigorous reactions have been observed in the moderately acid-high nitrate hexone systems which have been used for thorium extraction. Accordingly, an experimental program has been designed and initiated to determine the distribution of thorium and nitric acid into hexone and hexone-TBP mixtures as a function of pertinent process variables. A parallel program is in progress to establish the maximum acidity and nitrate concentrations tolerable in a Thorex system from the standpoint of chemical and radiation stability.

Continued study of head-end protactinium carrying by coformed lead dioxide indicates that, as with manganese dioxide, protactinium decontamination falls off for thorium and nitric acid concentrations greater than 1 M. For solutions up to and including 1 M Th, 1 M HNO_3, 0.015 M HF, consistent protactinium decontamination factors greater than 100 were obtained using 0.05 M PbO_2 and tracer concentrations of protactinium. Evaluation of the coformed lead dioxide (COLD) process will be extended to full level solutions as soon as additional dissolvings of irradiated thorium are carried out.

In the search for substitutes for manganese dioxide, another very promising protactinium scavenging process was discovered, viz., the formation of stannic oxide by digestion of stannous oxide in nitrate solutions. Protactinium decontamination factors with this technique were much higher than with preformed stannic oxide and approached those obtained with manganese dioxide and lead dioxide. Thus, scavenging of a 1 M Th, 1 M HNO_3, 0.015 M HF, tracer protactinium solution with stannous oxide equivalent to 0.05, 0.1, 0.2 and 0.5 M gave protactinium decontamination factors of 40, >100, 100 and 600, respectively. It is anticipated that this process might be less subject to radiation damage than either manganese dioxide or lead dioxide; high level tests are planned.

ISOTOPE SEPARATIONS

A separation of uranium isotopes by thermal diffusion has been observed for the system composed of the uranyl nitrate-tributyl phosphate complex. The equilibrium enrichment of U-235 was one percent, which is essentially the same value obtained in a previous aqueous uranyl nitrate experiment on the same column. The rate of solvent separation caused by the Soret effect is considerably slower for the TBP complex than for the aqueous uranyl nitrate solution and permits longer runs before plugging of the column occurs. The analytical data obtained to date indicate that the column had reached equilibrium before the first sample analyzed was taken (38 days). Samples that were taken at times previous to this are now being analyzed to determine the time required to reach equilibrium.

Two runs were made to demonstrate separation of copper isotopes by the electrolysis of fused salts. The separation occurs at the interface between a column of fused cuprous chloride and a column of fused lead chloride, with the heavier isotope (Cu-65) concentrating in the interface. Copper is being used in these tests to check the apparatus and techniques of the method with the previous results obtained by Klemm of the Max Planck Institute (Germany) who originated this method for the separation of isotopes. Isotopic analyses of copper are made by neutron activation of Cu-63 in the 305 pile. Precisions of the first analyses for a 31-hour run were very poor; it is estimated that a two percent enrichment of Cu-65 was obtained in the interface sample. The samples are to be reanalyzed; no additional analytical data on this run, or on the second run of 65 hours duration are available at this time.

FLUREX PROCESS

A bomb reduction of Flurex product (potassium uranic fluoride, KUF_5) gave a yield of 80 percent, a marked improvement over previous tests. Since the previous tests had indicated the presence of moisture in the material as obtained from the electrolysis cell and filtration steps, an additional drying of the salt in air at 300 C was made prior to the reduction. During the reduction, the refractory crucible broke, and a marked spattering of the slag occurred. The bulk of the uranium was recovered in two massive pieces at the site of the crucible failure. A new electrolysis cell has been designed and constructed that will enable the production of 200-300 grams of salt per day for further reduction tests.

NEPTUNIUM CROSS-SECTION

Additional preparations and pile irradiations of Np-239 have been made, but no conclusive results for the value of the neutron cross-section were obtained. All experimental runs were lost or vitiated as a result of delays caused by unscheduled pile shutdowns, or (one case) counting equipment failure. Since each experimental run must be made with a definite time schedule of operations,

any interruptions or delays of more than a few hours will cause loss of the run by permitting excessive decay of the Np-239. The separation difficulties created by the build-up of hydrogen peroxide by the intense beta activity of the neptunium have been overcome, and the removal of traces of chloride and other easily activated impurities from the reagents was accomplished. It is expected that several uninterrupted experimental runs can be made soon, and a good value for the cross-section obtained.

ANALYTICAL DEVELOPMENT

The determination of nitric acid in thorium nitrate solutions at low acidities has been further studied. The aniline titration method previously reported proved to have a serious disadvantage at high thorium to acid ratios because of a slight reaction of thorium with aniline requiring a large correction and an accurate knowledge of the thorium concentration. As an alternative a conductimetric titration method in use at the Savannah River Plant is being studied. Under the proper conditions of dilution and ionic strength of the sample, the method yields results which are probably sufficiently accurate for process control. Application to all Thorex process samples is being studied.

An attempt was made to apply the molybdate and vanado-molybdate colorimetric methods to the determination of phosphate in Thorex process feed solutions, but both thorium and fluoride ions interfere with the methods. The most promising approach to the problem seems to be to develop a method for removing the interfering ions from the samples although methods tried thus far have not been successful.

In the study of uranium fluorimetric analysis techniques, standard deviations of 13 to 15 percent for individual determinations at the 2×10^{-9} g level and 4.3 to 6 percent at the 2×10^{-7} g level are being obtained. These precisions are obtained using sodium fluoride pellets in selected platinum dishes individually covered during fusion, the sample distributed uniformly on the pellet, and the pellet fused six minutes at 1100 C in a muffle and cooled very slowly (about six minutes). Flame fusion is being studied because it results in the same precision with about 40 percent greater sensitivity. Factors found to affect precision adversely include poor sample distribution on the dish, rapid cooling of melts and variations in cooling rate, use of an instrument which reads or "sees" only a part of the sample, the dish, and the use of warped dishes or uneven sample distribution.

A combination extraction-spectrographic method for low level gallium in plutonium was developed and supplied the 234-5 laboratory for use in giving service to metallurgical research groups. The method was set up for the range of 0.01 to 0.5 percent gallium and yields a precision (σ) of 6 to 8 percent on 234-5 laboratory equipment. The application of the method to production metal samples will be studied.

The study to develop improved methods for concentrating aqueous solutions for spectrographic analysis has continued; the ion exchange resin technique reported previously has been considerably improved. Column eluting agents were studied and citric acid solutions have proved to yield narrower elution bands and greater over-all concentration than hydrochloric acid, oxalic acid or ammonium tartrate for solutions of cobalt, nickel, iron, aluminum, copper, calcium and zirconium. Radioactive tracer techniques are being used as well as spectroscopy in conducting the study.

An apparent discrepancy between uranium determinations by x-ray photometry and by calculation from specific gravity determinations arose in the Redox process control laboratory and prompted an investigation of the reliability of the specific gravity method for uranium analysis. The problem is important from an accountability standpoint because Redox plant starting solutions are analyzed for uranium by a specific gravity method. As a result of the investigation, the accepted specific gravity relationship as given in the Redox Technical Manual was found to be accurate in this application. Using eighteen standard solutions having from 1.0 to 2.2 M UNH and from 0.0 to 0.15 M HNO_3, uranium values calculated from specific gravity were accurate within ±0.3 percent, and in the vicinity of 2 M UNH, the values were accurate within ±0.1 percent. A uranyl nitrate solution made from pure uranium metal was used to check standardization procedures involving ignition of aliquots of sample to U_3O_8. It was found that accurate results could be obtained by ignition to any temperature in the range of 800 to 1000 C, although a temperature of at least 900 C is preferable in the interests of speed.

Other analytical activities included continuation of a study of uranium trioxide structural characteristics by x-ray diffraction and infrared absorption, and the spectrographic analysis of a thin film obtained from some thermometer insulators from the KW pile--this material was found to be a welding flux used in thermometer fabrication.

IN-LINE ANALYSIS

The gamma monitor units in the Hot Semi-Works were checked out in detail during the month, and they are now reading background. Many of the samplers in the Hot Semi-Works failed to draw an adequate sample during the initial tests, and the studies indicate the need to clean jets and repair leaks. In many cases, an excessive amount of air is entering the risers through leaks thus preventing in-line monitoring. These difficulties are expected to be corrected within a few weeks so that tests of the sensing units and associated plumbing themselves can proceed. Instruction classes in principles, operation, and maintenance of in-line monitoring instruments were held for operating personnel during the month. The plutonium gamma-absorption photometers for both Hot Semi-Works and Recuplex were received from the shop, and a uranium gamma absorption photometer for monitoring pot feed in the oxide plant was fabricated and calibration work was begun. In addition, some testing on newer turbidity and uranium photometer sensing unit was conducted,

and a turbidity monitor design was firmed up for use in the T and B plants to monitor bismuth phosphate cake dissolution steps. The study of cadmium sulfide photocells was continued, and although the photocell stability at the present time is poorer by a factor of about eight than the miniature (1 P42) photocell now used for uranium photometers, the sensitivity is good and the photocell can be used advantageously in many cases because the circuitry would be simplified and savings of about $300 realized by eliminating the amplifier. The second uranium photometer console for the Hot Semi-Works was delivered during the month, debugging was completed, and after calibration, the entire photometer-turbidimeter unit will be ready for plant tests.

The oxygen monitor for pile gas developed last month could not be tested on a reactor because the available gas pressure from the sampling pump was not adequate to obtain flow through the analyzer. An alternate method based on electrode depolarization was obtained from the Savannah River Plant, and it will be tested on a pile if an adaptation can be made to apply it to oxygen in carbon dioxide rather than oxygen in helium as applied at Savannah River.

LABORATORY SERVICES

Activities of Laboratory Services for the month of February may be summarized as follows:

One million gallons of "retention" level waste was discharged to ground in the 300 Area.

Seventy thousand gallons of "cribbing" level waste were transported to 200 West Area for discharge to 200 SL Cribs. Average gross beta analysis was 5.0×10^{-3} uc/ml, and average plutonium analysis was 3.4×10^{-5} uc/ml.

Examination of drain valves on the 5000-gallon waste trailers showed extensive pitting. To determine whether corrosion had seriously damaged the trailer tank an audio corrosion gauge was procured from 200 West Area. Readings taken indicated a groove about 1/10-inch thick and 5 feet long in one of the trailers. A visual inspection is planned to determine whether this is a welding groove or is the result of corrosion. Visual inspection is complicated by contamination within the tank.

Work at 300 North Burial Ground was completed. This consisted in covering radioactive waste with about 18 inches of dirt and restabilization of the bank to permit easier dumping. Estimated life of the pit is now about six months. Estimated cost of digging a new pit is $2000.

Two slug cut-off "gunk catchers" from the Radiometallurgy Building were concreted at 300 North Burial Ground. Survey readings on these units were about 500 rads/hr at six inches.

The valve on the 200 West Area 200 SL cribs failed necessitating its replacement. In order that crib waste disposal would continue pending receipt of a new valve, the vent line valve on the trailer was removed and substituted for the faulty crib valve. Trailer vent line and connecting hose were flanged in a manner that allows filling of the tank and transportation of waste without hazard increase.

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

CONTACT ENGINEERING UNIT

Specifications for "Soltrol 170" to be used as the hydrocarbon diluent in Purex were issued for procurement purposes.

Specifications were forwarded to the Manufacturing Department covering stainless steel nozzle plate details for possible replacement of the fluorothene sieve plate cartridge in the spare Purex HC Column.

Other Contact Engineering functions were devoted to routine Separations Technology coverage of separations construction projects.

TECHNICAL SHOPS UNIT

Mechanical Shops

A consolidation of the Instrument Machine Shop and the Electronic Construction Shop located in 3717 Building with the Technical Shops in 328 Building will become effective April 1, 1955. The combined operation will remain under the control and direction of the Engineering Department with the Manufacturing Department supplying craft labor and the supervision thereof.

The consolidated shops are expected to accomplish substantial economies due to the elimination of one craft foreman position, three non-exempt positions and the freeing of the 3717 Building for reassignment. Increased utilization of machine tools and a reduction in the inventory level of shop materials and tools will add to the expected savings. A more efficient operation will result by concentrating the manpower and supervision in one building.

The major components of the Engineering Department will be assured of an adequate number of craft personnel being assigned to their programs by their contracting for a specific number of craftsmen on an annual basis. Temporary fluctuations in the shop work load of any one component can normally be compensated for by reassignment of the craft personnel by the Technical Shops Supervisor. The component experiencing permanent changes in its shop work load can secure relief from the contractual agreement by notifying the Technical Shops Supervisor three months in advance of the desired change.

Buildings and Grounds

Technology Sections Landlord

During this period, the responsibility for building management and landlord liaison of the buildings within the 303 Area which are assigned to the Technology Sections was transferred to the Fuel Technology Sub-Section. In the Laboratory Area, a system was established for notification of the responsible occupants when emergencies involving their laboratories occur on off-shifts.

Contact Engineering

Project CG-576, Laboratory Area Improvements - The modification of Room 47B in the Pile Research and Development Building continued. Design progressed satisfactorily for the items in the Radiochemistry, Radiometallurgy, and Mechanical Development Buildings.

Drafting and Design

Total productive man-hours for the month was 1865 with an estimated backlog of 480 man-hours. Major design jobs for the month were as follows: Electric Conditioner & Duct Arrangement - 4X Program Prototype Calciner - MTR Cask - Spline Drive - Underwater Process Tube Saw - Core Borer - Automatic Roll Type Conveyor - 3000 Gal. Semi-Trailer Tank - Flux Leveling Tube and Can - SYNCRO Readout Panel - 170# Qt. Size Pig - MIZ-1 Ionization Chamber - P.C.T.R. Drawings - Semi-Automatic Sizing Die - Double Crystal Neutron Spectrometer - Purex Manual Drawings (95% Complete). A total of 1183 black and white prints were run through the Bruning Machine.

Glass Shop

Total productive man-hours for the month was 977 with practically no existing backlog. Major jobs completed during the month included the fabrication of four vacuum traps. As no glass tubing of the required size (8" O.D.) was available on site large Pyrex bottles were modified and utilized for the bodies. Constructed for the Biology Section were 20 complex metabolism cages designed for the study of radiation effects upon rodents.

Photo Laboratory

Work requests received from the Technology Sections were as follows:

	Orders	No. of Negatives	No. of Prints
Pile Technology	30	235	6450
Separations Technology	10	39	102

ANALYTICAL LABORATORIES,

General Chemical Laboratory

Titration of monobutylphosphate (MBP) and dibutylphosphate (DBP) in 30% tributylphosphate (TBP) - shell spray base solution was found possible, when made in a 50% isopropyl alchol-water solvent, using aqueous sodium hydroxide as titrant. Good response and definite end points were obtained in the TBP systems containing 1 g/l MBP and 30 g/l DBP. The absence of the alcohol-water solvent rendered the titration unsatisfactory, as the second end point could not be detected. Titration with alcoholic sodium hydroxide in the alcohol-water solvent was likewise unsatisfactory as insufficient response was obtained from the indicating glass electrode-calomel electrode couple.

Total and hexavalent chromium were determined in purex type concentrated waste samples employing a modified diphenylcarbazide colorimetric procedure. Iron and nitric acid were present in the samples in sufficient concentration to cause serious interference. Satisfactory results were obtained through critical timing of the color development reaction and addition of like amounts of iron and nitric acid to the standards used in preparation of the calibration curve.

Calcium in microgram quantity was determined in the presence of excess aluminum by the flamephotometric procedure after separation of the aluminum with 30% hexamethylene-tetramine.

Vacuum distillation of fluoride from thorium and other acid solutions yielded promising results from limited investigation. Further work is proposed to establish the reliability of the method.

Radiochemical Laboratory

Laboratory investigations have shown fission product Zr and Nb separations are not entirely reliable in the presence of Pa-233. The Pa-233 carries through with Zr and somewhat with Nb. Correct Zr and Nb values are possible by combining chemical separations and gamma scanning.

Increased precision of gamma spectrometer measurements has resulted since establishing a daily normalizing procedure to take account of the gamma yield vs. counting rate variations as they occur from day to day and among different instruments.

Resolutions of the gamma spectrometer is normally limited by the photomultiplier tube. It is of interest to note that one of the laboratory's instruments was found to be limited by characteristics of the NaI(Tl) crystal.

Absorption spectroscopy was employed to determine the valance state of plutonium solutions. Peak heights and wave-lengths vary somewhat according to matrix material. Standardizations have been worked out for an increased number of nitric acid concentrations. Ranges over which the measurements apply are:

PuVI	0.005 - 17 g/l
PuIV	0.15 - 3.1 g/l
PuIII	0.1 - 2.6 g/l

Colloidal Pu IV and significant amounts of Pu V can also be measured.

A new plutonium electro-deposition cell has been fabricated and used several times. Under conditions of use, 90% of the plutonium present at the less than micrograms level is deposited with excellent uniformity and adherence.

Spectrochemical Laboratory

Work continues on installation of the enclosed arc-spark source to be used for "Hot" work. The one-piece insulator has proved to be satisfactory. A suitable material for a thermal barrier for the insulator is now being sought. Construction of the optical bench to hold the source was started.

Mass Spectrometer Laboratory

The molecular leak in the General Electric Mass Spectrometer was found to be plugged, resulting in gas sensitivities too low to operate. The leak and the glass tube housing were coated with a peculiar deposit which was removed by prolonged treatment with hot nitric acid.

At month's end the spectrometer was being pumped down so that calibration could proceed.

The backlog of uranium samples awaiting isotopic analyses was eliminated and samples are now being analyzed on a current basis.

Water Quality Laboratory

Preparations are being made to move the Water Laboratory from its present location in Bldg. 108-B to new quarters in Bldg. 1706-KE. The new laboratory is awaiting installation of the two hoods and the bench tops.

Work volume statistics for the Analytical Laboratories are as follows:

	January		February	
	Number of Samples	Number of Determinations	Number of Samples	Number of Determinations
Research and Development				
Pile Technology				
Metallurgy Research	35	217	54	426
Pile Materials	200	752	300	1494
Fuel Technology	38	823	89	1781
Separations Technology				
Chemical Research	754	1599	810	1252
Chemical Development	457	580	339	401
Plant Processes	3	6	86	113
Process Technology	49	233	441	1412
Other Customers	49	485	78	589
Total	1585	4695	2197	7468

Separations Technology Section

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

Inventor(s)	Title
J. L. Carroll	The Use of Thiosulfate Compounds for the Removal of Ruthenium from Process Solutions.
Andrew C. Leaf	A Teflon Electroplating Cell for Electroplating Plutonium and Uranium in Less than Three Milligram Amounts Upon Stainless Steel and/or Platinum Discs.
A. S. Wilson	The Use of Nitrous Acid Formers to Suppress the Volatilization of Ruthenium in the Recovery of Nitric Acid from Fission Product Wastes.
R. L. Moore	The Scavenging or Recovery of Protactinium

[redacted]

R. L. Moore	The Scavenging of Protactinium with t he Oxides.

R. B. Richards

Manager, Separations Technology
ENGINEERING DEPARTMENT

RB Richards:khs

MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

R. L. Cleveland and O. O. Akerland of Panellit, Incorporated, Skokie, Illinois visited Hanford February 1st through 11th for consultation on Pressure and Temperature Monitor Regulation.

C. S. Slenning of Minneapolis-Honeywell Regulator Company, Richland, Washington visited Hanford February 1st through 2nd to review Redox Plant control room instrument problems.

D. R. Combs of Bumstead-Woolford, Seattle, Washington visited Hanford on February 4th to consult with C. W. Botsford on Edison Temperature Control System.

C. J. McVey of the Thomas A. Edison Company, Chicago, Illinois visited Hanford February 7th through 19th to investigate problems with temperature monitor equipment.

W. J. Faller of Panellit, Incorporated, Skokie, Illinois visited Hanford February 8th through March 3rd for consultation on problems of Pressure Monitor System.

Jack Ogle of Hannifin, Incorporated, Seattle, Washington visited Hanford February 8th and 9th to discuss reactor mechanical development.

C. W. Newman of Vickers, Incorporated, Seattle, Washington visited Hanford February 8th and 9th to discuss reactor mechanical development.

M. J. P. Bogart of The Lummus Company, New York, N. Y. visited Hanford February 8th through 10th for consultation on Project CG-598.

M. K. Burk and E. R. Wells of the General Electric Company, Schenectady, New York visited Hanford February 17th and 18th to discuss pump drive requisitions for CG-558.

R. A. Anderson of Panellit, Incorporated, Skokie, Illinois visited Hanford February 26th through March 5th to investigate temperature monitor difficulties in 105-KW & KE.

John Dietz of the Thomas A. Edison Company, West Orange, New Jersey visited Hanford February 28th through March 5th to examine metallurgical tests of the prototype temperature resistance thermometers at 105-KW.

W. J. Love and J. H. Snyder visited the General Electric Company, Schenectady, New York on February 2nd through 8th for reactor design discussion.

E. B. LaVelle visited Edison Vocational School, Seattle, Washington on February 3rd through 5th for discussion of welding problems and instructions.

H. W. Heacock visited the Byron Jackson Company, Los Angeles, California February 7th and 8th to discuss modification of 190-C pumps.

A. E. Engler visited the National Acme Company, Cleveland, Ohio on February 16th and 17th to review methods for industrial noise level reduction; on February 17th attended the Industrial Acoustics Course III, Second Session, Schenectady, New York.

W. A. Richards visited the Boeing Aircraft Company, Seattle, Washington on February 16th and 17th for consultation with Boeing Engineers on electrical connector problems.

W. L. Pearl, A. J. McCrocklin, R. A. Huggins and E. L. Armstrong visited the General Electric Company, Schenectady, New York on February 23rd through 28th for reactor design discussion.

M. T. Slind visited the Panascan Company, Chicago, Illinois on February 16th; the Westinghouse Electric Corporation, February 17th; Brown Instrument Company, Philadelphia, Pennsylvania on February 18th; Fisher-Porter Company, Philadelphia on February 19th; The Weston Company, Newark, New Jersey on February 21st; Ford Instrument Company, Long Island, New York on February 22nd; the Thomas A. Edison Company, West Orange, New Jersey on February 23rd; the Foxboro Company, Boston, Massachusetts on February 24th; General Electric Company, West Lynn, Massachusetts on February 24th; and on February 25th visited General Electric Company, Schenectady, New York for discussion of Temperature Monitor Equipment.

ORGANIZATION AND PERSONNEL

Personnel Statistics:	January 31			February 28		
	Exempt	Non-Exempt	Total	Exempt	Non-Exempt	Total
Design Management	1	1	2	2	1	3
Process Engineering Sub-Section	71	13	84	71	14	85
Design Planning Unit	16	13	29	16	12	28
Design Engineering Sub-Section	85	11	96	85	12	97
Design Drafting Unit	8	86	94	8	85	93
Total Section Personnel	181	124	305	182	124	306
Technical Graduates (Rotational)	-	4	4	-	5	5
Total	181	128	309	182	129	311

Accessions - 8
Separations - 6

GENERAL

Design Section engineering and drafting effort for February was distributed approximately as follows:

	Engineering Man Months Expended	Drafting Man Months Expended	% of Section Effort
1952 Expansion Program	28.8	13.1	16.5
Reactor Plant Modification for Increased Production	21.7	21.0	16.4
4X Program	21.8	15.7	14.4
Design Development	55.6	9.6	26.2
1706-KER Recirculation Facilities	6.4	5.3	4.4
Other Projects and Design Orders	33.2	24.5	22.1
	167.5*	89.2*	100.0

*Equivalent man months expended includes 2.9 months of engineering and .4 man months of drafting overtime, which represents approximately 6% of the Section on a six-day week basis. The overtime effort was principally applied to design revisions and design field liaison in support of 100-K Plant start-up and preparation of the FY 1957 Plant and Equipment Budget.

The Design Drafting Unit production for the month was 217 new drawings and 434 drawing revisions for an equivalent of 5.2 man days per drawing.

DESIGN DEVELOPMENT

Statistics:

The total number of engineering and drafting man months applied to design development activities during February were as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
Metallurgical Design Development	2.5	4.5	-	-
Reactor Plant Design Development	25.4	45.7	4.6	47.9
Separations Plant Design Development	24.1	43.3	3.9	40.6
Chemical Processing and Reduction Design Development	1.7	3.1	0.6	6.3
234-5 Design Development	1.9	3.4	0.5	5.2
	55.6	100.0	9.6	100.0

Metallurgical Design Development

Work was started on a preliminary process equipment layout of the hot press canning method for fabricating fuel elements. Upon completion of this study a comparison will be made of the point closure and hot press fabrication methods as to required space requirements for process equipment.

Methods for industrial noise level reduction are being investigated to determine what steps should be taken to reduce the present high noise level in 313 Building.

Reactor Design Development

Work continued on the preparation of a comprehensive report of present reactor shielding information including results of experimental tests with high density concrete and construction application in the 100-K reactors. Plans are in progress for further experimental tests to be conducted with high density concrete exposed to high and low temperature cycles.

Preliminary scope studies were started for continuous charge-discharge facilities. Prototype facilities for reactor operation with continuous charge-discharge are being reviewed for application to a complete reactor.

Four alternate systems to provide reactor control under emergency or disaster conditions are being investigated. Preliminary design scope, including sizes and capacities of important system components, together with cost estimates were prepared for each alternate and will be summarized in a report to be issued in March, 1955.

Further progress was made during February in the program of procurement and fabrication of fittings for use in a water wall piping system. This is part of the study of a water wall concept as a feasible method of supplying coolant to the reactor in place of the present cross-header piping system.

Mechanical development studies receiving attention during the month included: process tube flow monitoring; ruptured slug detection equipment; tube removal mechanism and hydraulic system; and ultrasonic equipment for decontamination of fuel element dummies.

Separations Plant Design Development

Thorex separation studies were continued during the month. Three studies are being prepared on the basis of alternate building and equipment arrangements and process flow sheets. Several alternate building arrangements using double line cells and transverse cells, with attached structures for housing extract columns, are being investigated. These studies are directed toward obtaining preliminary scope and cost estimates for a plant to be designed and constructed at minimum cost by providing only essential facilities and designing out high cost features of equipment fabrication and construction.

Tests were conducted with the mock-up facilities for the proposed Redox canyon ventilation system as part of the study of the Redox Plant contamination problems. The purpose of these tests is to determine the downward air flow velocities required to eliminate thermal drafts from opened cells. Preliminary results indicate that velocities required are not within practical ventilation capacity limits. Further tests are scheduled for March.

Preliminary studies were completed for a proposed Purex Plant capacity expansion to 1.5 times the design instantaneous rate. Further review of equipment capacity limitations is being made to determine the engineering and economic feasibility of a plant expansion to a factor of 2.5.

Work was started on the preparation of preliminary scope for a tank farm for Redox and/or TBP Plant wastes.

The feasibility of disposing of TBP wastes sludge is being evaluated. Approximately five million gallons of waste tank storage could be made available if such sludge could be put directly in the ground or transferred to inexpensive holding tanks or caverns.

Chemical Processing and Reduction Design Development

Shop fabrication of a vertical replacement type hydrofluorination furnace for Task II was completed. Experimental testing and development modification of this equipment has started.

Preliminary design for the adaptation of continuous fluorination and filtration equipment to existing Task I and Task III equipment is in progress.

234-5 Design Development

Preliminary design, including cost estimates, was completed for two alternate methods for improving the present RMA Line conveyor system.

Experimental chuck adapters, which permit the machining of three different weapon core models with existing Task V equipment, were designed and fabricated. Testing of these special lathe tools has started.

Engineering Standards and Materials Development

Cost to date for development of engineering standards for the current fiscal year is $53,958.

The following standards were completed and issued during the month:

J-1-1 Identification on Letters for Instrument Symbols
J-1-2a Instrument Drawing Symbols
J-1-2b Instrument Drawing Symbols
J-1-2c Instrument Drawing Symbols
J-2-4 Instrument Panel Curb
J-3-1 Height of Instruments on Panels
J-3-2 Instrument Connections for Diaphragm-Operated Control Valves
J-3-3 Instrument Air Pressure Reducing Station - 1/4"
D-7-13 Constant Current Transformer Structure Type "K" Rev. 2 (11" x 20" Sheet)
D-7-14 Constant Current Transformer Structure Type "L" Rev. 2 (11" x 20" Sheet)
B-0-2b Graphical Symbols for Piping Rev. 1

Work on standards and studies during the month is as follows:

a. The preparation of a standard specification for austenitic stainless steel pipe progressed to 80% complete.

b. Work was started on the preparation of the following separations process specifications: On-site fabrication of jumpers and non-code vessels; off-site fabrication of non-code Class I vessels; and replacement agitators and pumps.

c. The development of a design guide for "Welding of Miscellaneous Metals and Alloys" is 80% complete.

d. A study was started on methods of reducing industrial noise for application in future HAPO designs.

DESIGN PROJECTS

Statistics:

Engineering and drafting effort of the Section on projects for the month of February was as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
1952 Expansion Program	28.8	25.7	13.1	16.4
4X Program	21.8	19.5	15.7	19.7
Reactor Plant Modification for Increased Production	21.7	19.4	21.0	26.4
1706-KER Recirculation Facilities	6.4	5.7	5.3	6.7
Other Design Projects	10.2	9.1	4.6	5.8
Miscellaneous Design Orders	23.0	20.6	19.9	25.0
	111.9	100.0	79.6	100.0

CA-512 - 100-K Area Facilities

Design personnel were assigned to the KW reactor on a three-shift basis during the month to assist in preparatory start-up work. Principal activities included testing and overhauling of the temperature monitoring system and replacement of the failed reactor process tube flange gaskets. Design field liaison in support of operability tests for the KE reactor continued. An order was placed and vendor bids received for boron balls for the ball 3X Safety System. Tests are scheduled on a mixed ball column using a combination of carbon steel and boron balls. The 100-K reactor as-built program advanced to 71% complete.

The preliminary design scope for a gamma water monitor system for the "K" reactors was completed and issued for comment.

Design for the 1706-KER Facility progressed to 92% complete an advance of 6% during February. Detailed design is essentially complete with the exception of instrument drawings. The revised design scope was completed and submitted to the AEC for approval. Studies were conducted on the feasibility of methods for normal and emergency shut-down of the 1706-KER loop and an analysis made of the reliability of the KER pumping system to provide coolant supply following interruption of normal power supply.

CA-513 - Purex Separations Facility

A revision request to the Purex project was approved during February to defer procurement and installation of ammonia scrubbers in the Purex dissolver cells. Alternate preliminary designs were prepared for the waste tank farm condenser effluent distribution system for economic comparison with the present design. A study was made of radiation shielding requirements for the remote crane cab to allow process equipment such as the first acid waste concentrator to be raised above the crane gallery shielding wall.

CA-514 - 300 Area Expansion

Design revisions to the ultrasonic bond test equipment to bring reject rates to within tolerable limits were prepared. Alternate designs for proposed changes to the material handling system in the 313 Building were completed. The design most consistent with the operating requirements of the cleaning and gaging system will be selected after evaluation of vendor drawings for the gaging equipment has been made.

CA-539 - Additional Waste Storage Facilities

Design for Project Revision No. 5 has been completed for Part A. Drawings for Part B (emergency water system) were completed and have been issued for comment. Detailed design was started on Part C which includes special jumpers and shielding covers.

CA-546 - Fuel Element Pilot Plant

Design of the semiworks equipment for the fuel element pilot plant was reactivated during February. This work, which was curtailed by the Pile Technology Section in December 1954, is to be done on a somewhat reduced scale. A design estimate is being prepared to cover the current scope of work.

CA-558 - Reactor Plant Modification for Increased Production

Total design advanced to 63.5% complete, an increase of 5.5 % during February. Design scope is complete and detailed design 57% complete.

A revised project proposal was prepared which reflects the project scope in accordance with the AEC project directive in addition to other approved scope changes.

The major design effort for the month included acceleration of design for the 190-D Annex based on the decision to include the 190-B and 190-D Annex Buildings in one lump sum construction contract. Design for the 190-B Annex was completed with the exception of "hold" items pending receipt of vendor information.

Design for the 183 Buildings is well advanced and further progress was made on design for the 181 and 105 Buildings and for the effluent systems. Design progress for the 151 Substations has been limited primarily because of lack of vendor information on equipment. Attempts are being made to expedite required vendor data.

CG-578 - Effluent Water Monitoring Improvements, 100-D, B, DR, F and H Areas

Detailed design advanced 9% during the month to 96% complete. All requisitions have been completed. The preparation of acceptance test procedures has progressed to the rough draft stage.

CG-579 - Effluent Water Monitoring Improvements, 100-C Area

Design activity on this project was limited during February due to instrument design priority for CA-512-R temperature monitoring system.

Detailed design is 52% complete. Of a total of 25 required drawings, eleven have been approved and fourteen are issued for comment.

CA-586 - First Capacity Increase - 230 KV System

Detailed design for additions to the 230 KV system advanced on schedule to 9% complete. The preliminary line survey was completed and work is in progress to determine the number and location of transmission towers required. A preliminary drawing schedule was issued based on 25 required drawings.

CG-598 - Purex Vacuum Fractionator

Design was reactivated during February following the placing of a "design and fabricate" contract with the Lummus Company for the fractionator and associated components. A process piping arrangement for the building addition was completed and will be transmitted to Lummus in March. General Electric design is 12% complete based on 48 required drawings.

CG-599 - 4X Program - 100 Areas

Design scope is 85% complete and is proceeding on the basis of requirements for bucket loadings received from the Manufacturing Department in February. No detailed design was performed during the month. This phase of the work remained at 65% complete.

CG-600 - 100-C Alterations

Detailed design was advanced 6% during the month to 72% complete. An investigation of the overheating of the 190 Building process pump drives when operating at overload was completed. Revisions of the present design scope for the project may be required since design was based on operation at 7% overload.

CG-603 - Hanford 4X Program - Bismuth Phosphate Plants

Design scope is essentially complete. The Part II scope document for the "B" and "T" Plants was submitted to the AEC for approval. Detailed design advanced 9% to 75% complete.

A review of production schedules and requirements made during the latter part of February indicates a probable revision in requirements for reactivation of "B" Plant with a resultant relaxation of design schedules and a reduction in the number of required drawings. Detailed design for the "T" Plant first cycle waste scavenging facilities was completed and design was accelerated for "B" Plant scavenging facilities. All other phases of design progressed on schedule.

CG-613 - Hanford 4X Program - Metal Conversion Plant

Design scope is essentially complete and detailed design moved forward on schedule to 7% complete.

A design schedule based on 130 drawings was issued and a project proposal is scheduled for submission to the AEC in March.

Detailed design including specifications for the large stainless steel vessels was completed and procurement requisitions are being prepared. Design of the continuous calciners was started during the latter part of the month. Procurement for the calciners is proceeding on the basis of negotiated purchase orders for major components such as the trough assembly and the heater assembly.

CG-614 - Hanford 4X Program - 300 Area

Design scope advanced to 95% complete, an increase of 10% during the month. Detail design is 14% complete based on 60 new and revised drawings. Design scope revisions for the 3707-D Change House were prepared to include rearrangement of facilities.

CG-616 - Installation of Acid Feed Equipment 100-B, C, D, DR, F & H Areas

Scope drawings and design criteria for the gravity feed acid addition facilities were completed and issued for comment. Detailed design is scheduled to start early in March. A project proposal is in progress and is expected to be completed by the end of March.

CG-617 - Additional Air Drying Facilities - Building 234-5

A directive was received from the AEC authorizing the preparation of design scope and initiation of detailed design. Work has started on a limited basis.

CG-621 - Redox Contamination Control Facilities

A directive was received during the month authorizing design and critical procurement for the in-cell ozonization portion of the Redox contamination control project. A preliminary project proposal is in preparation to cover, in addition to construction for in-cell ozonization facilities, the following items: a pre-condenser for the J-6 vent system, centrifuge shroud; canyon clean-up facilities; and disposal and replacement of contaminated equipment.

Design scope is essentially complete. Schedules for detailed design were prepared based on 29 required drawings.

D. O. 100757 - "As-Built" Area Maps

Design drafting for the revisions to HAPO Project Maps to bring thme up-to-date advanced to 85% complete. Of a total of 370 drawings, 320 have been started.

D. O. 100946 - Foxboro Dewcel Moisture Monitoring System (CG-583)

Detailed design of a moisture detection system for existing reactors advanced 5% to 85% complete. Fourteen drawings have been approved for dewcell installations in 105-B, D, F and DR. Seven drawings for dewcell installation in 105-H have been issued for comment.

D. O. 101036 - Moisture Monitoring System, 105-C Building (CG-593)

Design for installation of the Foxboro dewcells for 105-C Building advanced to 85% complete. Six instrument drawings have been issued for comment.

D. O. 101045 - Discharge Area Television Viewer, 105-B Building (CG-593)

Design was inactive on this project during the month. Design progress remained at 56% complete pending receipt of vendor information for the closed circuit television chain.

D. O. 101062 - Nitric Acid Decontamination Facility, 100 Areas

Design scope was expanded to include investigation of the feasibility of a central cleaning facility. Preparation of the project proposal is approximately 75% complete.

D. O. 101063 - Alum-Activated Silica Water Treatment Facility, Phase II

Design scope is in progress and is scheduled for completion March 15. The preparation of a project proposal was started during the month.

D. O. 101114 - As-Builts for 189-D Substation

Design completion is 20% based on three required drawings.

D. O. 101147 - FY 1956 and FY 1957 Plant and Equipment Budget

Preparation of the FY 1957 and revised FY 1956 Plant and Equipment Budget for projects to be managed by the Engineering Department was completed with the exception of several items deferred pending management review. A document including all approved budget data sheets is scheduled for issue to the AEC early in March.

D. O. 101153 - Redox Railroad Tunnel Ventilation Barrier

A project proposal for this work was completed during the month and is scheduled for transmittal to the AEC in March.

D. O. 101190 - Irradiation Facility - HTRE Fuel Tests

Work continued on preparation of an engineering feasibility report covering the installation of a gas-cooled irradiation test facility for the GE-ANP fuel element testin program. Two drawings, a plot plan and cooling flow diagram, were completed for commen Progress during the month was impeded due to revised requirements for the facility.

[redacted] 11-10

D. O. 101195 - Replacement of Existing 313 Building Roof (CG-610)

Detail design started late in February for this project which includes replacing a section of the 313 Building wooden roof with a steel deck and replacing all roofing material for the old 313 Building.

D. O. 101218 - General Improvements to Laboratory Area Buildings (CG-576)

Detailed design was started during February and progressed to 20% complete.

D. O. 101230 - Irradiation Facility - WAPD Fuel Test Program

Design progressed to 70% complete on the engineering feasibility report for the installation of a pressurized water-cooled irradiation test facility for the Westinghouse Atomic Power Division. This report will be based on a "DR" location for the in-pile section of the test loop in addition to an outside test Building. The present schedule for completion of the feasibility report is March 18, 1955.

D. O. 101253 - Record Storage Facilities

Design liaison service was furnished to the AEC in connection with the detailed design for this facility which is being performed by an architect-engineer.

Design Work Completed During February

D. O. 101102	Facility for Testing of Fuel Elements - 314 Building
D. O. 101117	Installation of Additional Generating Capacity - 189 Bldg. (CG-605)
D. O. 101142	Alterations to 713 Building for IBM Installation (CG-612)
D. O. 101145	Phase II - Partical Problem Animal Exposure Equipment (CG-572)
D. O. 101156	Trench Jumpers, 221-T
D. O. 101191	Redox Stack Sampler & Sparger
D. O. 101192	Redox Plant Jumper Design
D. O. 101193	Redox Jumper Design
D. O. 101202	"T" Plant Horizontal Head - Design
D. O. 101207	234-5 Building - Gun Barrel Assembly - Title III
D. O. 101209	"B" Plant Jumper Design
D. O. 101210	"T" Plant Jumper Design
D. O. 101211	"T" Plant Jumper Design
D. O. 101217	High Pressure Flow Loop - 189-D Building - Drafting
D. O. 101219	Calciner Design Assistance
D. O. 101223	Redox Plant - Jumper Design Change
D. O. 101245	"T" Plant - Jumper Design
D. O. 101247	"T" Plant - Jumper Design
D. O. 101251	U Plant Jumper Design - Service Building
D. O. 101267	Redox Plant - Impact Wrench Revision

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:md

DESIGN SECTION WORK STATUS

ENGINEERING MAN MONTHS

PROCESS ENGINEERING SUB-SECTION

Description	Backlog Start of Mo.	Work Sch'd Dur. Mo.	Time Spent Dur. Mo.	% of Total Effort	Backlog End of Month	Mar.	Apr.	May	Jun.	Jul.	Aug.	Bal. of FY 1956 & Later	Total
1952 Exp. Program*	72.7		13.8	20.1	58.9	12	10	9	8	7	6	6.9	58.9
CG-558 & CG-600	22.3		3.4	5.0	18.9	3	2	2	2	2	2	5.9	18.9
4X Program	35.9		3.4	5.0	32.5	4	4	4	3	2	2	13.5	32.5
Reactor D&D	135.7		19.2	28.0	116.5	21	22	23	24	25	25	262***	402.0
Sep. D&D	87.4		18.0	26.3	69.4	18	19	19	19	19	19	202***	315.0
Met. D&D	8.2		2.1	3.0	6.1	2	2	2	2	2	2	26***	38.0
234-5 D&D	12.3		.8	1.2	11.5	1	1	1	1	1	1	16***	22.0
Weapons D&D	6.1		.8	1.2	5.3	1	1	1	1	1	1	10***	16.0
Other Proj. & Misc.	17.2	7.0	7.0	10.2	17.2	6	6	5	5	5	5	50**	77.2
Ant. Future Work						1	3	4	5	6	7	107	133.0
TOTALS	399.8	7.0	68.5	100.0	—	69	70	70	70	70	70	699.3	1113.5

DESIGN ENGINEERING SUB-SECTION

Description	Backlog Start of Mo.	Work Sch'd Dur. Mo.	Time Spent Dur. Mo.	% of Total Effort	Backlog End of Month	Mar.	Apr.	May	Jun.	Jul.	Aug.	Bal. of FY 1956 & Later	Total
1952 Exp. Program*	113.8		17.9	22.0	95.9	15	12	12	10	9	8	29.7	95.9
CG-558 & CG-600	240.1		16.8	20.7	223.3	17	17	18	18	17	16	120.3	223.3
CG-578 & 579	11.2		2.3	2.8	8.9	2	2	2	1	1	1	-	8.9
CG-586	18.7		1.7	2.1	17.0	2	3	2	2	2	2	4.0	17.0
CG-598	23.2		1.0	1.2	22.2	3	4	4	3	3	2	3.2	22.2
CG-616	-	18.0	0		18.0	2	4	5	4	2	1	-	18.0
CG-621		17.1	0.1	0.1	17.0	2	3	3	3	2	1	3.0	17.0
4X Program	96.2		16.3	20.1	79.9	16	14	12	12	10	8	7.9	79.9
Des. Dev. Program	62.7		11.4	14.0	51.3	11	11	11	12	13	13	142***	213.0
Other Maj. Minor, Misc.	91.6	10.0	13.7	17.0	87.9	12	11	10	10	10	10	120.9**	183.9
Ant. Future Work						—	1	3	7	13	20	376.0	420.0
TOTALS	—	45.11	81.2	100.0	—	82	82	82	82	82	82	807.0	1299.1

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
Arch. & Civil	155	80	235
Mechanical	287	133	420
Electrical	145	69	214
Instrument	214	100	314
Standards	78	38	116
TOTALS	879	420	1299

*Includes 1706-KER Recirculation Facilities
**Includes Minor & Miscellaneous Work for FY 1956
***Includes Budgeted FY 1956 Design Development Work

MONTHLY NARRATIVE REPORT - FEBRUARY, 1955

PROJECT SECTION

I. SUMMARY

A. ORGANIZATION AND PERSONNEL

Following is a summary of personnel changes in Project Section during the month:

	January 31, 1955	February 28, 1955	Net Change
Employees on Payroll	379	365	-14
Tech. Grad. - Rotational	3	1	-2

The end-of-month status involved these changes:

	Project Section	Tech. Grad. - Rotational
Payroll Additions	1	
Payroll Removals	4	
Transfers into Section	2	
Transfers from Section	13	2
Transfers within Section	9	

B. SCOPE OF ACTIVITIES

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

Project No.	Title	Completion Scheduled	Completion Actual
CG-496	Recuplex	96%	94%
CA-512	100-K Area Facilities		
	KW - Water Plant	100	99.9
	Reactor and Building	100	99.9
	KE - Water Plant	100	99.9
	Reactor and Building	100	99.9
	General Facilities	100	99.9
CA-513-A	Purex Facilities, Part "A"	98	97
CA-514	300 Area Expansion	63*	64*
CG-535	Redox Capacity Increase, Phase II	97	96
CG-539	Additional Waste Storage Facilities - Redox	87**	87**
CA-546	Fuel Element Pilot Plant	51	51
CG-558	Reactor Plant Modifications	5	4
CA-603	Hanford 4X - Bismuth Phosphate Plants	6	6

* Percentages based on revised schedule.
** Percentages based upon resumption of construction according to changed design.

C. CRAFT LABOR

A work stoppage at Purex occurred on February 16 when laborers and pipefitters became

involved in a jurisdictional dispute. The laborers walked out, but they returned to work after a settlement on the following day.

D. SAFETY AND SECURITY

Nine regular meetings for discussion of safety, security, and health topics were attended by about 245 persons. Five Monday morning tool-box meetings and four mass safety-security meetings were conducted in the field for contractor personnel. Six special hazards orientations were given for a total of 172 new and re-hired construction employees. All SWP work progressed under conditions of excellent radiation control. About 7000 man-days were worked by Minor Construction forces with only one Class I incident involving a forgotten badge and pencils.

E. HIGHLIGHTS

Project Auxiliaries Sub-Section

Reproduction output increased by about 25% to a total of 349,492 square feet for February, 1955. This increase was caused by requests for more prints per order. Distribution by the Engineering Files Unit increased to a total of 157,073 prints for the same period. The largest order was 13,276 prints for the Reactor Modification Program. Estimating completed 28 estimates, of which nine were for project proposals. Field Surveys completed field work in 100-F and H Areas for the Reactor Modification Program, and also completed field work on the proposed 100-K transmission line. Personnel representatives obtained assignments for about 12 exempt employees who were made surplus by the declining construction program.

Inspection Sub-Section

The workload for off-site inspection remained about level. Inspection was completed on 111 orders, and 128 new orders requiring inspection were received, leaving the total at 410. The monetary value of completed orders was about $1,150,000, of new orders about $1,100,000, and of total orders now assigned to inspectors about $11,200,000. Evaluations under the Corrosion Testing Program decreased slightly to a total of 122. Inspection personnel are assisting with on-site inspection at 100-K Area and for some process vessels being constructed by Minor Construction. Inspection personnel have continued participation in investigation of claims against construction contractors.

Minor Construction Sub-Section

The Sub-Section completed assigned work on nine work orders and CG-602, Remote Sampling Equipment, Hot Semiworks. Newly assigned work consisted of 13 work orders. Current work is being done on 14 projects, including Recuplex, Purex, 300 Area Expansion, 234-5 Building, Reactor Plant Modification, and Hanford 4X Program. Forces of the labor service contractor increased by more than 30% to a total of about 975. Plans were completed for Minor Construction to maintain and service buses, effective March 1, 1955. Minor Construction contractor forces have worked 665 days without a lost-time injury, as of February 21, 1955. This represents a total of 1,798,105 hours.

Project Engineering Sub-Section

Work was done on 44 project items, three informal requests, and miscellaneous engineering requests. The Sub-Section completed assigned work on CG-602, Remote Sampling Equipment - Hot Semiworks; IR-181, Temperature Control 108-F Building; and two engineering requests.

Initial work was accepted on CG-621, Redox Contamination Control Facilities, and ER A-3118, Replacement of 300 Area Fence. Work was in progress on nine larger projects. On February 25, documents pertaining to the closing out of A.E.C. Contract No. AT(45-1)-859 were transmitted to the A.E.C. This contract dealt with the 100-B Outfall Structure under Project CG-558.

Reactor Projects Sub-Section

Rehabilitation of 105-KW Reactor occupied Project Section personnel at intervals until February 14 when it was returned to the Manufacturing Department. 105-KE Reactor was transferred to Manufacturing on February 8. Following discovery of the failure of vanstone flange gaskets, the decision was made to replace gaskets on both reactors. Minor Construction forces are changing gaskets on both faces of 105-KE, and Plant Forces are replacing gaskets on 105-KW. It was necessary to place an emergency order for connectors to replace those which were rejected during the re-gasketing work. General completion of construction items was continued throughout the area. Acceptance testing was completed for 100-KE Water Plant except ATP-1436, the 150 Building heat exchanger, and ATP-1451, emergency electrical system. Both depend upon operation of the 105 Building. Structural work at 1706-KER included placing of concrete, conduit, and embedded items.

Separations Projects Sub-Section

Design work on Purex consisted of issuing 81 minor field design changes and development of the following major design changes: expansion of recycle hood facilities, revision of jumper installation, modification of remote maintenance crane, alterations to decontamination cell, and improvement of vessel vent system seal. Purchase of the two spare Purex concentrators is still delayed. All major operational equipment has been delivered to 202-A Building, and installation was completed in the cells. This equipment is being tested and run-in. Fabrication of process jumpers was 97% complete, and electrical 100%. Installation was 91% complete for process jumpers and 90% for electrical jumpers. The Head End Control Room was accepted with exceptions on February 15, as was Phase I (Cells "A" through "E" of 202-A). At Redox - Phase II, the 233-S Building was given final inspection on February 8, 1955, and declared ready-for-use.

F. MONTHLY REPORT OF INVENTIONS AND DISCOVERIES

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

NONE

J. S. McMahon, Manager - Projects

February 28, 1955

II. STATISTICAL AND GENERAL

A. SIGNIFICANT ASSIGNMENTS

1. Initial Reporting

CG-616 - Installation of Acid Feed Equipment - 100-B, C, D, DR, F and H Areas

This project is in the scoping stage, and a project proposal is being prepared by Design Section. The work is proposed to be accomplished as soon after July 1, 1955 as practicable in order to eliminate the additional cost of feeding alum. It is estimated that use of acid will reduce costs by $18,500 per month.

CG-621 - Redox Contamination Control Facilities

Scoping and design are being managed by Design Section; $48,000 has been authorized for initiation of detailed design and procurement of critical items. The authorized funds are considered an interim amount.

ER A-1219 - 105-KW Laboratory

With scoping and preliminary design each 95% complete, this project was approved by Pile Technology Section during early February 1955. Back-up data for justification for the project is being assembled.

ER A-1221 - Modifications to 105 Transfer Areas

With scoping 70% complete, a project proposal is being prepared. The Design Section has been requested to furnish additional scoping information.

ER A-3116 - Minor Construction Stores Study

This study was initiated and completed within the month.

ER A-3118 - Replacement of 300 Area Fence

With scoping 80% complete, preparation of a project proposal was begun during late February 1955. A meeting was held with representatives of Metal Preparation Section and Maintenance Sub-Section to determine the scope and justification of the project. The high spot estimate indicated costs above $20,000.

2. Final Reporting

CG-602 - Remote Sampling - Hot Semiworks

Construction progressed 15% to completion. Information for the Physical Completion Notice is being assembled.

IR-181 - Temperature Control Improvement - 108-F Building

Construction progressed 2% to completion. This Informal Request is being closed out as soon as the "as-built" data has been assembled.

ER A-764 - Fire Station Addition

Manufacturing Department has withdrawn the request since the scope of work has been reduced.

ER A-3115 - Prepare Scope Design and Estimate for Offices - Fuel Element Pilot Plant

This study was completed February 1, 1955, and all cost accounts were closed.

ER A-3116 - Replacement of 300 Area Fence

(Noted under Initial Reporting above.)

3. Current Projects

CG-496 - Recuplex Installation - 234-5 Building

Design had been completed previously; construction progressed 3% to a total of 94%. Over-all acceptance testing was continued. Beneficial use was obtained during the month on the Reception and Blending and the Slug and Crucible Hoods. Installation of the outside storage tanks was completed, including fabrication of the heating coil and insulation of the ANN tank and fabrication of the caustic trailer. Remaining items on the Solvent Extraction Hood are being installed, and beneficial use was expected about March 4, 1955.

CA-512 - 100-K Reactor Facilities

100-KW and 100-KE Water Plants

Over-all design was completed during the month; construction of each major part was considered 99.9% complete. The major work during the month consisted of clearing exceptions. Work orders are being prepared and processed for individual items. Five insulated thrust collars were installed in the 181-KW pump motors, and the sixth unit was expected to be in service during the first week of March. Corresponding work is to be begun at 181-KE about March 7, 1955. At about the same time work is to be commenced at the 181-K Buildings to provide for adequate freeze protection. Acceptance testing has been completed with the exceptions, ATP-1436 and ATP-1451, which provide for operation of 150 Building heat exchanger and emergency electrical system, respectively.

Installation of machine tools and equipment in the 1717-K Buildings was about 99% complete.

Work at 1706-KER included placing of concrete for walls, roof slabs, and floors. Electrical conduit and embedded items are being installed on the 449'-0" slab. Minor Construction forces have begun installation in 105-KE Building for pipe to 1706-KER.

At 1706-KE Building structural work consisted of installing equipment in laboratories, and also installation of permanent doors and hardware throughout the building. All mechanical equipment has been prepared for operation, and the major acceptance testing was about 50% complete. Power, lighting, and control systems are being installed. The communications systems were essentially completed. Construction of the filter instrumentation was about 80% complete. Instruments are being tested and calibrated. The ventilation control equipment was ready for preliminary checks before being placed in operation. Construction was about 75% complete, and all tubing in the system has been pressure-tested.

105-KW and 105-KE Reactor Facilities

Project Section personnel were engaged in the rehabilitation of 105-KW Reactor until about February 14. The vanstone flange gaskets used at 100-K were found to be of inferior material. Orders were placed for replacements for both 100-K Reactors. Minor Construction forces are changing gaskets on both faces of 105-KE, and Plant Forces are replacing the gaskets on 105-KW. An order for 1500 connectors was placed so that the damaged connectors could be replaced with the gasket replacement at both reactors. About 525 connectors were used at 105-KE Reactor, and replacement of the vanstone gaskets was completed at midnight February 25. Emergency orders were placed for pipe and fittings, pressure monitoring gauges, and resistance thermometers. Also an order was placed for 150,000 pounds of boron balls.

CA-513-A - Purex Facility

Design work during the month consisted of 81 minor field design changes and development work on the following major design changes: (1) expansion of recycle hood facilities, (2) revision of jumper installation, (3) modification of remote maintenance cranes, (4) alterations to decontamination cell, and (5) improvement of vessel vent system seal.

Construction progressed about 1% to a total of 97%. Remaining work is being transferred to Minor Construction and Plant Forces as rapidly as possible. The Head-End Control Room and Phase I of 202-A Building, Cells "A" through "E", were accepted with exceptions on February 15. The ventilating and heating systems were completed except for punch list items. Installation of all major equipment in the cells was completed, and this equipment is being run-in and tested.

Fabrication of process jumpers was 97% complete, and installation was 91% complete. The electrical jumpers have been fabricated, and about 80% have been installed. Installation of piping was essentially completed. Some insulation work remains in the Pipe and Operating Galleries and Organic Storage.

Over-all completion of the Waste Cribs, lines, and hot waste lines was 99%. Minor Construction forces are clearing punch list items. The 291-A Fan House Filter, and Gas Sampling Building were 99% complete, and Minor Construction forces are clearing up exceptions.

CA-514 - 300 Area Expansion Program - Production Facilities

Design had been completed previously; construction progressed 3% to a total of 64%. Revision No. 3 to the project proposal was being circulated for final approvals within the General Electric Company. This revision requests $6,200,000 and a completion date of April 1, 1956. It also provides for water autoclaving instead of steam autoclaving and for ultrasonic bond testing.

Structural work in 313 Building consisted of placing brick and concrete for floors and trenches. The frost test equipment has been relocated to the new building. Equipment installations included motor control centers, tanks and pumps, and the sleeve cleaning machines. Extensive work was done on the penetration etch machines, and their operation was observed by a representative of the vendor. At the end of the month the vendor had offered no firm recommendations.

CG-535 - Redox Capacity Increase, Phase II

Design had been completed previously; construction progressed 5% to a total of 96%. The beneficial use date for Building 233-S was established as February 8, 1955 when the final inspection was conducted. Exceptions are being cleared. The expected beneficial use for the Silica Gel Facility was extended one month to April 15, 1955. Erection of the Chemical Make-up Building was essentially completed.

CA-539 - Additional Waste Storage Facilities for Redox

The current status of design was 90% complete, and of construction 87% complete. Two revisions to the project proposal have been processed recently. The latest revision, No. 6, proposes a change in size of the vapor manifold and adds a safety water seal. Procurement for the increased scope was 75%. No new construction has been started.

CA-546 - Fuel Element Pilot Plant

Design and construction remained at about the same stage of completion. Over-all construction was 51% complete. Design proceeded on the basis of a reduced scope for the installation of semiworks equipment. Minor Construction completed tests and run-in of eight pieces of shop equipment which were installed by the contractor. Relocation of 3730 Building equipment was begun on February 21, 1955.

CG-558 - Reactor Plant Modification for Increased Production

Over-all design was about 56% complete; construction progressed 1% to a total of 4%.

Major design effort included design for the 190-D Building Annex based on a decision to include B and D Annexes in one lump sum construction contract. Design for the 190-B Building Annex was completed with exceptions. Design for the 183 Buildings was well advanced, and further work was done on design for the 181 and 105 Buildings and the effluent system.

In 100-F Area, installations and testing of horizontal rods were completed February 27. The rod shutdown for 100-DR has been postponed at the request of Manufacturing Department because of the assignment of personnel to work in the 100-K Area.

The principal work in 100-B Area consisted of installation of electrical services, relocation of electrical equipment, relocation of instrument piping in 190-B Building, and the outfall structure. This structure was about 95% complete. The 1500-foot section of the 66-inch effluent line, between Junction Box P18B and Station 200, has been hydrostatically tested. Preparation for abandoning the 30-inch storage drain has been completed. In 100-D and DR Areas the principal work was relocation of electrical services and facilities, including the 13.8 KV feeders, emergency circuits, and pump installations. Preparatory work was done for installation of additional air conditioning facilities.

Invitations to bid on the 190-B and D Building Annexes were mailed February 18, 1955.

CG-603 - Hanford 4X Program - Bismuth Phosphate Plants

Scoping and design are being managed by the Design Section, and work was about 7% complete. Construction progressed 5% to a total of 6%.

The Part II scope document for the "B" and "T" Plants has been submitted to A.E.C. for approval. Detailed design for the "T" Plant First Cycle Waste Scavenging Facilities was completed, and design was accelerated for corresponding work at "B" Plant.

Advance ordering of materials was continued, and the first shipment of blocks and connectors has been received. A $13,000 work order has been issued to "T" Plant Maintenance for the In-plant First Cycle Waste Scavenging. Minor Construction has started fabrication of jumpers. Related work included testing of operating gallery valves and piping, repacking of valves, re-gasketing of jumpers, and repair of existing cell equipment.

B. OTHER ASSIGNMENTS

CG-187-D-II - Redox Production Plant

The completion status remained at design 100%, construction 1%.

CA-187-D-III - Redox Cooling Water Disposal Basin

Both design and construction have been completed. The project is being held open to observe operation of the cribs for several months. Percolation tests are being scheduled for early March, 1955.

CA-431-C - Metal Examination Facility - 105-C

Design had been completed previously; construction progressed 7% to a total of 89%. Installation of equipment was continued; however, progress was delayed by assignment of manpower to 105-F work and to the charge-discharge machine job at 105-C. Shop tests on the end-cap remover were delayed because of a faulty hydraulic cylinder. This item was returned to the manufacturer, and is expected to be available during the first week of March 1955.

CA-532 - Fiscal Year 1954 Water Tank Replacements

Design had been completed previously; construction progressed 5% to a total of 98%. Painting of 2902-E and W Tanks has been completed, with exception of safety slogans. 1902-D and 1902-F Tanks have been chlorinated and tied-in to the powerhouse. The remaining work consists of painting and replacing vertical riser straps. 1901-D Tank has been dismantled, and 1901-F Tank was almost dismantled.

CA-533 - Hanford Works Official Telephone Exchange

Design had been completed previously. The completion status of construction has been re-evaluated and revised downward to 55%. The building structure was essentially completed, and final inspection of the fire alarm and underground telephone cable systems was held on February 18. These two systems were accepted. Installation of equipment by the vendor was about 40% complete. Tie-in of the telephone exchange cable was started by Plant Forces on February 21.

CG-543 - Replace Sanitary Tile Field 200 West Administration Area

With design completed, and the work release issued, construction began and progressed to 12% complete. The two tile fields have been excavated, and the rock backfill

is being placed. A Construction Progress Schedule has been prepared for transmittal to the A.E.C.

CA-544 - Central Distribution Headquarters

Work was suspended to await further instructions from the Electrical Utility Section.

CA-548 - Reactivate Project Proposal for New VSR Test Tower

With preliminary design and the report on the existing tower completed, the rough draft of the project proposal has been prepared.

CG-549 - Activate Task I, RMA Line - Building 234-5

Design had been completed previously; construction progressed 22% to a total of 95%. The installation of Task I process and associated equipment has been completed, and the installed equipment is being tested. Beneficial use was attained on February 24, 1955. Temporary arrangements are being made for Task I operations.

CG-551 - Expansion of 234-5 Building Facilities

Design had been completed previously; construction progressed 12% to a total of 98%. The new Task III line was being run-in and tested. Walls and barriers are being replaced. The Final Inspection Facility was completed except for installation of double doors which cannot be delivered until April 1955. Other minor exceptions are being cleared. Over-all beneficial use was scheduled for the first week of March 1955.

CA-555 - Graphite Hot Shop and Storage Building

With design completed, the revised project proposal is being held to obtain approval of the estimated cost of the project. A letter was prepared to state reasons for the estimate and to note possible deletions.

CG-562 - Waste Metal Recovery Plant Modifications

Completion status remained at design 100%, construction 74%. It is expected that the question of deleting additional solvent segregation facilities will be settled by the middle of March 1955. High uranium waste losses have made it necessary to consider modifications to the intercycle stripper.

CG-572 - Particle Problem Animal Exposure Equipment

Detailed design progressed 24% to a total of 85%; construction remained at 32% complete. The Phase II architectural and mechanical drawings are being routed for final approval. The electrical drawings are out for comment.

CG-574 - Irradiation

Scoping and design are being managed by Design Section. Construction progressed 58% to a total of 76%. Work on the 105-C Storage Basin doors has been completed. Two "J" slug casks have been completed and are ready for testing. Fabrication of

the "J" slug shipping bucket yokes and the "N" cask handling equipment is progressing. One of the two trailers arrived February 21, and the second arrived February 23, 1955. Delivery of the air compressor is still delaying completion of the air mask system in 100-H Area.

CG-576 - General Improvements to Laboratory Area - 300 Area

Design progressed 8% to a total of 35%; construction progressed 4% to a total of 33%. Design criteria for the tensile testing machine are being reviewed, and a new estimate was obtained. The new total was $55,000 as compared to about $20,000 previously estimated. The Manufacturing Department completed its review of the Davis-Bacon requirements on February 7, 1955. This review plus diversion of craftsmen to high priority work in the 100 Areas delayed work by Plant Forces about two weeks. Some Minor Construction work is to be released during March 1955.

CG-578 - Effluent Water Monitoring Improvements 100-B, D, F, DR and H Areas

Scoping and design are being managed by the Design Section. Construction progressed 1% to a total of 4%. Work was suspended on this project while Unusual Maintenance personnel were assigned to re-gasketing of 100-F and 100-KW Reactors. Delivery of the first spectrometer was promised for early March 1955.

CG-579 - Effluent Water Monitoring Improvements - 100-C Area

Delivery of the first spectrometer was promised for early March 1955.

CA-586 - First Capacity Increase - 230-KV System

The preliminary line survey has been completed, and work is being done to determine the number and location of transmission tunnels. A check estimate has indicated a cost of $300,000 for materials to be furnished by A.E.C. These materials include 20,000 feet of 230 KV transmission line, the addition to 100-K Substation, and the Hanford switch structures. The Bonneville Power Administration has established May 1, 1955 as the completion date for work at Midway Substation.

CG-587 - TBP Waste Scavenging

Design had been completed previously; construction completion was revised downward to 72%, based upon the addition of four cribs. Excavation work was started, and it appears that the first crib should be ready for use by the April 1 scheduled date. Sufficient pipe to complete the project has been located at Hanford.

CG-588 - Ammonia Scrubbers, Redox

Design is being managed by Design Section. The rerouting of solvent off-gas jet vents to the stack breech has been completed. Performance data extending through the middle of March 1955 is being obtained to allow a decision on the future status of the project.

CA-589 - Dejacketing and Ultrasonic Equipment - 105-C Building

Design progressed 1% to completion. Shop work by Plant Forces is awaiting delivery of the material.

CA-590 - Fly Ash Collection Equipment, Building 384

With preliminary design completed, the revised project proposal was returned by Financial Department for additional justification. This additional justification is to be based upon the clogging of 314 Building ventilation filters and the effects of fly ash on analytical work in the 300 Area Laboratory.

CA-595 - Car Pullers 184 Building Coal Yard - 100-B, D, F, and H Areas

Design had been completed previously. The Notice to Proceed was issued to the contractor on February 14, 1955. The decontamination of 100-B Area work site was completed by Radiological Sciences personnel. A revised project proposal is being circulated for comments, and the two requests are for electrical tie-ins to be performed by the lump sum contractor and a revised division of funds, with $4,500 to General Electric and $18,000 to A.E.C.

CA-596 - Central Mask Washing Station, Building 2723-W

Detailed design was completed by Design Section, and the drawings and specifications have been forwarded to A.E.C.

CG-599 - Hanford 4X Program - 100 Area

Scoping and design are being managed by Design Section. The study of the type of cask car required was continued, but no decision has been made. Only one vendor indicated a willingness to bid, and he has been requested to submit a design for a car less than 51 feet long.

CG-600 - 100-C Alterations

Design was about 72% complete. Construction work scheduled for the present was completed. It consisted of excavation for the new effluent line between existing distribution boxes and 107-C Basin, and it amounted to about 0.3% of the construction. Construction has been suspended until September 1955 when work is to be resumed on the poison column and toggle valves.

CA-601 - 300 Area General Improvement Program

With preliminary design 85% complete, the project proposal was submitted to A.E.C. on February 7, 1955.

CG-608 - Redox Crane Viewing Room

Design had been completed previously; construction progressed 4% to a total of 24%. It has been determined that the crane maintenance platform cannot be sufficiently decontaminated until early April 1955 and that work by Minor Construction could not be completed until about the middle of June 1955. A letter revision to the project proposal has been prepared to request an extension of the completion date to October 1, 1955.

CG-610 - Replacement of 313 Building Roof

Detailed design work was scheduled to start February 28, and to be completed by April 1, 1955. The start of construction depends upon progress of related work on 300 Area Expansion - Production Facilities.

CG-611 - Mobile Laboratory

The A.E.C. has been requested to reconsider the project proposal which was recently rejected.

CA-612 - Alteration of 713 Building for Electronic Data Processing Machine

Scoping and design are being managed by Design Section. The final design package has been approved and submitted to A.E.C. for preparation of the bid assembly. The Work Authority for procurement funds has been received, and about 90% of the total requisitions are out for bid.

CG-613 - Hanford 4X Program - Metal Conversion Plant

Design was about 7% complete, and a revised project proposal is being prepared to request construction funds. Requisitions for most of the stainless steel vessels are being processed. Considerable amounts of corrosion-passed stainless steel pipe, fittings, and plate are being obtained from the Purex excess materials. It is planned to procure the calciners on a negotiated contract which will allow the vendor to provide consultant services during detailed design.

CG-614 - Hanford 4X Program - 300 Area

Scoping and design are being managed by Design Section. The scope for the 3707-D Change House has been reduced by elimination of the 1000-square-foot addition and special lunchroom facilities. Six inert-arc welding transformers have been located, and three of these were inspected on February 17 and 18, 1955. Four transformers are needed for this project, and Manufacturing Department is buying two extra for spares.

CA-615 - Mechanical Maintenance Shop Centralization - 100 Areas

With preliminary design completed the project proposal was transmitted to the A.E.C. on January 12, 1955. Consideration is now being given to a Plant Central Shop instead of the proposed Central Shop for the 100 Areas only.

CG-617 - Additional Air-Drying Facilities - Building 234-5

Scoping and design are being managed by Design Section. Requisitions were processed, and bids were requested on the water chiller, cooling coil, and air drying equipment.

CA-619 - Alterations to 186-D Building

With preliminary design 85% complete, the project proposal was temporarily delayed during a review of related warehousing requirements for the 100 Areas. The proposal is again being routed for approvals within General Electric Company.

CG-620 - Melt Plant Modifications - 314 Building

With preliminary design completed, the project proposal was transmitted to A.E.C. on February 3, 1955.

Employee and Public Relations

PERSONNEL PRACTICES

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	4386
Five-year Service Recognition Pins presented during February to exempt personnel	5
Five-year Service Recognition Pins presented during February to non-exempt personnel	19

During February, 11 people whose continuity of service was broken while in an inactive status were so informed by letter.

Employee Services

The following contacts were made with employees during the month:

Employee contacts made at Kadlec Hospital	97
Salary checks delivered to employees at Kadlec Hospital	43
Salary checks delivered to employees at home	5

At month end, participation in the Benefit Plans was as follows as compared with last month's participation:

	January	February
Pension Plan	98.2%	98.2%
Insurance Plan	99.3%	99.4%
Savings and Stock Bonus Plan	50.7%	50.9%

Twelve letters were written concerning deceased employees and their families during February, regarding payment of monies from the Company and answering questions.

Since September 1, 1946, 161 life insurance claims have been paid totaling $ 1,048,013.00.

Three employees retired during the month of February, namely:

Elton L. Hastay	W-3378	Optional Retirement
Henry P. Jones	M-138	Normal Retirement
Dorothy A. Murphy	W-8034	Normal Retirement

All matters pertinent to retirement have been discussed with these employees in order that they will be fully informed of their retirement benefits.

One retired employee died during the month, namely:

David W. Sullivan	W-6814-617	2-14-55	Manufacturing

IR-183 - Study of Classified Scrap Disposal Problem - 300 Area Library

The pulping machine has been received and is being set up so that tests may be performed. As soon as these tests are completed, design work is to begin.

IR-184 - Tocco Induction Heating Unit, 314 Building - 300 Area

Design progressed 5% to completion; construction began and progressed to 1% complete. Installation work proceeded on the Unistrut safety switches, high frequency contacters, and associated controls.

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The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month.

ER A-761 - Decontamination Facilities, First Aid Station - 100-H and 200-W Areas

A rough draft of the study report is being routed for comments.

ER A-765 - Painting Water Plant Structures - 100-DR Area

A study report has been issued to the Reactor Section. It recommends minor maintenance at present and a complete painting of the facility after about two years.

ER A-1220 - Minor Construction Fabrication Shops Modifications

Work on this project proposal has again been stopped because of present plans to leave the White Bluffs Machine Shop intact.

ER A-2749 - Sheltered Welding Manifolds - 200 Areas

Preparation of the project proposal is awaiting definition of requirements. Additional justification has been requested from Plant Safety.

ER A-2756 - FY-1955 Water Tank Replacements - 100-200 Areas

A rough draft of the project proposal was nearly completed, and it is to be submitted to the contact representatives during early March 1955.

ER A-3113 - Development of Independent Water Supply Source - 300 Area

Rough draft copies of the project proposal were issued for comment on February 14, 1955. With scoping 25% complete the Engineering Department has requested that the request be postponed until further notice.

ER A-3114 - Relocate Oxide Burner North of Building 314

The Engineering Department has requested that preparation of the informal request be postponed.

C. RELATED FUNCTIONS

Workload for off-site inspection appears to be stabilized around 400 orders, representing about $11,000,000. Emergency attention was given to orders for vanstone gaskets, piping, connectors, and instruments for 100-K Reactors. Delivery of Purex vessels and equipment was essentially completed except for some spare units. The total evaluations under the Corrosion Testing Program dropped slightly to 122, of which 72 were done on the West Coast and 50 on the East Coast.

Several assistance functions were performed by Inspection Sub-Section personnel during the month. Two vendor inspectors are assisting at 100-K Area, and others are performing on-site inspection for process vessels being fabricated by Minor Construction. Inspection personnel are assisting in disposal of excess scrap and salvage material from orders placed by Blaw-Knox. This work included excess stainless steel materials which are being transferred from Purex to other Hanford projects.

Inspection Sub-Section has continued in formulation of methods, procedures, and applications of statistical sampling. Several large orders are being briefed to inspectors with instructions to use sampling procedures.

Following is a resumé of inspection activities during the month:

Item	Number	Value
New orders received during the month	128	
Total orders for items requiring inspection	410	
Cumulative orders assigned to inspectors	382	$11,200,000
Orders assigned to inspectors this month	149	1,100,000
Orders completed during the month	111	1,100,000

Reproduction output increased to 349,492 square feet, thus approximating the average workload during recent months. Engineering Files distributed 157,073 prints during the month. The largest order was 13,276 prints for the Reactor Modification Program.

Estimating completed 28 estimates during the month. The completed estimates comprised the following: project proposal - 9, scope - 8, study - 6, preliminary - 2, high spot - 2, and cost-to-complete - 1.

Field Surveys completed the field work in 100-F and H Areas on Reactor Modification Program, and the field work on the proposed five-mile transmission line from 100-K Area to the existing B.P.A. transmission line. Survey crews continued with assistance on the survey of Richland.

D. CRAFT LABOR

A jurisdictional dispute between laborers and pipefitters caused a work stoppage at Purex on February 16. The laborers ceased work over the question of drilling pipe anchor holes in a concrete wall; however, they resumed work on February 17.

Voluntary termination of construction personnel was negligible.

REPORT OF VISITORS

To Hanford

L. J. Haight of Johnson Pump Company, Los Angeles, California, visited R. C. Hollingshead on February 8 for consultation regarding Purex pump installation.

Roy Lee of General Electric - ANP, Arco, Idaho, visited W. A. Graf and M. R. Yates on February 9 to inspect compressor installation.

L. P. Shorts of L. H. Butcher Company, representing Udylite Corporation of Detroit, Michigan, visited P. J. O'Neil from February 23 through 25 to check the penetration etch machines for 300 Area.

Official Trips to Other Installations during February, 1955

W. F. Garetson visited General Electric Company, Schenectady, New York, from January 30 to February 9 to participate in a special conference on nuclear power.

C. P. Lawson visited Southwest Engineering and Standard Steel Company, both of Los Angeles, California, from February 13 to 17 to attend meetings regarding claims by vendors.

Fh-1

ADVANCE ENGINEERING SECTION

MONTHLY REPORT

FEBRUARY, 1955

The fiscal year summary of Engineering Department Research and Development Program on Reactors is ready to be issued. This report was delayed by priority attention given to the Hanford Atomic Products Operation Annual Report.

One of the major incentives for considering the use of sodium coolant in graphite moderated piles is the relative inertness of uranium metal when exposed to sodium instead of to water.

W K. Woods

ADVANCE ENGINEERING
ENGINEERING DEPARTMENT

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SUMMARY - FEBRUARY, 1955

PERSONNEL PRACTICES SECTION

Plans for the third Attitude Survey among HAPO employees have been established with questionnaires to be distributed and returned on Friday, March 25, 1955.

The number of applicants interviewed in February was 1,982 as compared with 2,146 for January. In addition, 216 new applicants applied by mail. Open, non-exempt, non-technical requisitions decreased from 620 at the beginning of the month to 470 at month end. One hundred and fourteen employees were added to the roll and 71 removed during the month. The separation rate for fiscal month of February was .78% and for fiscal month of January .67%. These rates when converted to annual rates are 10.17% and 7.51% respectively. During February 76 new requests for transfer to other type work were received by Employment, and 48 transfers were effected. Attendance recognition awards were distributed to 324 employees in February, including 104 who qualified for five-year awards.

Three employees retired during the month of February and one retired employee died. Ninety-seven visits were made to employees confined to Kadlec Hospital, and 48 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98.2%, in the Insurance Plan 99.4%, and the Employee Savings and Stock Bonus Plan 50.9%. At month end there were 536 non-veterans registered under Selective Service and 579 military reservists were on the roll. Since August 1, 1950, 387 employees have terminated to enter military service, of which 137 have returned, 27 have not claimed re-employment rights, leaving 223 still in military-leave status.

Eighty-one adopted suggestions were approved for awards in January, resulting in cash awards totaling $1,335 with a total net savings of $9,319.11.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION

The News Bureau issued 43 news releases during the month, 5 of which were especially planned for national publicity purposes and were sent to the Schenectady News Bureau. One manuscript was approved for publication and 5 papers received all required approvals. Arrangements were made for 4 speeches to be delivered before public groups. 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.

Five Hanford subjects were submitted for consideration as 1956 GE calendar paintings.

A search is being conducted for suitable subject material for use in a proposed exhibit that can be built and sent, at General Electric expense, to the International Conference on Atomic Energy to be held at Geneva, Switzerland in the summer.

Hanford Safety Report for 1954 was completed and distributed.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION (Continued)

The first full month of Photography Unit's experience on liquidation of costs proved to be remarkably successful. It was established that liquidation of costs would be satisfactory if we came within $1,000 variation. The actual variation was an over liquidation of $360.

The second HANFORD SCIENCE FORUM telecast was presented over KIMA-TV and KEPR-TV on February 26 at 6:00 PM. This show received a phenomenal telephone response according to the Program Director of the Stations, as a result of the first telecast last month. It is now scheduled as a permanent public relations feature with the time of telecast set for the last Saturday of each month at 6:00 PM. The show is presented as a public service by the station.

Graphics also began work on development of two large 48" x 40" display panels of the Hanford operation. The display will consist of an area location map, a schematic process flow from metal preparation to final product and supporting photographs of the areas and various points of interest. This work is being done at the request of the Manager, HOO,AEC, and will be shipped to the Weapons Display Room at Sandia for permanent display.

SALARY AND WAGE ADMINISTRATION SECTION

The initial phase of the scheduled reconciliation program was completed; 13 per cent of HAPO positions have been reconciled with other components of the Company.

Ninety per cent of the questionnaires for the Northwest Area Wage Survey have been completed and returned to us and the data is being processed. An extensive visit was made to nine AEC installations as well as to General Electric installations to obtain an exchange of wage and salary information.

Work continued on the non-exempt job study. About 95% of the clerical-functional and semi-technical job descriptions have been completed and are being analyzed. Job descriptions for manual jobs are being written. The selection of representative jobs and the study of their ranking is going on in order to develop a plant-wide evaluation scheme.

UNION RELATIONS SECTION

A discussion was held in Richland on February 18 with a field examiner from the National Labor Relations Board, and the Company took the position that the petition for election involving Laboratory Assistants should be dismissed as an inappropriate unit. This was later followed up by two letters to the Board which stated our case in more detail.

Negotations with the Material Expediters and Take-Off Men will be resumed on March 1.

We have received information that the Chemical Workers are again endeavoring to organize the Chief Operators and affirmative action is being taken to counteract union propaganda and threats.

UNION RELATIONS SECTION (Continued)

The initial issue of the Union Relations Information letter was distributed this month. In addition to reporting on all grievances settled at Step II, this letter will provide an opportunity to discuss other matters which do not come to us as formal grievances.

Several meetings were held during the month with the Hanford Guards Union regarding their desire to arbitrate a grievance alleging violation of the call-in procedure. We expressed our willingness to go to arbitration on the matter but no further action has been taken.

EDUCATION AND TRAINING SECTION

Seven Rotational Trainees were permanently placed during the month of February and three new graduates reported on the Program during the month.

Reimbursement authorization for the hiring of eight university professors and five graduate students has been requested and received from the AEC.

Reimbursement authorization has been received from the AEC for the employment of eleven third-year engineering and science students for the summer of 1955.

Registration in the School of Nuclear Engineering totaled 443, the highest number on record. Enrollment is about equal in graduate and lower-level courses.

A "Customer Relations" program for firemen has been given to small groups and will probably be expanded to include most of the firemen in preparation for their calling on Richland residents during March.

HEALTH AND SAFETY SECTION

The Occupational Health Institute presented their Certificate of Health Maintenance to the Hanford Atomic Products Operation during February.

Sickness absenteeism was 1.66% versus 1.76% for January while total absenteeism was 2.30% versus 2.42%. The year-to-date total absenteeism of 2.36% is an improvement over the comparable figure of 2.91% for 1954.

The total number of plant injuries increased greatly from 315 to about 430. There were no major injuries in plant or Community, but there were three sub-major injuries and one near-serious accident in Operations.

The average daily hospital census increased from 74 to 76.3 as compared with 89.9 a year ago.

AUXILIARY OPERATIONS AND PLANT PROTECTION

Through locations and declassifications the number of unaccounted for documents chargeable to the General Electric Company was reduced from 236 at the end of January to 225 at the end of February.

Incidence of plant fires continues at a low rate with five alarms during the month inclusive of two false alarms. Bona fide fires were minor, with losses amounting to $25.

COMMUNITY SECTION

It was announced that effective April 1, 1955, residential lot lines as staked would become final.

Two major changes in the housing policy were approved by the Atomic Energy Commission as follows:

1. Effective as soon as administratively feasible, all lessees of Wherry Act houses are eligible to go on the General Electric Company housing master list for government housing if otherwise qualified.

2. Effective immediately, the housing policy relating to the transfer of leases is hereby revised as follows: In cases of retirement of a male head of a family who is a lessee, the lease may be transferred to an adult son or daughter of the lessee if said son or daughter has dependents, has eligible project employment and is residing in the residence at the time of the retirement.

ORGANIZATION AND PERSONNEL

Total on roll February 1, 1955	1774
Accessions	31
Separations	36
Total on roll February 28, 1955	1769

*Total includes 33 Rotational Trainees.

Employee and Public Relations

PERSONNEL PRACTICES

General

Plans for the third Attitude Survey among HAPO employees have been established with questionnaires to be administered on Friday, March 25, 1955.

Employment	January, 1955	February, 1955
Applicants interviewed	2,146	1,982

517 of the applicants interviewed during February were individuals who applied for employment with the Company for the first time. In addition, 216 applications were received through the mail.

	January, 1955	February, 1955
Open Requisitions		
Exempt	---	---
Nonexempt	620	470

Of the 620 open, nonexempt, nontechnical requisitions at the beginning of the month, 336 were covered by interim commitments. Of the 470 open, nonexempt, nontechnical requisitions at month end, 351 were covered by interim commitments. During February, 104 new requisitions were received requesting the employment of 146 non-exempt, nontechnical employees.

	January, 1955	February, 1955
Employees added to the rolls	102	114
Employees removed from the rolls	74	71
NET GAIN OR LOSS	+ 28	+ 43

Separation Rate:

Fiscal Month January, 1955		Fiscal Month February, 1955	
Male	Female	Male	Female
.30%	2.39%	.50%	2.09%

Over-all Separation Rate:

Fiscal Month January, 1955	Fiscal Month February, 1955
.67%	.78%

During February, 15 employees left voluntarily to accept other employment, 5 left for business for self, and 1 left to enter military service.

Employee and Public Relations

PERSONNEL PRACTICES

Transfer Data

Accumulative total of requests for transfer received since 1-1-55	134
Number of requests for transfer received during February	76
Number interviewed in February, including promotional transfers	69
Transfers effected in February, including promotional transfers	48
Transfers effected since 1-1-55, including promotional transfers	73
Transfers effected in February for employees being laid off	---
Number of stenographers transferred out of steno pool in February	5
Transfer requests active at month end	325

ADDITIONS TO THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
New Hires	2	99	1	102
Re-engaged	-	--	-	---
Reactivates	2	10	-	12
Transfers	-	--	-	---
TOTAL ADDITIONS	4	109	1	114

TERMINATIONS FROM THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
Actual Terminations	7	34	-	41
Removals from rolls(deactivates)	4	23	-	27
Transfers	1	2	-	3
TOTAL TERMINATIONS	12	59	-	71

GENERAL

	1-1955	2-1955
Photographs taken	253	215
Fingerprint impressions	140	173

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	1-1955	2-1955
General Electric Cases	217	217
Facility Cases	18	28
TOTAL	235	245

Employee and Public Relations

PERSONNEL PRACTICES

One hundred and thirty inquiries were received from the advertisements which we placed in the two Yakima newspapers on February 4, 5, and 6, for Production Operators and Stenographers.

A representative of the Employment Unit visited the two commercial classes at the Columbia High School on February 17 to give out applications and schedule appointments for the students to come to the Employment Office for tests and pre-employment processing. A total of 45 students attended the two meetings and 31 accepted applications.

We were requested by Separations Section to place on "hold" status,requisitions for the "B" Plant which request a total of 144 employees. This includes the following: 16 Plumber Steamfitter Journeymen; 12 Instrument Technicians, 80 Separations Utility Operators, and 15 Radiation Monitor Trainees.

It is our understanding that these requisitions will probably be cancelled.

TESTING

Supervisory-Selection Program- Forty-six candidates were administered the test batteries, the results interpreted and relayed to the section evaluators. Fourteen of these candidates were from the Graphics Unit. This is a "new account" in the use of the G.E. Selection Program. In talking with Burt Leslie after the tests were given and the results interpreted, Mr. Leslie made the comment that he was pleased with the results of the Selection Program.

Personnel Records and Investigations

INVESTIGATION STATISTICS	1-1955	2-1955
Cases received during the month	295	386
Cases closed	215	223
Cases found satisfactory for employment	305	320
Cases found unsatisfactory for employment	66	56
Cases closed before investigation completed	68	45
Special investigation conducted	14	6

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	5028
One-year awards made in February for those qualifying in January	57
Total two-year awards to date since January 1, 1950	2727
Two-year awards made in February for those qualifying in January	61
Total three-year awards to date	1463
Three-year awards made in February for those qualifying in January	58
Total four-year awards to date	584
Four-year awards made in February for those qualifying in January	44
Total five year-awards to date	104
Five-year awards made in February for those qualifying in January	104

Employee and Public Relations

PERSONNEL PRACTICES

Employee Services

During February 30 letters were written concerning retirement and retired employees, providing information of a general or specific nature. To date 334 employees have retired at Hanford, of which 171 are continuing their residence in this vicinity.

A total of 107 new employees attended Orientation Programs given by members of this group during the month of February. Of this number 100% have signed to participate in the Pension Plan, 100% have signed to participate in the Insurance Plan and 79% have signed to participate in the Good Neighbor Fund.

Military Reserve and Selective Service

Statistics with respect to employees who are members of the military reserve are as follows:

Total number of non-veteran employees subject to military service training through Selective Service System		536
Number Classified	1A	88
Number Classified	2A	105
Number Classified	3A	189
Number Classified	4F	70
Number Classified	1D	45
Number with Classification unknown		39
Total		536

Number of Technically Trained & Engineering Personnel for whom deferments are currently being requested	108
Number of NonTechnically Trained & Engineering Personnel for whom deferments are being requested	5
Accumulated Total of deferments requested	1440
Accumulated Total of deferments granted	1153
Current number of deferment requests pending	34
Current number of deferment requests denied	7
Current number of deferment requests granted	9

Number of Deferment requests pending at Local Board Level	19
Number of Deferment requests pending at Appeal Board Level	14
Number of Deferment requests pending at Presidential Appeal Level	1
Total	34

Number of Deferment requests denied by Local Boards	4
Number of Deferment requests denied by State Appeal Boards	3
Number of Deferment requests denied by Presidential Appeal Board	0
Total	7

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Service

Number of Deferments granted by Local Boards	8
Number of Deferments granted by State Appeal Boards	1
Number of Deferments granted by Presidential Appeal Board	0
Total	9
Number of Technically Trained & Engineering Personnel denied, or requesting no further appeal, now pending induction	17
Number of Technical Graduates with over two years of deferments	79
Number of Selective Service vulnerable Technical Graduates Enlisted	0
Number of Selective Service vulnerable Technical Graduates Drafted	0

Reservists Data:	
Total number of Reservists on roll	579
Number of Active Reservists	138
Number of Inactive Reservists	428
Number of Employees in the National Guard	13
Total	579
Reservists and National Guard members subject to drills, Tours of Duty, Cruises, Summer Camp and/or weekly or monthly meetings	119

Military Service Leaves of Absence - August 1, 1950 through February 28, 1955

Reservists	123
Selective Service System	259
Female Employees Enlisted	5
Total Military Leaves	387
Total number returned to roll	137
Reservists 54	
Selective Service 73	
Known number not claiming re-employment rights	27
Number of employees still on Military leaves	223

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Suggestion Plan	January	February	Total Since 7-15-47
Suggestions Received	267	252	16140
Acknowledgements to Suggesters	263	202	
Suggestions Pending Acknowledgement	40	90	
Suggestions Referred to Depts. for Investigation	330	252	
Suggestions Pending Referral to Departments	62	143	
Investigations Completed and Suggestions Closed	201	217	
Suggestions Adopted - No Award	2	1	
Adopted Suggestions Approved by Board for Award	73	81	
Total Net Cash Savings	$15,257.15	$9,319.11	
Total Cash Awards	$ 2,025.00	$1,335.00	
Total Suggestions Assigned to Field for Investigation	735	656	
Total Number Suggestions Outstanding to Departments	729	654	

Awards of $145 each went to John A. Clark and C. C. Farley, both Chief Operators "S" in the Separations Section. Their suggestions were for reactivation of an unused tank as a part of the processing and thus save purchasing additional recycle cans. A savings of $2873.91 in cans resulted from adoption of these two suggestions.

Life Insurance

Code information which is known only to Home Office Life Underwriter's Association has been furnished 49 insurance companies and investigation agencies during the month of February, 1955. This is in accordance with an arrangement with the Underwriters whereby employees on this project might be insured on the same basis as those working elsewhere.

Insurance Statistics

Claims reported to Department of Labor

January, 1955	
Long Forms	Short Forms
32	293

February, 1955	
Long Forms	Short Forms
42	533

Total Since September, 1946 - 24,432

Claims reported to Travelers Insurance Co.	January, 1955	February, 1955
	13	* 13

Total Since September, 1946 - 948

*Of the claims reported to Travelers Insurance Company during the month of February nine were property damage and four were bodily injury claims.

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Workmen's Compensation

a. — Date of Injury: 4-10-47; Employer: ; Nature of Injury: Low Back Injury.

After surgery and prolonged treatment, claim was closed with a permanent partial disability award of 50% of the maximum allowable for an unspecified disability. He appealed to the Board contending a greater amount of disability and a hearing was held on February 16, 1955, in Richland. all testified on behalf of the claimant. The doctors testified that in their opinion was permanently and totally disabled as a result of the injury of 4-10-47. The Assistant Attorney General asked for a continuance to Seattle for further medical testimony.

b. — Date of Injury: Indefinite; Employers: ; Nature of Injury: Hearing Loss.

— Date of Injury: Indefinite; Employer: ; Nature of Injury: Hearing Loss.

filed claims with the Department of Labor and Industries alleging loss of hearing as a result of working in noisy power buildings in the 100 areas over an extended period of time. The claims were rejected by the Department and appeals were then filed to the Board of Industrial Insurance Appeals. On February 8, 9 and 10 the two claims were heard before the Board in Richland. The claimants were present and represented by Williams and Critchlow, Richland attorneys and the was represented by Gerald DeGarmo and Seth Morrison of the law firm of Allen, DeGarmo and Leedy of Seattle. Four claims were scheduled to be heard, however, time permitted only the cases to be completed. It was agreed by all parties that the claims of should be continued to March 15 and 16. It is expected that no decision will be rendered by the Board with respect to the hearing loss claims until all four have been completed.

Liability Insurance

a.

A Summons and Complaint was served upon the on 2-24-55. The action was brought by as a result of alleged injuries sustained by in a traffic accident in Richland on 7-30-54. had been riding in a private sedan which was hit in the rear by a bus driven by The total amount claimed is $90,175 plus costs. is not a

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Liability Insurance (Continued)

employee. We have recommended to the Commission that the matter be referred to The Travelers for defense. The Commission has not yet indicated their attitude on the matter.

b.

The case was settled on February 16, 1955 for $3,500. The settlement resulted from a traffic accident of January 16, 1954 when a government car driven by employee, bumped into the rear of a private car occupied by and his wife. Neither or his wife are employees.

c.

The demurrers on the cases were argued before Judge Horrigan on February 1, 1955. We have since been advised by Mr. John Gavin that he has received a memorandum from the judge sustaining the demurrers. Mr. Gavin also mentioned that he expected that the cases would be appealed by the plaintiffs.

d.

On February 8, 1955 the Travelers attorney, John MacGillivray, argued the appeal in Supreme Court.

General

Chapter 233 of the Laws of 1947 provided that pension awards would be increased and that the increases would be paid from state funds. Modification No. 6 of our agreement with the State provided that the increased payments with respect to duPont pensioners would be paid from state funds effective 10-1-53. Because of a delay in signing the modification, payments continued from the General Electric Pension Award Reserve Account rather than from the state funds and a substantial refund was due General Electric. In February a refund check in the amount of $17,813.35 was drawn in favor of the General Electric Company representing the total amount of overpayments to the duPont pensioners.

Employee and Public Relations
PERSONNEL PRACTICES

Technical Recruitment

Campus recruiting of 1954-55 BS/MS candidates may be summarized as follows:

Field	Offers Extended	Offers Accepted	Offers Rejected	Estimated Requirements
Engineering:				
Chemical	28	7	5	27
Mechanical	23	3	6	28
Electrical	13	4	6	17
Chemistry	10	4	3	36
Physics	9	1	2	21
Metallurgy	2		1	15
TOTALS	85	19	23	144

Offers to be extended (pending spot check) -- 38

To date, 27 colleges and universities have been visited. Eighteen additional schools are scheduled for visits during the remainder of the season, and approximately 7 more schools remain to be scheduled.

In order to meet the requirements of the Rotational Training Program, plans have been formulated to acquire candidates from (1) Engineering, Chemet, Physics and Manufacturing Training Programs; (2) military service; (3) recruiting of men with 1-3 years of experience.

Experienced drop-in candidates interviewed in the office totalled thirteen during February. Two experienced candidates and three new graduates were signed on HAPO rolls. Other experienced activities during the month may be summarized as follows:

Field	Open Invitations	To Visit	Open Offers	Acceptances, but not CTR	Offers to be Extended	On the Roll
Engineering:						
Electrical	1					
Mechanical	1			2		
Chemical	1	1		1		
Industrial				1		
Chemistry			2			
Other		1		6		2
Metallurgy			1			
TOTALS	3	2	3	10		2

A total of 416 PhD cases have been reviewed with 167 visit invitations extended to date. Eighty-six candidates have accepted these invitations. Two hundred nineteen cases have been signed off as being of no interest to HAPO. Fifteen PhD

Technical Recruitment (Continued)

candidates visited Richland during the month. Several offers are anticipated from this group since many were extremely well-qualified candidates. An acceptance was received from a physical chemist to whom an offer was extended during the month. One PhD, a chemical engineer, reported on HAPO rolls.

During the month there were 8 terminations of exempt employees; 1 entered military service, 1 transferred to another GE site, 3 left for other jobs, and 3 for other reasons.

Employee and Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

During the month of February the News Bureau issued 43 releases. The breakdown by category, distribution and content was as follows:

Subject		Distribution	
Pay and Benefits	5	Hanford	35
Employment Services	12	West Coast Area	3
Good Will	4	National	5
Technology & Research	2		
Utilities & Public Works	1	Information	6
Safety and Fire	1	Pictures	7
Real Estate	4	Short	26
Recreation	2	Long	3
Richland, Hanford Protection	1	Feature	1
Education & Library	5		
Health and Medicine	5		
Organization Changes	1		
Total	43		

In the national publicity field, the News Bureau has placed a total of 35 new feature stories about Hanford accomplishments in production this month. In addition, they have obtained final approval on, and returned, 10 previously completed features to the Schenectady News Bureau for release to national newspaper syndicates and other media.

National publicity releases sent for distribution to the Schenectady News Bureau with carbon copies to N. P. Jackson were: a story with picture on the use of a cereal bowl, attached to a ray counter, for more accurate metering of atomic radiation, and a picture and cutline showing five Hanford engineers and technicians target practicing. The atomic symbol was their unusual target.

J. Stanford Smith visited Hanford on February 15 and 16 to obtain, at first hand, necessary information about the Company's work here for the AEC. A luncheon meeting, together with individual conferences with the General Manager and Department Managers, and with the HOO,AEC Manager, afforded him an opportunity to secure the information he required.

Pictures on Biological Research at Hanford were sent to the New York LIFE office at the request of the Seattle representative of LIFE magazine. The material was to be used as possible back-up material for a LIFE story on the effects of radioisotopes on living things in connection with a story on recent atomic weapons tests.

BUSINESS ATOMIC REPORT was suggested to the Schenectady News Bureau as an addition to release lists for all information about the Company's atomic work.

Charts and photographs to be shown to LIFE representatives to maintain an interest in the proposed Hanford essay were sent to the Schenectady News Bureau.

A release concerning the Certificate of Health Maintenance awarded by the Occupational Health Institute to General Electric's Industrial Medical Unit was sent to the daily list. Pictures and cutlines were also sent to Northwest newspapers and to a TV station.

Employee & Public Relations

Callison Marks, Chief Editorial Writer for the SPOKESMAN REVIEW, visited Hanford. At his request his name has been added to Hanford release lists and he will be sent suggestions for editorials about Hanford.

A regional release was made concerning the 100th Hanford Science Forum Broadcast.

A special release written by Caesar Branchini, in charge of Public Health Education, concerning the Community Health Conference to be held in Pasco, April 13 and 14, was sent to the local and daily lists.

Fifteen stock photos with cutlines were given to Bill First, now a stringer for KIMA-TV, who will submit these photos for use as quick features during news telecasts.

Two requests for information were received and answered this month. Fact sheets on Hanford and Richland and plastic man fact sheets were sent to each requester.

Some 30 pictures and eight stories on several phases of work at Hanford have been given throughout the month to the COLUMBIA BASIN NEWS for their fifth anniversary Special Edition.

Photographs of William Russel Smith, a chemist with GE at Hanford, were given to the local representative of the Veteran's Administration. Information also was provided about Mr. Smith's job at Hanford, which he performs in spite of an artificial arm handicap. The VA expects to use this material for national publicity.

The editor of the GE REVIEW requested that an article be prepared for the July issue about the economy of plutonium production. He suggested this article appear over the signatures of the General Manager and the managers of Engineering and Manufacturing.

Eight articles from Hanford for the July issue of the GE REVIEW are being completed on schedule. Two articles are fully approved and are ready to send to Schenectady. Another article is completed and being approved, and a fourth article will be sent for approvals this week. The remaining four articles have been completed and are at Oak Ridge for declassification. They are to be published in an issue of the GE REVIEW that will be devoted entirely to the Company's work in the atomic field.

We have been notified by M. R. Cydell of AEC,HOO that he does not wish to see unclassified formal reports before they are published. We have documented this fact, and we will continue to review such reports since they frequently are made available to technical and trade magazine editors after they are published at Hanford.

A list of technical papers presented during 1954 and a list of signed articles proposed for 1955 were prepared and duplicated at the request of Technical Personnel.

The following papers received all required approvals during the month:

C. A. Bennett, "Some Statistical Methods Useful in Analyzing Personnel Data," for presentation at a meeting of the Cleveland Section of the American Statistical Association on February 14, 1955.

Employee & Public Relations

C. A. Bennett, "Recent Advances in the Design and Analysis of Industrial Experiments," for presentation at the Seattle Section of the American Society for Quality Control on February 8, 1955.

B. B. Lane, "Operation and Services of the HAPO Technical Library," to be given at the meeting of the Puget Sound Chapter of the Special Libraries Association on February 18, 1955.

R. L. Tomlinson, "Two Techniques for Fast Neutron Detection Using S^{32} (n,p) P^{32} Reaction," prepared as a formal unclassified report which will be distributed to the persons and places on the mailing lists.

L. K. Bustad, "Biological Implications of Atomic Bomb Fall-Out," for presentation at a meeting of the Nevada State Veterinarian Association on February 28, 1955.

"The Design and Construction of Concrete Shields," by H. S. Davis was approved for publication and submitted to NUCLEONICS by the author.

The following speeches were arranged during the month:

Presentation Date	Subject and Organization	Speaker
October 27, '55	A paper about chemical engineering and atomic energy to the Vancouver Section of the Chemical Institute of Canada.	C. A. Rohrmann
February 22, '55	"The New Hanford Telephone Exchange" to a Richland Naval Reserve meeting	L. H. Reagan
March 16, '55	Will speak and participate in a panel discussion on the subject, "Peacetime Use of Atomic Energy," before the Management Conference Committee of the Oakland, California Chamber of Commerce.	A. B. Greninger
February 21, '55	Will speak to a group of X-Ray Technicians and Civil Defense personnel at Walla Walla about radiation instruments and their use.	D. P. Ebright

Information about the length of time required to teach HOBSO to high school teachers was received from the Plant Community Relations Manager at Baltimore. He also sent copies of letters from Baltimore school teachers and comments about HOBSO from students who have had HOBSO in school courses. The information was furnished to representatives of the Richland schools with further assurance that we will be glad to present HOBSO for a group of teachers or students at any time in the future.

The February Community Newsletter was sent to community leaders with a booklet, "Neighbors From Way-Back," which describes GE's business activities in the West.

Copies of R. J. Cordiner's NAM talk, "Which Way America?", have been ordered from Schenectady for distribution to the community leader mailing list.

Employee & Public Relations

In answer to a request from Schenectady, five Hanford subjects were suggested for illustrations for the 1956 GE calendar. Black and white photos of subjects were also sent. The subjects were: the sheep farm, the meteorology tower, aquatic biology activities, a mock-up of chemical process activities in 300 Area, and monitoring of sagebrush.

A search is being conducted for suitable subject material for use in a proposed exhibit that can be built and sent, at GE expense, to the International Conference on Atomic Energy to be held at Geneva, Switzerland this summer. Engineering and Radiological Sciences Departments are cooperating to discover suitable topics for the exhibit.

Hanford safety report for 1954 was completed and distributed.

March safety topic, "Don't Take 'No' for an Answer," and health bulletin, "Too Much of a Good Thing," were produced and distributed.

Copy for booklet, "Caution, Contamination and Cash," explaining policy for reimbursement for loss of contaminated personal articles, was approved by Radiological Sciences.

Enrollment figures for spring term, GE School of Nuclear Engineering, were compiled, and a report of Employee Communications' promotion activities for the School was prepared.

Communications program directed at Laboratory Assistants in the Manufacturing Department, concerning current "organizing" efforts by the HAMTC, was prepared at the request of Union Relations; drafts of two letters to laboratory assistants, over C. N. Gross' signature, were written, and a full-page message on the GE 9-point better job program was published in the February 11 issue of the GE NEWS.

Holiday notice concerning George Washington's birthday, for bulletin board posting and publication in the GE NEWS, was prepared for C. N. Gross' signature.

Two Management NEWS Bulletins were produced and distributed.

Classified advertisement for Production Operators and Stenographers was prepared and placed in four consecutive issues of the YAKIMA HERALD and YAKIMA REPUBLIC.

Major GE NEWS items for the month included: HAPO Credit Unions offer of participation via payroll deduction; plant major injury which developed from minor scratch; review of amendments to the Social Security Act; announcement that residential lot lines will become effective April 1; announcement of Feb. 14 as "IF" (injury-free) day in the 200 Areas; change in the inter-area bus schedule; advance photo coverage of GenTrics 1955 style show; March of Dimes Campaign going over the top; Wherry Act housing lessees eligible for master housing list; visit of J. Stanford Smith; announcement of W. K. MacCready's appointment as Manager-Reactor; and suggestion award winners.

Prominent syndicated news items about the Company included: GE scientists made diamonds; a new GE-built computer; GE employee compensation and benefits total more than one billion dollars in 1954; GE sets best safety record in its 76-year history.

Employee & Public Relations

The Tri-City HERALD was low bidder for printing the GE NEWS during a two-year contract period beginning March 25. Printing cost during the period will be reduced by approximately $2500 through use of a less expensive paper stock.

Commercial artwork during the month included: three full-page photo layouts; layout of full-page message on 9-point job program; and photo retouching; layout and final artwork for the March health bulletin and safety topic; final art was developed for a radiation protection poster; artwork for the revised Security handbook was completed. Miscellaneous artwork included: three-foot atomic symbol; 5 layouts for Job Hazard Breakdown manual; layout of "Caution, Contamination and Cash" brochure, title page for fire prevention scrapbook, type layouts for Attitude Survey questionnaires, and preliminary work on forthcoming Employee Communication visualizer.

A conference was held with AEC Engineering Division officials to reallign the Construction Progress Motion Picture Program in order to effect a reduction in the over-all cost of finished films. Recommendations were made to reduce the number of finished films, by extending the length of two films in order to convey the progress story of the Current Construction Program more thoroughly. Film is being arranged in order of subject and Security Classification in order to determine finished film requirements.

Film footage (1963 feet) exposed on the "KWA-Special" project has been received from the processing studio. An initial review by members of this Section shows that the story was well covered and will provide excellent training-documentary footage on this problem. A meeting with both AEC personnel and G-E Design people is being planned for the near future so that they may review this film.

A total of 15,700 feet of exposed film was sent to the processing studio in Hollywood this month. This figure represents the total footage exposed on the Construction Progress Motion Picture Program that remained to be processed to date.

Conferences were held this month involving the Construction Progress Motion Picture Program. Precise plans were formulated for completion of the filming. Discussions concerned the in-studio shots yet to be taken, aerials, retakes, exteriors and several sequences that present difficult technical problems in their filming. An outline is available embracing a description of all scenes yet to be taken for this program.

Final review and recommended revisions were made on the educational television featurette, "Hands Across the Atom." Following discussions held with the Chief, Information Division, HOO,AEC, concerning our TV production at Hanford, it was proposed that the film and narration script be sent to AEC, Washington D.C., to obtain policy approvals. Production of training, documentary and educational films provides another inexpensive, nation-wide recognition of Hanford accomplishments.

The second television edition of HANFORD SCIENCE FORUM was telecast over KIMA-TV and KEPR-TV on Saturday, February 26, 1955 at 6:00 p.m. This show received a phenomenal telephone response, according to the Program Director of the stations, as a result of the first telecast last month. It is now scheduled as a permanent HAPO public relations feature. The time of the new series of telecasts is the last Saturday of each month at 6:00 p.m. The show is presented as a public service by the station.

Employee & Public Relations

Four editions of HANFORD SCIENCE FORUM, including the 100th broadcast, were prepared and broadcast on each Monday evening of the Month. Due to station commitments, the broadcast time of HANFORD SCIENCE FORUM, will be changed from Monday, to Saturday at 6:00 p.m. and will remain in this slot until further notice.

Four editions of the HAPO-produced radio program INSIDE HANFORD were recorded, cleared and broadcast throughout the month. These programs included features on the Geese Banding at Hanford, Aquatic Biology research activities, the Hanford Animal Farm, and Dredging activities in the Columbia River. Also included in "INSIDE HANFORD" broadcasts were late news items from the GE NEWS, and statements from such people as the Chairman of Public Information for the Benton County Red Cross Campaign.

"Here's Hanford" was shown by the Holy Names Academy in Seattle this month at the request of Sister Marian Josephine. Approximately 300 persons enjoyed both this HAPO-produced public relations motion picture and the GE motion picture, "A is For Atom."

Graphics February assignments were distributed as follows:

	Precent
General Administrative (Includes Operations Research)	10
Employee & Public Relations	18
Engineering	18
Manufacturing	27
Financial	18
Radiological Sciences	6
Atomic Energy Commission	3

	January	February
Total Assignments completed	61	50
Total Assignments backlog	26	34

Work was started in preparation of master plates for the "1954 at Hanford" annual report. Mock-up plates were completed and submitted for review by the General Manager. Final printing and binding should be completed by March 15.

Three separate assignments were reviewed for preparation of illustrations to be submitted for publication in the GE REVIEW. Included were two illustrations and four graphs on "Radiation Safety Aspects of Atomic Power;" a flow diagram of the "Ethylene Glycol Heat Exchanger;" and illustrations of automatic control features of the Separations Process, Flexawriter control and recorders for reactor, and a simplified flow chart of uranium ore in metal preparation process.

A total of 29 visual aid assignments were completed during the month and a total of 41 charts, graphs, illustrations, and reproduction plates were prepared for use in Engineering Department technical publications during the month.

Graphics also began work on development of two large 48" x 40" display panels of the Hanford operation. The display will consist of an area location map, a schematic process flow from metal preparation to final product and supporting photographs of the areas and various points of interest. This work is being done at the request of the Manager, HOO,AEC, and will be shipped to the Weapons Display Room at Sandia for permanent display.

Employee & Public Relations

Graphics Statistical Summary

	Charts or Graphs	Illustrations	Other
Report Material (includes Technial Publications)	58	13	
Technical or Scientific Illustrations		17	
Mechanical Art (flow charts, schematics, maps, etc. - not for publication)	27	3	40
Lecture Material (includes plates and slides)	34	1	
Posters and Embossograph Signs			404
General (posting of current data, assembly, revisions, etc.)	68	6	
	187	40	444

Embossograph signs completed	404
Charts, illustrations, etc.	267
Total plates completed	671

A total of 223 photographic assignments were completed for the month, and 17,715 prints were produced, of which 8,077 were "A" and "B" employee identification photographs. A total of 9,638 were of area and news subjects.

Motion picture film exposed during the month included 300 feet, 16mm (color) for Pile Technology on canning; 600 feet 16mm (b&w) for television; 900 feet, 16mm (b&w) on 100-KW; and 2,000 feet, 16mm (b&w) on Purex.

Liquidation of the costs of operation for the Photography Unit was started January 24. A tentative price list of all the work performed was made up and given to customer components. It was established liquidation of costs would be satisfactory if we come within $1,000. The entire cost of operating the Photography Unit from January 24 through February 25 was $8,860, an over liquidation of only $360.00. As a result of the success of the first month's experience on cost liquidation, and the remarkably small over liquidation, no changes in the costs for photographic work will be made for the month of March.

Among the larger requests for photography this month is one for the Pile Technology Quarterly Report. Twenty hours of work produced 5,800, 8½" x 11" prints. Another large order was completed for Minor Construction involving the reprinting of 328, 8½" x 11" prints. Others were: Minor Projects, 111, 8½" x 11" prints; Engineering Project Section, 168, 8½" x 11" prints; and Pile Technology, 110, 8½" x 11" prints.

All scheduled moves of Employee Communications and Public Relations Section Units were completed during the month. The Section Manager, his secretary and the entire staffs of the Public Communications and Employee Communications Units completed their move to the 770-A Bldg. on February 15, and installation of Photography Unit equipment in the 717-A Bldg. was essentially completed by February 25.

See attached statistical report for Photography Unit.

PHOTOGRAPHY UNIT MONTHLY REPORT FEBRUARY, 1955	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	N E G.	35mm Color Slides	3¼" X 4" Color Slides	3¼" X 4" (b&w) Slides	16mm M.P. Film
EMPLOYEE & PUBLIC RELATIONS												
COMMUNITY												
Library			9					8				
Fire				12				11				
Police			216		25			77				
EMPLOYEE COMM. & PUBLIC RELATIONS												
Audio-Visual Comm.			65	25	105		2	48				3,500' b&w
Employee Comm.		24	35	45	91			247				
Photography								147				
Public Comm.		86		22	403	35						
Graphics					7	2						
HEALTH & SAFETY												
Public Health				11				7			4	
PERSONNEL PRACTICES												
Employment	880							176				
Employee Services					2			3				
Suggestion System & Workman's Compensa.				1	51			19				
Technical Recruitment		4	5					4				
AUXILIARY OPERATIONS & PLANT PROTECTION												
Security & Patrol	3,348	3,771				72		44				
Landlord				6	91							
ENGINEERING												
DESIGN			68	12		106		79		1	13	
Process Engineering						96		20			6	
ENGINEERING ADMINISTRATION												
Technical Information					4							
PROJECT						768		47				
PILE TECHNOLOGY		40	26	9	28	6,436		235	15			300' color

(Continued)

PHOTOGRAPHY UNIT (Con't.)	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	N E G.	35mm Color Slides	3¼" X 4" Color Slides	3¼" X 4" (b&w) Slides	16mm M.P. Film
ENGINEERING (Con't.)												
SEPARATIONS TECHNOLOGY			52		6	44		39				
FINANCIAL	19											
MANUFACTURING												
Manufacturing Admin.						89						
METAL PREPARATION SECTION					37	13		27				
PLANT ENGINEERING			16			48		31			77	
REACTOR			32			107		38		1		
SEPARATIONS	54				23	40		43				
ELECTRICAL UTILITY					9							
RADIOLOGICAL SCIENCES												
BIOLOGY						18		12		11		
Aquatic Biology										1		
BIOPHYSICS						50		7			4	
RADIOLOGICAL ADMIN. & COMM.					3							
RADIOLOGICAL ENGR.						6					17	
OPERATIONS RESEARCH STUDY											13	
A.E.C. SECURITY	5							1				
TOTALS	4,306	3,925	524	143	885	7,930	2	1,370	15	14	133	3,800*

	DECEMBER	JANUARY	FEBRUARY
TOTAL ASSIGNMENTS	335	266	223
TOTAL NEGATIVES	1,814	1,291	1,370
TOTAL PRINTS	16,275	17,774	17,715

UNION RELATIONS

Union Relations - Operations Personnel

A field examiner for the National Labor Relations Board was in Richland on Friday, February 18, to discuss the Council's petition for an election involving Laboratory Assistants in the Manufacturing Department. At that time we took the position that the unit petitioned for was inappropriate and that the petition should be dismissed by the Board on the basis of:

1. A lack of community of interest and the fact that the Board has, on previous occasions, held that technical employees should not be included in a production and maintenance unit.

2. The fact the petitioned unit is not sufficiently comprehensive since it includes only one-third of our non-exempt laboratory personnel in related jobs.

3. The control functions of Laboratory Assistants which require that they not be included in the unit with Chemical Workers over whom they exercise such control.

This conversation was later supplemented by two letters to the Board which stated our case in more detail. In view of the history of having dismissed two previous petitions involving these same people, it would seem that the Board would not be consistent if they failed to dismiss the petition. However, we can expect a formal hearing on the matter before the Board would order an election.

We reported last month concerning a notice received from the Hanford Guards Union that they wish to arbitrate a grievance alleging violation of the call-in procedure. Several meetings were held during the month regarding this subject in which we expressed our willingness to go to arbitration on the matter which we believe effectively called their bluff. We know that the Union has taken this matter to an attorney who is also business representative of the Hanford Atomic Metal Trades Council, but we believe that his advice to them will be to drop the matter. The HGU at the present time is under very weak leadership, however, and their actions are entirely unpredictable.

Negotiations with the Material Expediters and Take-Off Men will be resumed on March 1. Our response to the demands of this group have been negligible but there is little that we can appropriately offer to them. We will endeavor to arrive at a satisfactory seniority arrangement and suggest to them that improvements in their working conditions can only result from the experience gained working under the contract rather than across the bargaining table.

The initial issue of the Union Relations Information letter was distributed this month. We had not originally intended to report on all grievances settled at Step II; however, so many requests were received from the field that we resumed this type of a report. The report, however, provides the flexibility

for us to discuss those aspects of the grievances which we think will be of most help to the operating supervisor rather than to report factually with regard to the discussion during the grievance meetings. It, likewise, gives us the opportunity to discuss other matters which did not come to us as a formal grievance. We received a number of very favorable comments from the field following this first issue.

We have been informed that the Chemical Workers are again endeavoring to organize the Chief Operators who, on two previous occasions, have voted against union representation. Both Separations and Reactor management are aware of the situation and are taking affirmative action to counteract union propaganda and threats.

Grievance Statistics:

A total of sixty-two (62) grievances were received and two (2) Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

	ALL DEPARTMENTS				
	HAMTC	HGU	BSEIU	Total Unit	Total Nonunit
Received this month	60	0	0	60	2
Received this year	86	2	0	88	5
Step I					
Pending January 31	0	1	0	1	0
Settled this month*	16	1	0	17	0
Settled this year	32	2	0	34	1
Pending February 28	7	0	0	7	0
Step II					
Pending January 31	31	0	0	31	0
Settled this month**	5	0	0	5	0
Settled this year	13	1	0	14	3
Pending February 28	92	0	0	92	1
Arbitration					
Pending January 31	4	1	0	5	
Settled this month	0	0	0	0	
Settled this year	0	0	0	0	
Pending February 28	4	1	0	5	
Total settled this month	21	1	0	22	0
Total settled this year	45	3	0	48	4

*Grievances brought to Step II prior to December 1, 1954, but never processed by the union are, for the purpose of this report, considered settled at Step I.

**Grievances which the union formally indicated their intention to submit to arbitration but have taken no further action since December 1, 1954, 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	31	40	5	10	1	5
Separations - Unit	14	25	4	11	3	5
Nonunit	1	3	0	1	0	2
Metal Preparation - Unit	3	6	3	4	0	1
Transportation - Unit	5	6	4	6	1	1
Electrical Utilities - Unit	2	3	0	1	0	0
Stores - Unit	1	1	0	0	0	0
Employee and Public Relations						
Community - Unit	2	3	0	0	0	1
Aux. Ops. & Pl. Pro. - Unit	1	3	2	3	0	1
Radiological Sciences - Unit	1	1	0	0	0	0
Engineering - Nonunit	0	1	0	0	0	1
Financial - Nonunit	1	1	1	1	0	0

*Grievances brought to Step II prior to December 1, 1954, but never processed by the union are, for the purpose of this report, considered settled at Step I.

**Grievances which the union formally indicated their intention to submit to arbitration but have taken no further action since December 1, 1954, 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	1	1	0	0	0	0				
Discrimination	1	1	0	0	0	0				
Jurisdiction	21	28	2	4	0	0				
Health-Safety-Sanitation	1	2	0	0	0	0				
Hours of Work	4	10	0	0	0	0				
Overtime Rates	7	10	0	0	0	0				
Vacations	0	1	0	0	0	0				
Seniority	0	3	0	0	0	0				
Wage Rates	1	2	1	1	0	0				
Miscellaneous	20	23	0	1	1	1				
Nonunit										
Continuity of Service	1	1	0	0	0	0	0	0	0	0
Overtime Rates	0	0	0	0	0	0	0	0	1	1
Wage Rates	0	2	0	0	0	0	0	0	0	0
Miscellaneous	0	0	0	0	0	0	0	1	0	0

Employee & Public Relations

SALARY & WAGE ADMINISTRATION

1. R.C. Grant completed the initial phase of the scheduled reconciliation program. Thirteen percent of HAPO positions have been reconciled with other components of the Company. A revised list of 145 representative positions has been made, of which 65% have been reconciled.

2. Contacts were made with four employers of technical personnel in connection with selected positions.

3. Ninety percent of the questionnaires for the Northwest Area Wage Survey have been completed and returned to us and the data is being processed. J.J. Tagen completed an extensive visit to nine AEC installations as well as to General Electric installations to obtain an exchange of wage and salary information.

4. Work continued on the non-exempt job study. About 95% of the clerical-functional and semi-technical job descriptions have been completed and are being analyzed. Job descriptions for manual jobs are being written. The selection of representative jobs and the study of their ranking is going on in order to develop a plant-wide evaluation scheme.

5. A current HAPO organization directory was distributed. A task force to study and recommend rules for naming components and positions was initiated.

6. Based on experience with the new salary plan since the first of January, two minor changes in the Salary Administration Manual were recommended.

7. The study of a proper differential between supervisors and those supervised was essentially completed for the Manufacturing Department.

Employee and Public Relations Department
Education and Training Section

The report of the Education and Training Section is submitted as follows:

ROTATIONAL TRAINING PROGRAM

	Last Month	This Month
Present Assignments		
Department		
Engineering		
Pile Technology	5	5
Separations Technology	3	5
Design	4	5
Project	5	1
Manufacturing		
Metal Preparation	4	3
Separations	1	0
Reactor	11	9
Radiological Sciences		
Biology	0	0
Records and Standards	0	0
Biophysics	3	3
Financial		
Procedures and Computing	1	1
Employee and Public Relations		
Personnel Practices	0	1
	37	33

Permanent Placements

There were seven (7) placements off the Program, as follows:

Design	1
Reactor	3
Metal Prep	1
Separations	2

Six (6) placements are anticipated during March. One loss to military service due to ROTC commitment is expected during March.

Employee and Public Relations Department
Education and Training Section

Additions

Three (3) new graduates reported on the Program during the month. Four (4) others are due to report in March. One (1) technical graduate formerly a member of the Program and later placed with off-site inspection activities, which are now being curtailed, was allowed to transfer back to the Program to facilitate locating a suitable job opening.

Selective Service

Two (2) technically trained men were lost to the armed forces due to the Selective Service program, making a total of 51 lost from the various sections since the first loss in September 1953. Although 118 technically trained men are still vulnerable, it is believed that losses in the next few months will be at a rate of not over 1-2 per month since draft quotas have been reduced.

Summer Programs

Reimbursement authorization has been received from the AEC for the employment of eleven (11) third-year engineering and science students for the summer of 1955.

Reimbursement authorization for the hiring of eight (8) university professors and five (5) graduate students has been requested and received from the Hanford Operations Office.

The sections interested in utilizing the services of university staff members and graduate students are as follows: Pile Technology, Separations Technology, Biology, Radiological-Engineering, Design, Manufacturing - Plant Engineering and Manufacturing, General.

One university staff member from the University of Washington, Chemical Engineering Department, has already visited Hanford for interviews for a summer assignment in Separations Technology Section.

Close coordination with the Personnel Practices Section in the employment and placement of these personnel is planned. Schools to be contacted for representation are: University of Idaho, Washington State, University of Washington, Oregon State, University of Oregon, Stanford, University of California, University of Utah, Montana State, and the University of Colorado.

A program of orientation, counseling and guidance, introductory meetings with Hanford management, and follow-up on the effectiveness of the summer employment for the promotion of good will toward Hanford on the respective campuses is planned.

Employee and Public Relations Department
Education and Training Section

SCHOOL OF NUCLEAR ENGINEERING

Spring Semester

Twenty-nine courses are being conducted with registration as follows:

Course	No. of Students	
GRADUATE		
Advanced Math	14	
Complex Variables	14	
Mathematical Statistics II	8	
Analog Computers	7	
Operations Research	16	
Modern Physics II	11	
Pile Physics I	6	
Electricity and Magnetism	11	
Physical Chemistry II	7	
Colloid Chemistry	7	
Heat-Power Cycles	6	
Diffusional Processes II	6	
Electric Transmission Problems II	9	
Reactor Design	11	
Nuclear Metallurgy	46	
Radiobiology	14	
		193
COLLEGE-LEVEL		
Intermediate Algebra	23	
Plane Trigonometry	16	
Analytic Geometry	16	
General Chemistry	17	
Elements of Measurement	14	
Automatic Control	12	
Mechanics - Statics	8	
Elements of Physical Metallurgy	9	
Principles of Quality Control	29	
Elementary Accounting II	9	
Business Law II	14	
Engineering Communications	20	
Electronic Data Processing	52	
		239
Total Number of Students		432

Two courses have been divided into two sections to accommodate the large number of registrants. These figures show the initial registration in each class, and as the four week decision period draws to a close, the number of active students will be reduced. However, the registration to date is still the largest Spring registration in the history of the School of Nuclear Engineering. This large enrollment is due to three factors:

1. Seven new courses offered this term, all bearing closely on work of HAPO.

2. Greater publicity and advertising with the help of the Employee Communications Unit.

3. The Company-wide emphasis on personal development.

The school is now collecting tuition balance payments prior to the end of the four-week period. It is estimated that 350 students will complete their tuition payments. All of the students, who indicated that they would like to have college credit, have been notified of the procedure necessary in order to obtain this credit.

Arrangements are underway with the four affiliated colleges for their spring visits to Richland to counsel the students who are registered with them.

Fall Semester - Completion

Final grades for Fall classes have been sent to the 225 students who completed courses. Each student has been offered the opportunity to have his grade sent to his supervisor or put in his personnel record. The majority are anxious to have their supervisors informed of their achievement.

This number of completions shows that 81% finished their studies. In graduate courses 92% completed the term.

General

Several of the technical courses are being written up as lecture notes, some of which will become departmental reference books. In a few cases, the authors look forward to ultimate publication as textbooks. Some of the instructors have been aided in making contact with the technical representatives of prominent book publishing companies.

Our proposal for an Advanced Engineering Program in the nuclear field has been recognized informally by the Engineering Services Division.

TRAINING

Supervisor's Accident Prevention program was held Wednesday 9 and Thursday 24, with an attendance of 33 supervisors. These four-hour meetings give supervisors an opportunity to discuss the problems of accident prevention and how they, as supervisors, can develop their employees' awareness of the desirability of performing their jobs safely.

Employee and Public Relations Department
Education and Training Section

Customer Relations program for firemen was presented Tuesday 15, Wednesday 16, Friday morning 18, Monday 21, and Wednesday morning 23, with an attendance of 48 employees. This training was prepared at the request of the Richland Fire Chief, and has been well received. It will be continued throughout the group.

Conference Leading was conducted Thursday 24, with 8 supervisors participating. This program is directed toward stimulating interest in learning the techniques of leading group discussions.

A program of Secretarial Training has been drafted, and is being reviewed by appropriate critics prior to completion.

Job Instruction Training, first presented at HAPO during summer 1954, has been improved, shortened, and is now ready for re-offering.

A brief program to aid in Report Writing has been developed to meet the needs of various supervisors, and is encountering widespread demand.

V. J. Bryon has completed a brochure outlining the types of visual aids available at HAPO, their uses, and approximate cost guides. This brochure is to aid in presenting Job Instruction Training by making new tools available to supervisors.

S. E. Linter has rewritten parts of "Effective Human Relations" program and R. B. Shoen is doing work on script of "Job Relations Development", to prepare for initial presentation at Richland on March 8-9.

The Supervisory Orientation Program "New Exempt Responsibilities", reduced in length from 40 hours to 24 hours, was presented January 24-26. The written comments of those who attended have been reviewed by D. G. Dayton, as a basis for the further improvement of this program.

Training staff previewed "The Invisible Committees" (Conference Leading film) on Thursday afternoon, February 3.

A new program "Introductory Economics" has been outlined by V. J. Byron, and is being prepared, looking toward presentation later in March.

V. J. Byron attended Health Activities meeting at Kadlec Hospital Thursday afternoon, February 17.

Training program schedules for three months period were distributed Monday 21 to all department and section correspondents.

Employee and Public Relations Department
Education and Training Section

On Friday 18, the economics book "How You Really Earn Your Living" was distributed to 86 supervisory personnel.

Transcripts are being prepared on training program attendance, educational and industrial background of Financial Department.

D. G. Dayton met Thursday afternoon, February 17, with Reactor Section supervision, Manufacturing Department, to discuss "Report Writing Program".

R. B. Shoen attended "Work Simplification" program Wednesday morning, February 16, 200-W, and on Friday morning, February 18, D. G. Dayton attended "Work Simplification" program in 200-W.

During the month there were requests from supervisors for 291 training program attendance transcripts.

There were five requests from secretarial personnel for Business English reference sources.

Three Supervisor's Handbooks were issued during February.

D. G. Dayton, R. B. Shoen, and D. W. McLenegan met February 18 with R. W. Harvey and P. J. Norderhus, who are offering Work Simplification instruction in the Separations Section, to study a possible Job Methods Improvement Program to be submitted to supervisors of groups of office employees. Evidence from other industries indicates that even brief programs of this type have stimulated large savings.

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
FEBRUARY 1955

General

Personnel Changes

Seven additions and five deletions resulted in an increase to 249.

Employee Relations

Employee attendance at 34 meetings was 269.

Visits

Dr. Lloyd M. Farner of Seattle presented the Certificate of Health Maintenance of the Occupational Health Institute to Mr. W. E. Johnson at a ceremony at Kadlec Hospital. This indicates that the Industrial Medical services meet the requirements of the Industrial Medical Association.

Industrial Medicine

Medical examinations decreased from 1088 to 820 while dispensary treatments increased from 4504 to 5148.
Sickness absenteeism was 1.66% vs. 1.76% for January while total absenteeism was 2.30% vs. 2.42%. The year to date total absenteeism of 2.36% is an improvement over the comparable figure of 2.91% for 1954.
Department of Labor hearings were conducted for two claims of hearing loss alleged to be due to industrial noise exposure. Two more claims will be reviewed in March.

Safety & Fire Prevention

The operations group sustained no major injuries, but three sub-major injuries and 458 total injuries.
The latter was a 45% increase over January.
The community sustained no major or sub-major injuries, and 21 minor injuries.
Five minor plant fires were reported.

Kadlec Hospital

The average daily census increased from 74.0 to 76.3 as compared with 89.9 a year ago. A sharp down turn in census at the end of the month suggests that possibly rather drastic operating changes may be necessary to stay within the budget.

Public Health

Dr. R. R. Sachs has resigned to accept a very responsible position in his field in Los Angeles.
We are negotiating for a temporary part time public health officer. At the same time we are renewing our efforts for inclusion of Richland in the Bi-County Public Health Unit. This unit will have a competent physician in charge next June.

HEALTH & SAFETY SECTION

FEBRUARY 1955

General

Costs-January

	Dec.	Jan.	Jan. Budget
Industrial Medicine	$47,093	$44,385	$47,852
Public Health (Oper.)	10,025	9,600	10,324
Kadlec Hospital (Net)	23,553	10,886	15,701
Hospital Expense Credits	2,085	1,537	2,000
Safety & Fire Prevention	20,301	13,173	20,412
Total Health & Safety	$103,057	$79,581	$96,289

The net cost of operating the Health & Safety Section before charges were assessed to various departments was $79,581, about $23,000 less than the December costs and $18,000 below the budget. Much of this is due to improvement in patient load and economy measures at Kadlec with some $7,000 underrun on Safety operations being due to financial provision for a possible safety award which did not materialize.

HEALTH & SAFETY SECTION

FEBRUARY 1955

Industrial Medical Services

The total number of examinations decreased from 1088 to 820. General Electric employees sustained three sub-major injuries but no major injuries. Contractor employees sustained no major or sub-major injuries during the month. The total number of dispensary visits increased from 4504 to 5148. On February 15 responsibility was assumed for the treatment of Kaiser employees remaining in the 100-K Area. The night shift schedule for 100-B and 100-D was expanded during the month to include the 100-K Area. There were 25 nurses and 1 nurse aide on the non-exempt roll.

On February 1 certification ceremonies were held for HAPO Industrial Medical Services meeting the standards of the Occupational Health Institute. Dr. Farner of Seattle presented the certificate to Mr. W. E. Johnson in the presence of staff members and invited guests.

On February 8, 9 and 10, Department of Labor hearings were held for alleged hearing loss due to noise exposure. Two cases were heard and two more were scheduled for March 8 and 9.

Remodeled facilities for dispensary services in the 300 Area were nearing completion. Operation in the new facilities is anticipated by March 15.

The Health Activities Committee met on February 17 and the health topic on Headache was presented and prepared for distribution to all employees. Ways to recognize perfect attendance records were discussed.

Net costs for January reflected a $3,766 decrease from December due mainly to lower salaries and related expenses. A reduction of one employee and smaller prorata share of Clinical Laboratory expenses accounted primarily for the reduction in salaries. In addition, expense credits, or charges to other departments for services rendered, increased approximately $1,000.

Costs - Operations

	Jan.	Dec.	Increase (Decrease)
Salaries	$33,672	$36,144	$(2,472)
Continuity of Service	3,030	3,253	(223)
Laundry	174	196	(22)
Utilities,Transportation,Maintenance	3,953	4,130	(177)
Supplies and Other	4,547	4,307	240
Total Gross Costs	45,376	48,030	(2,654)
Less: Revenue	991	937	54
Expense Credits	8,784	7,726	1,058
New Cost of Operation	$35,601	$39,367	$(3,766)

On a fiscal year to date basis, actual expenses are approximately $4,000, or slightly more than 1%, under budget. It is anticipated that a favorable cost-budget relationship will be maintained during the balance of the year.

HEALTH & SAFETY SECTION

FEBRUARY 1955

Industrial Medical Services (Continued)	January	February	Year to Date
Physical Examinations			
Operations			
Pre-employment	85	109	194
Rehire	19	17	36
Annual	295	116	411
Interim	191	43	234
A.E.C.	24	23	47
Re-examination and recheck	171	113	284
Termination	73	62	135
Sub-total	858	483	1341
Contractors			
Annual	18	29	47
Pre-employment	157	253	410
Recheck	46	43	89
Termination and Transfer	9	12	21
Sub-total	230	337	567
Total Physical Examinations	1088	820	1908
Laboratory Examinations			
Clinical Laboratory			
Government	95	92	187
Pre-employment, Termination, Transfer	2113	2811	4924
Annual	1577	667	2244
Recheck (Area)	986	231	1217
First Aid	20	11	31
Total	4791	3812	8603
X-Ray			
Government	15	18	33
Pre-employment, Termination, Transfer	338	430	768
Annual	523	187	710
First Aid	85	65	150
Total	961	700	1661
Electrocardiographs	105	86	191
Physical Therapy Cases Referred	275	236	511

HEALTH & SAFETY SECTION

FEBRUARY 1955

Industrial Medical Services (Continued)	January	February	Year to Date
First Aid Treatments			
Operations			
New Occupational Cases	354	508	862
Occupational Case Retreatments	1245	1482	2727
Non-occupational Treatments	2521	2626	5147
Sub-total	4120	4616	8736
Construction			
New Occupational Cases	79	93	172
Occupational Case Retreatments	216	298	514
Non-occupational Treatments	89	141	230
Sub-total	384	532	916
Total First Aid Treatments	4504	5148	9652
Major Injuries			
General Electric	2	0	2
Contractors	0	0	0
Total	2	0	2
Sub-Major Injuries			
General Electric	1	3	4
Contractors	0	0	0
Total	1	3	4
Nurses' Visits			
Calls made	0	2	2
Employee Personal Illness	0	1	1
No. absent due to illness in family	0	0	0
No. not at home when call was made	0	1	1

HEALTH & SAFETY SECTION

FEBRUARY 1955

Kadlec Hospital

The average daily adult census increased from 74.0 to 76.3 as compared with 89.9 a year ago. This represents an occupancy percentage of 70.0 broken down as follows: Mixed Service (Medical, Surgical, Pediatrics) 74.8; Obstetrical Service 49.5. The minimum and maximum daily census ranged as follows:

	Minimum	Maximum
Mixed Service	45	83
Obstetrical Service	3	19
Total Adult	50	95

The average daily newborn census increased from 9.9 to 11.7 as compared with the same figure of 11.7 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.06
Obstetrical	5.59
Newborn	3.08

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of January was 1.97. When newborn infants are included, the ratio is 1.73.

The net expense for the operation of Kadlec Hospital for January was $10,886 as compared with $23,553, for December 1954. Summary is as follows:

Kadlec Hospital net expense $10,886
This is a decrease of $12,667 from December costs. Gross costs increased $536 but the patient census increased sufficiently to produce $13,751 of additional revenue. Expense credits decreased $548. This reduction of costs reduced the hospital's budget overrun for the period July through January to approximately $3,300.

Following is a summary of employee relations meetings held in the Health and Safety Section during the month of February.

	Meetings	Attendance
Hospital	27	211
Industrial Medicine	2	10
Public Health	4	36
Safety & Fire Prevention	1	12
Total	34	269

Hospital Unit (Continued)	January	February	Year to Date
Kadlec Hospital			
Average Daily Adult Census	74.0	76.3	75.0
Medical	23.6	18.1	21.0
Surgical	26.0	28.6	27.2
Pediatrics	13.9	19.2	16.4
Mixed	63.5	65.9	64.6
Obstetrical	10.5	10.4	10.4
Average Daily Newborn Census	9.9	11.7	10.7
Maximum Daily Census:			
Mixed Services	82	83	83
Obstetrical	15	19	19
Total Adult Census	90	95	95
Minimum Daily Census:			
Mixed Services	36	45	36
Obstetrical Service	7	3	3
Total Adult Census	46	50	46
Admissions: Adults	567	493	1060
Discharges: Adults	523	526	1049
Medical	136	115	251
Surgical	219	230	449
Pediatrics	91	106	197
Mixed	446	451	897
Obstetrical	77	75	152
Newborn	71	70	141
Patient Days: Adult	2295	2136	4431
Medical	732	507	1239
Surgical	806	800	1606
Pediatrics	431	539	970
Mixed	1969	1846	3815
Obstetrical	326	290	616
Newborn	306	327	633
Average Length of Stay: Adults	4.4	4.1	4.2
Medical	5.4	4.4	4.9
Surgical	3.7	3.5	3.6
Pediatrics	4.7	5.1	4.9
Mixed	4.4	4.5	4.3
Obstetrical	4.2	3.9	4.1
Newborn	4.3	4.7	4.5
Occupancy Percentage: Adults	67.9	70.0	68.8
Medical	63.8	48.9	56.7
Surgical	81.3	89.4	85.0
Pediatrics	73.2	101.1	86.3
Mixed	72.2	74.8	73.4
Obstetrical	50.0	49.5	49.5
Newborn	38.1	45.0	41.2

(Occupancy Percentage based on 109 adult beds and 26 bassinets.)

Hospital Unit (Continued)	January	February	Year to Date
Kadlec Hospital (Continued)			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.15	3.06	
Obstetrics	5.74	5.59	
Newborn	3.64	3.08	
Avg. No. Employees per Patient (excluding newborn)	1.97		
Operations: Major	73	64	137
Minor	74	86	160
E.E.N.T.	62	61	123
Dental	1	0	1
Births: Live	70	65	135
Still	2	2	4
Deaths	3	6	9
Hospital Net Death Rate	.34%	.34%	.34%
Net Autopsy Rate	66.6	16.6	33.3
Discharged against advice	0	1	1
One Day Cases	155	162	317
Admission Sources:			
Richland	78.8	80.5	79.6
North Richland	8.3	6.9	7.6
Other	12.9	12.6	12.8
Admissions by Employment:			
General Electric	72.7	75.3	73.9
Government	.5	2.8	1.6
Facility	5.6	6.9	6.2
Contractors	14.5	8.1	11.5
Schools	.7	.6	.7
Others	6.0	6.3	6.1
Hospital Outpatients:			
First Aid	521	467	988
Clinical Laboratory	158	166	324
Bacteriological Laboratory	81	61	142
X-Ray	159	138	297
Physical Therapy	341	313	654
Physical Therapy Treatments			
Outpatient Treatments	335	315	650
Hospital	86	69	155
Total	421	384	805
Pharmacy			
No. of Prescriptions Filled	3054	2613	5667
No. of Store Orders Filled	534	503	1037

HEALTH & SAFETY SECTION

FEBRUARY 1955

Hospital Unit (Continued)	January	February	Year to Date
Kadlec Hospital (Continued)			
Clinical Laboratory Examinations			
Outpatient Examinations	444	469	913
Hospital	4380	3775	8155
Public Health	0	1	1
Total	4824	4245	9060
X-Ray Examinations			
Outpatient Examinations	200	153	353
Hospital	245	253	498
Public Health	19	7	26
Total	464	413	877
Electrocardiographs			
Outpatient Examinations	2	2	4
Hospital	37	24	61
Total	39	26	65
Bacteriological Laboratory			
Treated Water Samples	191	176	367
Milk Samples (Inc.Cream & Ice Cream)	38	30	68
Other Bacteriological Tests	612	603	1215
Total	841	809	1650
Patient Meals			
Regulars	3369	2907	6276
Children under 8	943	1254	2197
Specials	1148	888	2036
Softs	708	578	1286
Tonsil and Adenoid	87	96	183
Liquids	133	160	293
Surgical Liquids	92	72	164
Total	6480	5955	12435
Cafeteria Meals			
Noon	1788	1646	3434
Night	291	290	581
Total	2079	1936	4015

HEALTH & SAFETY SECTION

FEBRUARY 1955

Public Health Unit

The total number of communicable diseases reported increased by approximately 25% due chiefly to increase in scarlet fever and mumps. However, there were no apparent complications of either of these diseases reported.

With the increase in communicable disease, the number of field visits by nurses increased by approximately 19%.

The Board of Health approved the plan where regrading of restaurants will be accomplished by a score method. Further business of the Health Board was a presentation of the health department functions.

A quarterly tuberculosis control clinic was held with G. E. Marcy, M.D. of the Central Washington Tuberculosis Hospital as consultant.

Dr. Kenneth Nesbitt, Resident in Industrial Medicine, spent some time with the unit as part of his in-service training course.

A field visit was made by Julia Anderson, Field Consultant, University of Washington School of Nursing, in relationship to the student nursing program.

Of the 313 consultations held by the social service counselors, 197 were concerned with family relationships. These were centered primarily on problems of marital discord or difficulty with children.

Nine-three consultations dealt with problems of individual personality adjustment either in children, adolescents or adults.

Problems of physical or mental illness were the focus of 23 consultations.

Restaurant inspections indicate a decided improvement in sanitation over preceding months. This is felt to be due largely to the recently adopted grading program. The new grading program has received favorable comments from the better restaurant operators. Most restaurants have received their first inspection and new grade cards will be issued after the second inspection is made.

One case of food poisoning involving three persons was investigated and resulted from using home canned beans in preparation of a stew.

Ten grocery and meat markets received a sanitary inspection. Principal violations found were inadequate cleaning of meat boxes and cleanliness of rest rooms.

Plans have been formulated for the mosquito control program. Burning operations will be started next month.

Bacteriological results of water and milk samples were found to be satisfactory.

Public Health Unit (Continued)

A series of bacteriological samples was taken from the #2 sewage treatment plant to determine the percentage of reduction at various stages of treatment. Raw sewage showed a coliform count of 8,000,000 + per 100 ml. There was gradual reduction throughout the plant with final effluent at the river showing 13 coliform organisms per 100 ml. This shows that operation of the sewage disposal plant is acceptable.

It is with deep regret that the present health officer, namely Ralph R. Sachs,M.D. resigned his position and subsequent reports will be written by his successor.

HEALTH & SAFETY SECTION

FEBRUARY 1955

Public Health (Continued)	January	February	Year to Date
Education			
Pamphlets distributed	10,997	11,000	21,997
News Releases	0	0	0
Staff Meetings	1	1	2
Classes	8	14	22
Attendance	59	160	219
Lectures & Talks	20	16	36
Attendance	602	947	1549
Films Shown	16	7	23
Attendance	587	750	1337
Community Conferences & Meetings	20	10	30
Radio Broadcasts	0	8	8
Immunizations			
Diphtheria	51	8	59
Diphtheria Booster	525	64	589
Diptussis	15	0	15
Tetanus	1	0	1
Tetanus Booster	1	3	4
Pertussis	1	0	1
Pertussis Booster	1	3	4
Smallpox	553	293	846
Smallpox Revaccination	0	0	0
Tuberculin Test	2	8	10
Immune Globulin	5	25	30
Other	1	0	1
Social Service			
Cases carried over	109	94	203
Cases admitted	12	13	25
Cases closed	27	9	36
Remaining case load	94	98	192
Activities:			
Home Visits	2	2	4
Office Interviews	330	311	641
Conferences	73	56	129
Meetings	12	13	25
Sanitation			
Inspections made	103	106	209
Conferences held	17	33	50

HEALTH & SAFETY SECTION

FEBRUARY 1955

Public Health (Continued)	January	February	Year to Date
Communicable Diseases			
Chickenpox	58	40	98
German Measles	4	17	21
Impetigo	3	0	3
Influenza (U.R.I.)	4	0	4
Infectious Mononucleosis	1	6	7
Infectious Hepatitis	2	5	7
Measles	2	7	9
Mumps	27	55	82
Pinkeye	0	2	2
Ringworm	3	1	4
Roseola	1	5	6
Scarlet Fever	18	28	46
Tuberculosis	0	1	1
Whooping Cough	4	1	5
Total	127	168	295
Total No. Nursing Field Visits	428	533	961
Total No. Nursing Office Visits	65	43	108

COMMUNITY SECTION

FEBRUARY 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	142
Police Unit	16	31	16	31
Commercial & Residential Property Unit	8	24	8	24
Fire Unit	67	0	66	0
Transfer Study	1	0	1	0
Community Operations Administration	1	1	1	1
Electrical Unit	5	16	5	16
Engineering Unit	7	4	7	4
Water & Sewerage Utilities Unit	5	18	5	18
Library Unit	4	9*	4	9*
Public Works & Recreation Unit	7	37	7	38
	131	283	130	284

	Exempt	Nonexempt
Additions to Payroll	0	5
Transfers In	0	7
Removals from Payroll	0	5
Transfers Out	0	7

* Includes two half-time employees.

MAINTENANCE AND RENOVATION UNIT

February, 1955

	Exempt	Nonexempt
Employees - Beginning of month	9	142
New hires	0	2
Reactivate	0	1
Transfers out	0	2
Terminations	0	1
Employees - End of month	9	142

INTERIOR PAINT REPORT - FY 1955

FOREMAN	PAINTERS	TRUCK DRIVERS	TOTAL
R. A. Chambliss	20	1	21
D. W. Lukins	19	1	20
M. E. Tappan	19	1	20
Total	58	3	61

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	82	13	58	24
B	143	18	91	52
C	9	1	1	8
D	0			
E	6	0	3	3
F	31	6	19	12
G	0			
H	51	7	27	24
K	2	0	0	2
L	1	0	0	1
M	1	1	1	0
Q	3	1	3	0
R	1	0	1	0
S	1	0	1	0
T	3	0	3	0
U	18	3	15	3
V	44	3	36	8
Y	93	8	76	17
Z	6	1	6	0
1BP	65	10	38	27
2BP	452	64	235	217
3BP	314	51	205	109
Tract	17	4	9	8
1BR Apt.	10	2	7	3
2BR	0			
W-13 Apt.	1	0	0	1
TOTAL	1354	193	835	519

Est. MH B. F.	28,532	Act. MH B.F.	29,021
Est. MH This Month	8,465	Act. MH This Mo.	7,995
Total Est. MH	36,997	Total Act. MH	37,016

PLUMBING SHOP

FOREMAN - F. L. ELSENSOHN

JOB DESCRIPTION	NO. COMPLETED
Electric water heaters replaced	19
Laundry trays replaced	14
Shower stalls replaced	12
Miscellaneous plumbing work orders completed	24
Cleared major sewer stoppages caused by tree roots	67
Worked on plumbing service orders	73.6 hrs.
Plumbing for floor and sink linoleum replacement	91
Steam work orders completed	4
Dormitory radiators completely overhauled	20
Loaded and hauled dirt to fill holes where prefabs had been removed	6
Loaded and hauled dirt to fill holes where trees had been removed	40

Replaced large water heater in The Mart with two smaller heaters hooked up together.

Made routine steam inspection once each week in Government owned commercial buildings, apartments and dormitories.

Excavated sewer lines for cleaning out of roots, and to repair all leaking and broken underground piping, and backfilled and landscaped excavated portion.

Loaded and hauled away salvage material in yard around Hangar.

Furnished 7 men to work at 100-F Area on overtime work.

SERVICE ORDER CREW

FOREMAN - L. F. CARPENTER

The following is a status report on service orders:

A.	On hand at the beginning of the month	195
B.	Received during the month	1944
C.	Completed during the month	1775
D.	On hand at the end of the month	364

E. A total of 149.2 hours were expended on work orders.

F. Backlog of service orders by craft:

Electrical	149
Plumbing	192
Carpentry	23
Total	364

RENOVATION AND LABOR CREW

FOREMAN - B. C. BAIN

The following services were performed during the month:

Vacant houses renovated	41
Trash pickups	33
Minor carpentry repairs to housing units	34
Minor carpentry repairs to dormitories	9
Minor paint jobs - renovated houses	9
Complete paint jobs - Renovated houses	5
Sprayed dormitories for insect control (Entire of dorms. M-3, M-4, M-1, M-2, M-5, M-8, M-6, M-9)	8

Provided weekly service of delivering linens and janitorial supplies to occupied dormitories.

Provided weekly pickup and delivery of laundry from various General Electric Company units to Richland Laundry and Dry Cleaners.

MECHANICAL SHOP

FOREMAN - Z. H. MAYBERRY

The following services were completed during the month:

A. Millwright Crew:

Furnace service orders	166
Routine furnace inspections	280

Routine service is about 90% complete on Ranch type houses.

Repadding of all coolers in dormitories has been started.

B. Sheetmetal Crew:

Fabricated shower stalls	11
Installed gutters	17
Replaced smoke pipes	14
Installed metal thresholds	24
Installed Ranch house bathroom window flashings	60
Prefab metal door keepers	60
Installed coal hatch flashings	7

C. Labor Crew:

Tree removal orders	69
Pick up trees removed by tenant	16
Pick up broken black top and trash	12
Top soil orders	49

LINOLEUM AND CARPENTER SHOP

FOREMAN - R. M. MARTIN

Replaced bath wall tile	3
Repaired bath wall tile	1
Replaced bath floor linoleum	17
Repaired bath floor linoleum	3
Replaced bedroom floor linoleum	4
Replaced living room floor linoleum	2
Repaired living room floor linoleum	1
Replaced dining room floor linoleum	1
Replaced kitchen floor linoleum	42
Repaired kitchen floor linoleum	1
Replaced hall linoleum	2
Replaced steps linoleum	28
Repaired steps linoleum	1
Replaced sink top linoleum	76
Repaired sink top linoleum	2
Replaced cupboard top linoleum	2
Replaced work bench linoleum	7
Jack and Shim	5
Repaired porches	8
Replaced kitchen sinks	7
Chempoints	154
Paint touch ups	63
Exterior doors repaired	2
Interior doors repaired	2
Interior carpentry - houses	173
Drilled weepholes	54
Repaired siding	8
Repaired walls - houses	2
Repaired walls - dormitories	1
Sidewalk forms	1
Repaired floor boards	16
Repaired roofs	17
Ranch house screens	44
Repaired ceilings - houses	1
Replaced basement stairs	2
Repaired basement stairs	2
Replaced floor linoleum - commercial property	2

COMMUNITY SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
FEBRUARY 1955

ORGANIZATION

	Exempt	Non-Exempt
Employees - Beginning of Month	16	31
Transfers In	0	0
Transfers Out	0	1
New Hires	0	1
Terminations	0	0
Total - End of Month	16	31

GENERAL

Chief H. W. Strock attended a meeting of law enforcement officials held on February 25 at the Penitentiary in Walla Walla at the invitation of James A. Pryde, Chief of the Washington State Patrol. This meeting was held to formulate plans for assistance in the protection of the penitentiary in the event of riots and general emergencies.

Lt. E. E. Miller of this department attended a Civil Defense meeting on the 24th of this month of Eastern Washington Civil Defense groups and law enforcement groups held in Spokane, for the primary purpose of formulating procedures for evacuation of residents as a result of extensive damage to be expected from an H bomb attack. Plans were outlined for radiation monitoring groups to be equipped with monitoring equipment in all communities of the state.

Approximately 50 red stop signs were installed to replace the old style yellow stop signs, resulting in 85% of all major arterials now being posted with red stop signs. A survey showed a need for approximately 150 parking signs which require renewing; these signs will be replaced with new faces within the next 90 days.

Approximately 120 children, members of Boy and Girl Scout troops and Camp Fire troops, were escorted on tours of Police Headquarters during the month of February.

TRAFFIC

RICHLAND	1955 Jan.	1955 Feb.	1954 Jan.	1954 Feb.	1955 Total To Date	1954 Total Same Period
Reportable accidents	34	17	32	25	51	57
Property damage accidents	30	14	29	22	44	51
Injury accidents	4	3	3	3	7	6
Total persons injured	6	3	3	3	9	6
Fatal accidents	0	0	0	0	0	0
Accidents-daylight hours	17	12	20	16	29	36
darkness	17	5	12	9	22	21
Accidents-business dist.	5	3	8	7	8	15
residential "	26	10	20	13	36	33
other "	3	4	4	5	7	9
Accidents investigated	21	10	16	11	31	27
Criminal complaints filed	5	5	9	6	10	15
Violations contributing to accidents:						
Negligent driving	2	2	3	7	4	10
Fail. to yield r.o.w.	8	4	4	7	12	11
Following too closely	3	1	8	4	4	12
Drunk driving	1	1	0	0	2	0
Pedestrian violation	0	1	0	0	1	0
Inattention to driving	0	0	0	2	0	2
Reckless driving	0	0	0	1	0	1
Speeding	1	0	0	1	1	1
Unsafe speed	14	4	16	3	18	19
Improper parking	0	0	0	0	0	0
Improper backing	3	2	0	0	5	0
Disregarding stop sign	0	0	0	0	0	0
Hit and run	1	0	0	0	1	0
Improper passing	0	0	0	0	0	0
Improper turn	1	1	1	0	2	1
Failure to signal	0	0	0	0	0	0
Wide right turn	0	0	0	0	0	0
Bicycle violation	0	0	0	0	0	0
Defective equipment	0	0	0	0	0	0
Wrong side of road	0	1	0	0	1	0
North Richland						
Reportable accidents	12	6	10	7	18	17
Property damage accidents	12	5	9	6	17	15
Injury accidents	0	1	1	1	1	2

Richland	1955 January	1955 February	Ave.Per Accident 1955 January	Ave.Per Accident 1955 February	Ave.Per Accident 1954 January	Ave.Per Accident 1954 February
Accident Property Damage	$7,360.50	$5,888.08	$216.49	$346.36	$168.31	$222.66

TRAINING

Advance training for Richland Police members at the Small Arms Range for the period in Field Instruction was as follows:

.38 Caliber Revolver ½ Hour
Total number of men reporting at the range 18
Number of men fired over the Army-L course 17

Qualifications on the Army-L course as follows:

Expert	8	47%	Sharpshooter	2	12%
Marksman	5	29%	Unqualified	2	12%

ACTIVITIES	January		February	
	Richland	North Richland	Richland	North Richland
Bank escorts and details	0	4	2	4
Bicycles impounded	0	0	0	0
Bicycle violations, other	0	0	0	0
Bicycles registered	33	0	33	0
Children lost or found	7	1	13	2
Complaints investigated	43	9	26	2
Deaths reported	0	0	0	0
Dog, cat, loose stock complaints	4	0	3	0
Dogs, cats, reported lost or found	7	2	7	1
Doors, windows found open in facilities	33	2	25	12
Emergency messages delivered	18	52	7	44
Fires investigated	4	2	11	1
Guns registered	16	0	13	0
Law enforcement agencies assisted	10	0	4	0
Letters of inquiry	229	0	213	0
Miscellaneous escorts	7	5	2	1
Persons injured by dogs	0	0	3	0
Plant departments assisted	37	0	22	0
Prisoners processed through Jail	10	6	12	12
Private individuals assisted	12	3	8	3
Property lost or found	30	1	16	1
Records inquiries	80	0	70	0
Reports processed through Records	242	102	265	94
Street lights out reported to Electrical	248	20	197	15
Traffic safety meetings (Feb. attendance 2845)	3	0	11	0
Total	1073	209	963	192

G&b-3

MONTHLY REPORT
RICHLAND POLICE DEPARTMENT
(RICHLAND - NORTH RICHLAND)
FEBRUARY 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 Manslaughter								
b. Manslaughter by Negligence								
2. Rape								
3. Robbery								
4. Aggravated Assault								
5. Burg.-Break. & Entry	3	1	-	-	-	-	1	-
6. Larceny Over $50.00	1	2	-	-	-	1	1	-
Under $50.00	11	3	3	-	-	-	-	-
7. Auto Theft	-	1	-	1	-	-	-	-
TOTAL PART I CASES	15	7	3	1	-	1	2	-
PART II								
8. Other Assaults	1	1	-	-	-	-	1	1
9. Forgery & Counterfeit	3	-	-	-	-	-	1	-
10. Embezzlement & Fraud	2	-	-	-	1	-	-	-
11. Stolen Prop:Buy:Receive	-	-	-	-	-	-	-	-
12. Weapons:Carry:Possessing	-	-	-	-	-	-	-	-
13. Prostitution	-	-	-	-	-	-	-	-
14. Sex Offenses	2	2	-	-	-	-	-	2
15. Offenses Ag. Fam. & Child	1	-	-	-	1	-	-	-
16. Narcotics	-	-	-	-	-	-	-	-
17. Liquor Laws	-	-	-	-	-	-	-	-
18. Drunkenness	4	3	-	-	1	-	3	3
19. Disorderly Conduct	-	-	-	-	-	-	-	-
20. Vagrancy	-	-	-	-	-	-	-	-
21. Gambling	-	-	-	-	-	-	-	-
22. Drunk Driving	5	3	-	-	-	-	5	3
23. Viol. Road & Driving Laws:								
Fail. to Stop & Identify	1	-	-	-	-	-	-	-
Speeding	35	10	-	-	8	-	27	10
Stop Sign	21	6	-	-	4	-	17	6
Reckless Driving	1	-	-	-	-	-	1	-

	OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
		Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
	Right of Way	1	-	-	-	-	-	1	-
	Negligent Driving	6	4	-	-	-	-	6	4
	Defective Equipment	4	4	-	-	4	4	-	-
	Illegal Passing	-	1	-	-	-	1	-	-
24.	Parking	10	12	-	-	5	-	5	12
25.	All Other Traffic Violations	35	20	-	-	12	5	23	15
26.	All Other Offenses:								
	Malicious Mischief	-	4	-	-	-	1	-	-
	Vandalism	8	3	-	-	1	-	-	-
	Public Nuisance	1	-	-	-	-	-	1	-
	Family Trouble	-	1	-	-	-	1	-	-
	Viol. of Dog Ordinance	1	-	-	-	-	-	1	-
	Molesting	1	1	1	-	-	-	-	-
	Illegal Shooting	3	-	-	-	3	-	-	-
	Pickup for Outside Agency	1	-	-	-	-	-	1	-
	Dog Poisoning	5	1	-	-	-	1	-	-
	Obscene Phone Calls	1	-	-	-	-	-	-	-
27.	Suspicion	2	1	-	-	2	1	-	-
TOTAL PART II CASES		155	77	1	-	42	14	93	56
PART III									
28.	Missing Persons	1	2	-	-	1	2	-	-
	Lost Persons	13	1	-	-	13	1	-	-
	Lost Animals	3	-	-	-	-	-	-	-
	Lost Property	33	-	-	-	21	-	-	-
29.	Found Persons	-	-	-	-	-	-	-	-
	Found Property	35	-	-	-	33	-	-	-
	Found Animals	1	-	-	-	-	-	-	-
TOTAL PART III CASES		86	3	-	-	68	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. Traf. Accid.								
31. Pers. Inj. M.V. Traf. Accid.	3	1						
32. Prop. Dam. M.V. Accid.	14	5						
33. Other Traffic Accid.								
34. Public Accidents)								
35. Home Accidents)	No Accurate Statistics Kept							
36. Occupational Accidents)								
37. Firearms Accidents								
38. Dog Bites								
39. Suicides	3	1						
40. Suicide Attempts								
41. Sud. Death & Bod. Found								
42. Sick Cared For								
43. Mental Cases								
TOTAL PART IV	20	6						
COMPOSITE TOTALS								
PART I, II, III, IV CASES	276	93	4	1	110	18	95	56

Cases listed under "Cleared Other" are those cleared by various means other than arrest, such as: orders from prosecutor, juvenile probation officer or other situations in which a mutual agreement is obtained. They are definitely "cleared" cases and differ from the arrest column only in that there was no arrest.

Property reported stolen	Richland	$1,837.57
Property reported stolen	No. Richland	$ 206.20
Property recovered	Richland	$1,537.85
Property recovered	No. Richland	$ 100.00

MONTHLY REPORT — RICHLAND POLICE DEPARTMENT — JUVENILES INVOLVED — FEBRUARY

OFFENSES	NO. CASES	JUVENILES	SEX	JUVENILES INVOLVED 11	12	13	14	15
RICHLAND								
Breaking & Entering	1	1	M				1	
Larceny	1	2	M		2			
Disturbance	1	3	M		2		1	
Vandalism	1	1	M	1				
Illegal Shooting	3	5	M	1	2	1		1
TOTALS	7	12		2	6	1	2	1
NORTH RICHLAND								
Malicious Mischief	1	3	M	1	1			1
Disturbance	1	1	M			1		
TOTALS	2	4		1	1	1		1

RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
FEBRUARY 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	6	2	3							$30.00	$ 2.50	$
Invalid Vehicle License	16	11	1	2	1					7.50	74.50	17.50 (2)
No Registration Certificate	3	2									10.00	
No Drivers License	11	5	5						1	31.00	23.50	
Negligent Driving	5	2	1		2				1	25.00	22.50	
Neg Drvg, Liquor Involved	1		1							50.00		
Reckless Driving	1											
Drunk Driving	2	1		1				1	2		52.50	25.00 (1)
Speeding	27	12	15							160.00	147.50	40.00 (2)
Illegal Passing	1	1									5.00	
Illegal Parking	13	2	7		2				1	24.50	7.50	
Stop Sign	19	7	10	2						88.50	70.00	7.50 (1)
Fail. to Yield Right of Way	2	2									75.00	
Leav. M/Veh with motor running	1	1									5.00	
Fail. to Give Name after Acc	1				1							
Following Too Close	1	1							1		7.50	
Unnecessary Noise	1		1							7.50		
F.T.O. School Patrol Flag	1			1								
Public Intox	5		4	1						50.00		
Public Nuisance	1	1				1						
Harboring Vicious Dog	1				1						2.50	
Third Degree Assault	1				1						2.50	
Indecent Liberties	1				1				1			
Totals	121	50	48	7	9	1		1	8	$474.00	$508.00	$90.00 (6)

1 Speeding - Did Not Appear
1 No Cert. of Reg. - Did Not Appear
1 Invalid Veh Lic - Did Not Appear
1 Illegal Parking - Did Not Appear
3 No Drivers Lic - Did Not Appear

1 Defective Equip - Judge held drivers lic 1 week
1 Reckless Drvg - Change of Venue to Judge Nyborg's Court
1 Defective Equip - " " " " " " "

RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
FEBRUARY 1955

VIOLATION	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								$	$ 7.50	$
INVALID VEHICLE LICENSE	10	7	3							23.25	37.50	
NO DRIVERS LICENSE	5	8	1						1	5.00	20.50	9.00 (1)
NEGLIGENT DRIVING	2	2									32.50	
NEG DRVG, LIQUOR INVOLVED	3	2	1						1	25.00	27.50	
DRUNK DRIVING	2	2						2			155.00	
SPEEDING	9	3	5	1						55.00	20.00	
ILLEGAL PARKING	15	1	8	2					1	26.50	3.50	
STOP SIGN	9	6	2	1					2	20.00	27.50	
ILLEGAL PASSING	1								1			
ILLEGAL USE OF LEARNERS PERMIT	1		1							15.00		
PERM. CHILD TO OP. MOTOR VEH WITHOUT OPERATORS LICENSE	1	1									37.50	
PUBLIC INTOXICATION	4	1	3							37.50	12.50	
VAGRANCY	3	1	1		1	1				25.00		
BOOTLEGGING	1	1				1						
INDECENT LIBERTIES	1											
SODOMY	2											
TOTALS	70	36	24	4	1	2		2	6	$232.25	$381.50	$ 9.00 (1)

4 ILLEGAL PARKING - DID NOT APPEAR
1 ILLEGAL PASSING - DID NOT APPEAR
1 NO DRIVERS LICENSE - DID NOT APPEAR
1 STOP SIGN VIOLATION - DID NOT APPEAR

1 INDECENT LIBERTIES - BOUND OVER TO SUPERIOR COURT
2 SODOMY - BOUND OVER TO SUPERIOR COURT
1 FAILURE TO OBSERVE STOP SIGN - JUDGE HELD DR. LIC 2 WEEKS

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT
COMMUNITY SECTION
February, 1955

PERSONNEL - COMMERCIAL & RESIDENTIAL PROPERTY UNIT:

	February Exempt	Non-Exempt
Beginning of Month	8	24
End of Month	8	24
Net Change	0	0

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	Commercial		Noncommercial		Total	
	Richland	North Richland	Richland	North Richland	Richland	North Richland
January	1,639	140	120	1	1,759	141
February	1,636	94	120	1	1,756	95
Net Change	-3	-46	0	0	-3	-46

SUMMARY OF ROUTINE ITEMS PROCESSED:

	Commercial		Non-Commercial		Total		
	Richland	North Richland	Richland	North Richland	Richland	North Richland	Total
Work Orders	48	20	2	0	50	20	70
Back Charges	3	0	0	0	3	0	3
FY Work Orders	891	338	38	0	929	338	1267
FY Back Charges	40	1	4	0	44	1	45

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Leases:

a. James R. Parcell - a ground lease in connection with the construction and operation of an automotive service station and drive-in restaurant to be located at the southwest corner of Goethals Drive and Williams Boulevard.

b. Murphy Motors, Inc. - a lease of government-owned land and building at 615 George Washington Way for the operation of an automobile agency.

c. Dale Mathes - a lease of space in the Medical-Dental Building for the operation of a dental laboratory.

2. Supplemental Agreements:

   a. L. R. and Sarah Bailey - to provide for a new rental and makes certain other changes as a result of the recent renegotiation.

   b. Block's Shoe Store - to provide for a new rent and makes certain other changes in connection with the recent renegotiation.

   c. Richland Jewelry, Inc. - to provide for a new compensation arrangement in connection with rental adjustment.

   d. Sam Levinson - to provide for a new rental and certain other changes in connection with the renegotiation of the lease covering the operation of the Mixer.

   e. L. G. Cook - to provide for the construction of building additions and changes in the method of payment for utilities and services.

3. Business Development:

   a. The proposal of Hubert R. Moore was accepted in connection with leasing Site I at Van Giesen Street and Wright Avenue. He proposes to operate an automotive service station.

   b. The proposal of L. G. Cook was accepted in connection with leasing Site II at Van Giesen Street and Wright Avenue. He proposes to construct an investment building.

   c. The proposal of Parker Hanson was accepted in connection with leasing Site III at Van Giesen Street and Wright Avenue. He proposes to construct an investment building.

   d. The lease award to Frances S. Taylor for a 100 foot frontage on Stevens Drive was rescinded.

   e. The License Agreement dated July 1, 1953, with Tri-City Television Service, Inc. was terminated.

GENERAL:

A. Commercial:

1. Austin Wilhite's Texaco Service Station and Paul Fredette's Tune-Up Shop opened for business in the A.P. Thorsness Building at the southeast corner of Goethals Drive and Williams Boulevard.

2. La Hart's Jewelry Store opened for business in the space formerly occupied by Al Nihart's Jewelry Store in the Uptown Theatre Building.

3. Patricia H. Cochrane, doing business as "Mill Ends" opened for business in the space formerly occupied by Shawn's Millinery Shop in the Richland Investment Company Building.

4. Five of the eight Lessees occupying privately-owned structures in North Richland have been granted authorization to conduct their operations and activities until not later than April 30, 1955.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland.

Golf Driving Range	Equipment Rental Yard
Trailer Court	Automatic Laundry Service

COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

February, 1955

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

A. Commercial:	JANUARY			FEBRUARY		
	Richland	North Richland	Total	Richland	North Richland	Total
1. Number of Government-owned Buildings	42	8	50	42	8	50
a. Number of Prime Lessee Businesses	37	10	47	37	10	47
b. Number of Sublessees Businesses	18	0	18	18	0	18
c. Total Businesses in Government-owned Buildings	55	10	65	55	10	65
2. Doctors and Dentists in Private Practice	35	0	35	35	0	35
3. Number of Privately-owned Buildings	71	6	77	71	6	77
a. Number of Prime Lessee Businesses	45	5	50	45	5	50
b. Number of Businesses operated by Sublessees	113	1	114	115	1	116
c. Total Businesses in Privately-owned Buildings	158	6	164	160	6	166
4. Privately-owned Buildings under Construction	3	0	3	3	0	3
5. Total Number of Businesses in Operation	213	16	229	215	16	231

COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION — February, 1955

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

B. Noncommercial:

	JANUARY			FEBRUARY		
	Richland	North Richland	Total	Richland	North Richland	Total
1. Government-owned Buildings						
a. Churches	1		1	1		1
b. Clubs and Organizations	5		5	5		5
c. Government Agencies	2		2	2		2
Total	8		8	8		8
2. Privately-owned Buildings						
a. Completed and in Use	10	2	12	10	2	12
b. Under Construction	6	0	6	6	0	6
Total	16	2	18	16	2	18
3. Church Plots and Buildings in Private Ownership	3		3	3		3
4. Pasture Land Permits	105		105	105		105

Cgc-5

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of January 31, 1955	Orders issued 1-31 to 2-28	Total orders Incomplete as of February 28, 1955
Service orders	423	2110	567
Work orders	1043	399	881
Service charges		314	

Principal work order loads

	Incomplete as of January 31, 1955	Incomplete as of February 28, 1955
Laundry tub replacement	29	25
Tileboard bathroom	9	4
Kitchen floor linoleum	97	60
Kitchen cabinet linoleum	196	153
Shower stall	21	10

---

100 alteration permits were issued, as compared to 133 issued in January.

Install automatic dryer	14	Install automatic washer	17
Install TV antenna	34	Install patio	1
Install oil burner	3	Install electric heat	6
Remove closet	1	Change position of steps	1
Install fence	1	Add wiring	3
Build retaining wall	1	Basement partition	7
Install air conditioner	1	Install tool shed	2
Basement excavation	3	Install water heater	1
Install back door	1	Move water heater	2
Install water softener	1		

---

910 inspections were made, as compared to 1026 in January.

Alteration permits	15	Basement	1
Bathroom	1	Ceiling	3
Doors	3	Fill	2
Floors	4	Laundry trays	9
Linoleum	15	Lot lines	50
Paint	229	Porch	4
Range & refer recall	9	Steps & walks	4
Sink	2	Toilet seat	5
Trees	18	Walls	2
Windows	2	Yard	2
Renovation rechecks	41	Dormitories	215
Miscellaneous	48	Cancellations	74
Renovations	91	Shows (new tenants)	61

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

Merchandise Issued	Total Amount
Shades	309
Reflectors	22
Drip trays	8
Meat tenders	3
Ice trays	13
Hydrator glass	5
Furniture delivery	34
Furniture recall	41
Range parts	2
Refer parts	4
Space heaters	5
Door stops	9
Grass seed	12
Furnace shaker	1
Caulking compound	2

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS -- MONTH OF FEBRUARY

	DELIVERY		RECALLED	
	REFERS	RANGES	REFERS	RANGES
1Br.	0	0	0	0
2Br.	1	2	2	0
3Br.	0	0	1	1
A	3	3	1	0
B	0	3	1	3
C	1	0	1	0
E	1	0	1	0
F	0	0	0	1
H	2	0	1	2
L	0	0	1	1
U	1	1	0	0
V	3	1	2	0
Y	4	2	2	1
Tract	0	1	0	1
Z	0	0	1	1
Total	16	13	14	11

Salvaged: February 28 -- 5 ea. refers -- (3 TA's, 1 GE and 1 GM)

In Warehouse:

1 GM 7' refer	8 GE ranges
1 SO 82 7' refer	8 SC ranges
1 GM 6' refer	1 GM ranges
3 TA 7' refers	

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	2230	256	10	392	854	1122	10	54	61	202	36	5227
Comm. Fac.	91	18		28	58	48		5	4	10	2	264
AEC	64	29		18	51	17		4	3	11	3	200
Other Gov't	9	2			3	1						15
Post Office	6				2	8				1	3	20
Schools	64			6	11	44			1	1		127
Comm. Activities	11			2	6	5					1	25
Med. Facilities	4	17			3	2				3		29
Chas. T. Main	2				1					1		4
Kaiser Eng.	4	7			5	1						17
J. A. Jones	2	2			2							6
Blaw-Knox	1	2		1	2							6
Minor Const.					1	1		1				3
Not Certified	3			1		2					1	7
Total	2491	333	10	448	999	1251	10	64	69	229	46	5950
Ready to Rent	2			1		9						12
In Renovation	7			1	1	16			1	1		27
Total	2500	333	10	450	1000	1276	10	64	70	230	46	5989

	Begin Month	Moved In	Moved Out	End of Month	Diff.
Conventional Type	2492	+19	-20	2491	-1
A&J Type	333	+1	-1	333	
"T" Type	10			10	
Precut Type	450	+6	-8	448	-2
Ranch Type	997	+8	-6	999	+2
Prefab Type	1259	+30	-38	1251	-7
Dorm Apts.	10			10	
A&J Apts.	64			64	
2BR Apts.	70		-1	69	-1
Fourth Housing	230	+2	-3	229	-1
Tracts	47		-1	46	-1
Total	5962	+66	-78	5950	-11

COMMERCIAL & RESIDENTIAL PROPERTY UNIT
RESIDENTIAL LEASES

FEBRUARY 1955

DORMITORY REPORT

Dormitories:

	Beds available	Vacant beds	Occupied beds
Men	477	61	416
Women	381*	86**	295*
Total	858*	147**	711*

*This includes 2 beds used for Dorm Offices
**This includes 12 vacant beds in Dorm M 13

WAITING LISTS

	Single Rooms	Double Rooms
Men	0	0
Women	1	0

The following Dormitories are in stand-by condition:

W 21	50 beds	W 15	50 beds
W 17	50 beds	M 7	39 beds
W 16	50 beds		
	Total beds 239		

RESIDENTIAL LEASING

CANCELLATIONS		ALLOCATIONS	
Voluntary terminations	21	Houses allocated to new tenants	40
R.O.F.	2	Exchanged houses	14
Discharge	0	Moves (within Richland)	23
Transfers	12	Turnovers (divorce,death,schools)	4
Retirement	4	Wherry house move to GE house	0
Move off project	14	Total leases signed	81
Divorce	0	Total cancellations	96
Death	0	Houses assigned "AsIs"	29
Move to Wherry house	1	Houses sent to "Renovation"	48
Military Service	1	Applications pending	316
Total	55		

Total includes tract house at 3415 Davison which was excessed 2-3-55.

COMMUNITY SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT

February 1955

Organization and Personnel	Exempt	Non-Exempt
Employees beginning of Month	67	0
Transfers In	0	0
Transfers Out	2	0
Terminations	0	0
New Hires	1	0
End of Month	66	0

Fire Protection		Richland	North Richland
Fire Loss (Estimated):	Government	275.00	0.00
	Personal	40.85*	700.00
	February Total	315.85	700.00
	Year's Total	340.85	725.00

*This does not include personal loss on February 26, residential fire. Loss not yet computed.

Response to Fire Alarms	34	15
Investigation of Minor Fires and Incidents	4	1
Ambulance Responses	18	0
Inside Schools or Drills	35	12
Outside Drills	5	7
Safety Meetings	9	2
Security Meetings	3	2
Fire Alarm Boxes Tested	207	100

All Fire Department personnel attended classes conducted by the Training Section in "Human Relations" preparatory to projected residential program.

Ladder truck was dispatched February 12, to assist with a flag raising ceremony at an emergency mobilization of Richland Boy Scouts.

Sixteen Boy Scouts were examined during the month for Firemanship Merit Badge.

Fire Marshal's Activities

A total of 144 Richland and 10 North Richland buildings were inspected, resulting in 67 hazard reports being submitted. A total of 251 fire

extinguishers were inspected, 1 installed and 4 removed. Eight-six fire hose standpipes were inspected and serviced; seven fire hose yard boxes were inspected; one sprinkler system tested and one equipped with surge retarding device and inspector's test valves.

Lectured to 42 employees of Public Works on "Home Fire Prevention."

Prepared a Home Inspection form and arranged pictures in homes for publicity on the inspection program.

Reviewed plans and specifications for complete fire alarm, fire detector and sprinkler systems for buildings at request of AEC Engineering.

Reviewed plans for an addition to Kadlec Hospital Industrial Medical Section with GE Engineering.

Assisted AEC Engineer with final acceptance test of the new fire alarm system in the 706 Telephone Exchange.

Assisted Community Engineer with final acceptance of sprinkler system in the new Central United Church school.

Requested repairs on Kadlec Hospital sprinkler system in "D" wing South due to air valves leaking that would cause great delay in fire alarm.

Prepared year-round fire prevention activities to add to our contest book for entry into the U. S. Chamber of Commerce contest in Washington, D. C., next month.

Attended weekly membership meetings of the Chamber of Commerce as representative of the Fire Department and arranged for a clean-up week campaign on a Tri-City basis to start March 21, with the Chamber as sponsor.

Discussion of fire hazards from fluorescent lighting fixtures against combustible ceilings, and sprinkler and Fire alarm problems with Bullion-Griffith Architectural firm in Seattle resulted in the firm requiring spacing of fixtures and addition of retard devices in all their present and future planning of new construction in Richland.

RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
FEBRUARY 1955

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees Beginning of Month	5	16
Transfers In		
Transfers Out		
Terminations		
Total End of Month	5	16

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set and transferred	5
Anchors set and guys installed	0
Street lights repaired and steel mast arms installed	2
Street lights relamped - mercury vapor	2
Street lights relamped - 6000L and 4000L, 1100 Area	164
Street lights relamped - 6000L and 4000L, 700 Area	0
Flood lights relamped, 1100 Area	3
Flood lights relamped, 700 Area	0
Stack lights relamped, 700 Area	1
Primary line footage added	0
Primary line footage removed	0
Transformer KVA added	386
Transformer KVA removed	236
Net transformer KVA installed	150
New services installed - residential	0
New services installed - commercial	2
Temporary services installed and removed	3
Scheduled outages - primary	2
Scheduled outages - secondary	9
Unscheduled outages - primary	0
Unscheduled outages - secondary	1
Standby and escort	1
High voltage tree trimming	62
Low voltage tree trimming	13
Residential service removed	1

TRAFFIC SIGNALS

Relamping	1
Operational failures	0
Installations	0
Removals	0

RICHLAND ELECTRICAL UNIT

Routine maintenance checks	47
Routine check R. R. signal at Van Giesen	4
Total signals in operation - automatic	19
Total signals in operation - manual	3
Total signals in operation - flasher	3

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	3
Electrical motors checked and serviced - water	105
Electrical motors checked and serviced - sewage	117

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	6
Outside circuit checks	7
Inside faults repaired	4
Outside faults repaired	1
New circuits placed in operation	0
New boxes placed in operation	0

SUBSTATIONS

Main feeder and tie breaker checks - BB1S1	4
" " " " " " - BB1S2	4
Secondary and pad located substations - checked jumpers, cutouts, grounds and general condition	25

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	26
Meters tested - customer's requests	6
New meters shop tested	12
Faulty meters replaced or repaired	4
Damaged meters and covers	2
Residential read-ins	136
Residential read-outs	187
Residential disconnects	16
Residential reconnects	16
Meters resealed	2
Radio interference checks	3
Overloaded meters changed out	27
Routine meter tests	49

Consumption and Revenue:

	No. of Meters	KWH	Revenue
Residential - Schedule 1	6984	5,896,569	$58,678.63
Commercial - Schedule 2	399	3,563,924	28,694.75
TOTAL	7383	9,460,493	$87,373.38

RICHLAND ELECTRICAL UNIT

COMMENTS

STREET LIGHTING:

Installed steel mast arms to existing lights to replace defective wood arms on Duane at Benham and Comstock.
Disconnected 26 perimeter lights on series system surrounding stores excess yard as requested by Stores Section.
Accomplished usual routine relamping on system, and washed glass globes and reflectors to street lights as follows: 59 lights along Wright Avenue, 62 lights downtown on 200 circuit, 62 lights on 400 circuit, and 82 lights on 300 circuit on south end of town.

TRAFFIC SIGNAL SYSTEM:

No failures or operating difficulties during month. Usual preventive maintenance and checks are being followed.

FIRE PROTECTION SYSTEM:

Corrected low ground reading on positive side of circuit to Desert Inn.
Wind storm caused tree at Fitch and Cullum to break fire alarm wire - repairs were made and tree trimmed back to clear.
Changed out defective masterbox at Jason Lee School.
Routine tests at Dorm W-9 located inoperative signal horn circuit - repaired burned wire in junction box.
Routine checks located trouble on auxiliary signal light circuit in Dorm W-3, which was isolated and repaired.

WATER SYSTEM:

Electrical Maintenance - Replaced burned out 1 kva dry transformer at K well in North Richland Field with 3 kva dry type transformer.
Usual preventive maintenance schedules are being performed.

SEWAGE AND TREATMENT AND DISPOSAL SYSTEM:

Heat exchanger pump motor #6 from main plant was brought to shop for complete overhaul.
Made routine overhaul of #3 50 HP motor from sewer lift station at Swift and George Washington Way. Usual preventive maintenance schedules are being performed.

OUTSIDE LINES AND STATIONS:

Planned outages to change out overloaded transformers were scheduled as follows:

Rear of 1304 Birch - changed 37.5 to 50 - 2 hrs.
Rear of 315 Abert - changed 37.5 to 50 - 2 hrs.
Rear of 1107 Marshall - changed 25 to 37.5 - 2 hrs.
Rear of 307 Bernard - changed 50 to 100 - 3 hrs.
Rear 310 Comstock - installed 25 kva transformer to assume load from existing 75 kva transformer by splitting loads.

RICHLAND ELECTRICAL UNIT

Planned primary outages were scheduled as follows:

On rural section of Line 34 west of Central Stores to repair broken 7200 volt insulators - 1 hour.

On Line 12 short primary lateral west of GW Way and south of Abbot to transfer to newly set poles.

General maintenance and rearrangement - Disconnected and reconnected service to 1407 Marshall to permit Housing to repair service entrance and wall damaged by tenant felling tree on service wires.

Disconnected and reconnected 13 customers due to delinquent payment of consumption billing as provided by Rules and Regulations.

Made lighting connection to telephone booth at Duportail and Wright as requested by General Telephone Company, according to Rules and Regulations.

Wind storm damage, 2-7-55, resulted in failure of #1200 series light circuit in south part of ranch house area for part of night due to broken wire jumper on pole and trees pulling off two service insulators. Minor damage only was sustained by Electrical Unit.

Disconnected and reconnected service to one house to permit tenant to rearrange house wiring for heating installation, on permit from Housing Office.

Installed sectionalizing fused switches on Line 34 just west of tap to Central Transportation to afford the important loads of Transportation and Stores protection from outage exposure on rural line to the west where there is considerable damage to line from rocks and bullets.

Dangerous kites and strings were removed from 7200 volt lines at four locations.

Removed two unused guys and anchors from tenants premises at 1309 Hains.

Performed routine overhaul on seven transformers that were processed through our unit due to removals and re-installations, includes testing oil and insulation.

Checked and halted oil leak that developed on transformer in rear of 1107 Marshall.

Transferred services to C&H Store and Thrifty Drug in uptown shopping area from present overloaded transformer station to the adjacent one which is underloaded. Transfer will improve loading conditions.

Disconnected from excess yard those primary lines feeding Army area. Army tied in to lines cut loose.

The following work was performed for Telephone Section on Job C-55-55:

Installed 465 ft. of 202 pr. cable between manholes #A and #3 on south side of 700 Area.

RICHLAND ELECTRICAL UNIT

The Electrical Unit is presently engaged in surveying load conditions in uptown commercial area and placing in service for commercial customers, in that area, additional transformer capacity due to release of capacity by installation of oil heating equipment by Launderland.

Also, there is being conducted by the Unit an extensive survey of residential transformer installations based on consumption records, heating requirements and use of temporary meter recordings, designed to prevent damage to transformers caused by additional appliance and heating loads, and to assure the supply of correct voltages.

CALL-OUT - One man to restore service to 1407 Marshall when tenant felled tree on service over weekend.

VANDALISM - Replaced five lights and glass globes in Columbia Hi parking lot and four additional in scattered locations.

COMMUNITY OPERATIONS SUB-SECTION
ENGINEERING UNIT
MONTHLY REPORT
FEBRUARY 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 FEBRUARY:

1. L. G. Cook - Residence Garage - 2202 Frankfort
2. 2 Sign Permits

NEW MUNICIPAL CONSTRUCTION STARTED IN FEBRUARY:

NONE

NEW PRIVATE CONSTRUCTION STARTED IN FEBRUARY:

1. Uptown Thrifty Drug Store Addition
2. L. G. Cook - Residence Garage - 2202 Frankfort

PRIVATE CONSTRUCTION COMPLETED, OR ON WHICH FINAL INSPECTION MADE IN FEBRUARY

Richland Lutheran Church Alterations

ENGINEERING JOBS COMPLETED IN FEBRUARY:

C-89566 - "As Builts" J. J. Newberry Store

C-70592 - Legal Description SE Corner Knight & Stevens (Frances S. Taylor)

C-70590 - Legal Description of Plot at SE Corner Knight & Stevens - (Continental Oil Co.)

STATUS OF ENGINEERING UNIT PROJECTS

G-01005 - Sewer and Water Lines to Richland Heights Baptist Church - 90% complete. Concrete lining of irrigation ditch to be completed.

G-01008 - 6" Water Line, Williams & Goethals - 99% complete. Cleanup to be completed by contractor.

G-01009 - Knight Street Improvement - Design 25% complete.

STATUS OF ENGINEERING UNIT PROJECTS (Cont.)

G-01010 - Extension Torbett West of Perkins Avenue - Design 75% complete.

G-01012 - Boise Street Extension - Design 75% complete.

G-01013 - Sewer Extension to Commercial Site, Wright & Van Giesen - Construction 90% complete.

G-01014 - Utility Extension to Knight & Stevens - 99% complete. Cleanup to be completed.

G-02171 - Automatic Bar Screens Sewage Lift Station - To be readvertised in April 1955. No bids received at first advertising.

G-02176 - Comfort Station, Sewage Lift Station - Chlorination Station, Riverside Park - Redesign 85% complete. Design revised from reinforced concrete to concrete block by request of A.E.C. and permission of Corps of Engineers.

G-03570 - Replace Raw Water Line #5 to Lee Boulevard - 95% complete. Blacktop patching of street yet to be completed.

STATUS OF ACTIVE ENGINEERING SERVICE REQUESTS

I-90234 - Inspection, Bauer-Day Housing - Reinspection made at request of A.E.C. and final letter of exceptions submitted to A.E.C.

I-90914 - Utility Lines, Legal Descriptions and Diagrams for Churches - Utility location sketches 95% complete.

I-91014 - Retirement of Separate Irrigation System - Public area design 70% complete. Residence areas design scoping being reviewed by A.E.C. River pumphouse design completed and discussed with A.E.C. 1-24-55. Awaiting comments by A.E.C.

I-91024 - Retirement of Irrigation Canal - Storm sewer design 50% complete. Backfill and landscaping design not started.

STATUS OF WORK ORDERS:

C-0554 - Expansion of Riverside Park North of Lee Blvd. - Scoping for project in progress.

C-11443 - Plat and Legal Description on Church of Jesus Christ of Latter Day Saints - 95% complete.

C-11447 - Plat and Legal Description, American Red Cross - 10% complete.

C-11448 - Northwest Corner Lee Boulevard and Goethals Drive (Tide Water Associated Oil - Legal Description - 90% complete.

STATUS OF WORK ORDERS (Cont.)

C-70524 - Pauls, Inc. (Legal Description) - 95% complete.

C-70591 - Legal Description Plot West of By's Burgers - 95% complete.

C-70667 - Murphy Motors, Inc. (Legal Description) - 95% complete.

C-70698 - Legal Description of Plot of Land on Lee Boulevard (Chas. D. McGuinness) - 90% complete.

C-70699 - Southeast Intersection of Lee & Wellsian Way (Colin Bleiler) - 90% complete.

C-81020 - "As Builts" - Phase III - 20% complete.

C-89516 - Legal Description on Newton & G. W. Way (Tide Water Associated Oil) - 90% complete.

C-89584 - Legal Description Plot Van Giesen & Wright (Plot #1) - Hubert H. Moore) - Legal Description - 40% complete.

C-89585 - SW Corner Van Giesen & Wright (Plot #2) - L. G. Cook Investment Bldg) - 40% complete.

C-89586 - Legal Description Plot on Van Giesen (Plot #3) - Parker Hanson Investment Bldg. - 40% complete.

C-89597 - "As Built" Plans Utoco Service Station - Duane & Lee - (E. H. Kidwell) - Plans received but returned for "As Built" data not included.

C-89698 - Legal Description for Ferry Landing Site - 10% complete.

BUILDINGS UNDER CONSTRUCTION

First Baptist Church (Richmond and Raleigh Streets) - Construction 92% complete. No progress this month.

Assembly of God Church - 99% complete. Work progressing very slowly.

Alteration Permits - an open active file.

Television Antennae - an open active file - no permits being issued.

Plans, Specs., Inspections, Church of Nazarene Addition - 88% complete. Work progressing slowly.

Plans, Specs., Inspections, Christ of King Parish (Catholic) - 85% complete. Work progressing slowly. Portion of school occupied.

Plans, Specs., Inspections, Thorsness Drive In - SE Corner of Goethals and Williams - 95% complete. Service station open for business.

Plans, Specs., Inspections, Uptown Thrifty Drug Store Rehabilitation - Construction 80% complete.

COMMUNITY OPERATIONS SUB-SECTION
PUBLIC WORKS & RECREATION UNIT
MONTHLY REPORT
FEBRUARY 1955

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees Beginning of Month	7	37
Transfers Out	0	2
Transfers In	0	4
New Employees	0	0
Terminations	0	1
Total End of Month	7	38

ROADS AND STREETS

Streets became icy early on the morning of February 27 and it was necessary to spread 66 cubic yards of sand at a cost of 20 man hours of overtime labor to provide sufficient traction for safe progress of vehicles.

Gravel gutters in Black Court, Gunnison Court, the 900 block on Snow, and the 1,000 and 1400 blocks of Perkins were bladed and shaped to assist in drainage of these areas and 132 cubic yards of 3/4" minus material were spread for stabilization. The gutters on Putnam from Thayer to Wright were re-shaped to assist drainage on this street. The following gravel roads were bladed and re-shaped during the month: Burlin Road, Park Road, Sprout Road, Saint Road, Snyder Road, Hagen Road, Gay Road and Lacey Roads.

The road to the disposal pit which was stabilized last month was covered with 448 cubic yards of 3/4" minus material as a surfacing. The By-Pass Highway has begun to show some longitudinal checking and deterioration and work has been started on patching out the more serious breaks with hot oil and aggregate. Present plans provide for seal-coating of the entire surface on the By-Pass Highway during June.

Pavement replacement was made following water meter installations at Skip's Drive-In. Tastee Freeze and the New City Cleaners.

A long standing problem of water around the Little League Field at Jefferson Play Ground was corrected by the installation of a catch basin on Hunt Avenue directly east of the Little League Field with effluent pipe tied to the sanitary sewer

Work has been started on the pick-up of sand spread on streets during the winter season and at this time all heavy concentrations of sand have been removed.

Approximately 160 cubic yards of top soil were loaded and hauled to the 700 Area for use by the Maintenance and Renovation Unit.

The 1500 gallon tank on the street flusher has corroded to the point that it is not economically feasible to make further repair and a replacement tank is now being installed on this truck.

Routine seasonal maintenance of streets, drainage systems and street signs was continued.

PUBLIC WORKS AND RECREATION UNIT

SANITATION

The following customers are now being billed directly for waste removal service in accordance with a schedule of rates which was recently approved by the A.E.C. The affected facilities have either purchased their land, as in the case of churches, or are now operating under a new commercial lease policy which does not include utility and waste removal charges in the basic real estate lease.

Austin's Texaco Service Station
Richland Marina
Richland Jewelry
New City Cleaners
L. G. Cook Building
Skip's Drive-In
Bailey Building No. 1
American Red Cross
Richland Community Chest
Richland Lutheran Church
Christ the King Church

The garbage and Trash Regulation which was originally written in 1950 was revised to provide for implementation of the commercial waste collection rate schedule and to make certain changes indicated by past experience, and the revised regulation has been submitted to the Community Council for their approval prior to final submission to the A.E.C

Collections were carried out according to schedule and, in accordance with policy, those routes normally scheduled for collection on February 22, which was observed as a work holiday, were made on February 23. Total weight of waste material collected and disposed of during the month was 1018 tons.

PARKS AND PUBLIC GROUNDS

At the direction of the A.E.C. responsibility for performance of maintenance work at the Richland Cemetery which was formerly assigned to this unit was transferred to the Richland School District effective February 28, 1955. Equipment normally required in maintenance at the cemetery has been transferred to the School District, also at the direction of the A.E.C.

Fertilizing of all lawn grass areas is now in process.

Weed burning and general clean-up of all areas within the community were continued during the month.

Preparation of ball diamonds for the coming play season was started the latter part of February.

Routine maintenance of all parks buildings, equipment, and grounds was continued.

RECREATION

The annual Model Train Races were held at the Community House on February 5.

A Valentine dance was held in the Community House by the Hi-Spot on February 14.

The Rec-A-Teers held a Valentine dance in the Social Hall of the Community House on February 17.

PUBLIC WORKS AND RECREATION UNIT

Recreation (Continued)

The Altrusa Club held a bridge party at the Community House on February 21 and donations were for the benefit of a scholarship sponsored by this club.

The city championship finals of the "Hoop Shoot" were held during the half-time of Chief Joseph vs. Carmichael Junior High basketball game.

The Adult Table Tennis League concluded its schedule in the last week of February.

ATTENDANCE STATISTICS - February 1955

	No. of Sessions	Youth	Adults	Sub-Total
A. Community House				
Adult Table Tennis League	3		27	27
Arts & Crafts Class	7	74	8	82
Ballroom Dancing	4	138	8	146
Elementary Movies	4	727	60	787
Elementary Square Dancing	4	563	44	607
Fencing	3		16	16
Games Room (Open Play)	20	1 201	147	1 348
Junior Square Dancing	4	292	42	334
Minnesingers	5	291	84	375
Tumbling	4	36	19	55
Model Train Races	1	30	90	120
Rec-A-Teers	4		375	375
Hi-Spot	8	2 364	29	2 393
Int. Folk Dancers	3		29	29
Junior Sportsmen Club	1	12	4	16
Junior Stamp Club	2	11	13	24
Richland Rod & Gun Club	1	11	117	128
Y-Supper Club	2	34	34	68
Youth Council	1		8	8
Miscellaneous Bookings	55	243	1 163	1 406
Total Community House	136	6 027	2 317	8 344
B. Parks & Play Grounds				
School Activities - Columbia	15	4 500	120	4 620
Total Parks & Play Grounds	15	4 500	120	4 620
C. Summary				
Community House and Parks and Play Grounds total for February 1955.	151	10 527	2 437	12 964
Calendar Year to Date				25 390

COMMUNITY OPERATIONS SUB-SECTION
WATER AND SEWERAGE UTILITIES UNIT
MONTHLY REPORT
FEBRUARY 1955

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	5	18
Transfers Out	0	0
Transfers In	0	0
New Employees	0	0
Terminations	0	0
Total End of Month	5	18

DOMESTIC WATER

Normal operations were continued throughout the month. Richland wells are out of service for construction to complete work on new well header line and for repair work on chlorination building at 1182 reservoir.

When construction forces removed part of the chlorinator house flooring at 1182 reservoir, it was found that the wood floor joists were about 75 percent rotted away. Some repair work had previously been planned on this building but when this condition was found we decided to replace the wood floor with concrete. This work is now about 90 percent complete.

Water meters were installed during the month to the following locations:

Richland J.C.C. Clubhouse, Parkway Pumps, Skyline Theater, and Waschers Service Station

3000 Area "A" well pump was pulled for routine overhaul. 3000 Area "J" well was pulled for maintenance work on oil sealed shaft tubing. Work on "J" well was completed and the pump re-installed. Overhaul work on Richland No. 12 well has been completed and the pump re-installed.

Domestic Water

	Well Production	Av. Da. Prod.	Total Consumpt.	Av. Da. Consumpt.
Richland	0	0	81,690,700	2,917,500
North Richland	116,160,000	4,148,600	36,285,000	1,295,900
Columbia Field	51,735,200	1,847,600		
300 Area			49,527,000	1,768,800
TOTAL	167,895,200	5,996,200	167,502,700	5,982,200

Maximum daily production was 8,086,600 on February 14, 1955. Maximum daily consumption was 6,934,000 on February 21, 1955.

WATER AND SEWERAGE UTILITIES UNIT

SEWERAGE SYSTEM

Normal operations were continued throughout the month. The No. 3 pump at the sewage lift station previously reported out of service awaiting repairs has been repaired and returned to service.

Some operational difficulty was encountered with the primary digester at the sewage treatment plant, but has apparently been overcome at present.

Approximately 90,000 gallons of sludge was pumped to the drying beds during the month.

The routine annual sewer flushing program is about 85 percent complete.

SEWAGE

Plant No. 1	Total Flow	28,510,000	Average Daily Flow	1,018,200
Plant No. 2	Total Flow	51,869,000	Average Daily Flow	1,852,400
TOTAL		80,379,000		2,870,600

IRRIGATION CANAL

The irrigation canal is in service supplying water to the 3000 Area percolation basin. That portion of canal between the penstock and the wood flume at the Government Airport has been cleaned and flushed during the month.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
February 1955

ORGANIZATION AND PERSONNEL	EXEMPT	NON-EXEMPT
Employees - Beginning of Month	4	8
Transfers In	0	0
Transfers Out	0	0
New Hires	0	1
Terminations	0	1
End of Month	4	8

GENERAL

Circulation

Books	18,301	
Magazines	530	
Pamphlets	74	
Records	898	
Inter-Library Loans	50	
Grand Total	19,853	

Current Book Stock

Books added this month	359	
Books withdrawn this month	16	
Grand Total	33,979*	(Corrected figure)

Registration

Adult	150	
Juvenile	53	
Grand Total	203	
Total Registered Borrowers	18,827	
Children's Story Hour Attendance	569	
Meetings in North Hall	11	

Community Operations
Library Unit

A regular Tuesday night record listening hour was started on February 8. It is planned for these programs to feature new library records, music of one composer, recordings of one type of music and requests from library patrons.

Special Valentine story hours were held this month for both pre-school and elementary school age children. Movies were shown as a special feature of both activities. Attendance at the two sections of the pre-school special story hour was 165 and at the elementary school age story hour was 135. Two "Brownie" Girl Scout groups and two kindergarten groups from John Ball School made special visits to the library. Seventy-three children were included in these visits. Mrs. Joyce Bliss, Children's Librarian, talked to the Brownie groups on how to use the library and told a story to the kindergarten groups.

During the month, Mrs. Joyce Bliss, spoke at the Kiwanis luncheon and to a meeting of the Richland Jaycettes on the subject of children's books and reading.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT - FEBRUARY 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		
Security and Patrol	490	480		10 (a)
Fire Protection	135	137	2 (b)	
Office Auxiliaries	113	117	4 (c)	
Telephone	79	78		1 (d)
TOTALS	923	918	6	11

NET DECREASE: 5

(a) - Security and Patrol

1 - New Hire
1 - Reactivated
8 - Transferred out
3 - Deactivated
1 - Termination

(b) - Fire Protection

2 - Transferred in

(c) - Office Auxiliaries

12 - New Hires
1 - Transferred in
9 - Transferred out

(d) - Telephone

1 - Deactivated

FIRE PROTECTION UNIT

Fire Responses

Construction	2	Loss ----
HAPO	4	Loss $45.00
TOTALS	6	$45.00

Safety and Security Meetings

Number of Security meetings	12
Number attending meetings	82
Number of Safety meetings	24
Number attending meetings	182

Drills Held During February

Outside drills held	114
Inside drills held	119

49,250 feet of fire hose and 1,004 feet of ladders were used for drill purposes during February.

Three Information Meetings were held with seven members attending each meeting; exempt and non-exempt.

Five Round Table Meetings were held with seven members attending each meeting; non-exempt.

Fire Protection officers held five classes on fire extinguishers which were attended by 72 people of various departments.

Fire Extinguishers

Inspected	1,295
Installed	14
Tested	1,175
Delivered to new locations	8
Seals broken	18
Serviced	280
Weighed	1,005

Gas Masks

Inspected	72
Serviced	45

OFFICE AUXILIARIES SUB-SECTION

Plant Mail Unit

Special assignments included preparation and mailing of Organization Directories for Salary Administration, Year End Review, 18 Organization & Policy Guides, eight separate distributions of safety material, Monograms and Public Health Bulletins. A steady flow of addressograph material all through the month was processed.

A complete review of the outer area mail runs was made and the timing and mail boards revised where needed to meet requirements and schedules.

Nomenclature changes are being made in the addressograph lists to conform with the changes reflected in the new Organization Directory.

Types and Pieces of Mail Handled	January	February
Internal	4,321,107	4,579,596
Postal	86,993	81,412
Special	1,781	2,202
Registered	10,287	10,455
	4,420,168	4,673,665
Total Postage used	$2,794.39	$3,042.89
Total teletypes handled	2,545	2,943
Total store orders handled	816	339

Addressograph Type of List	January Number of Runs	January Total Copies	February Number of Runs	February Total Copies
Plate name list	114	164,385	116	169,289
Housing list	15	44,360	17	36,971
Payroll list	10	35,602	12	49,267

	January	February
Total new plates	3,659	2,843
Total corrected plates	2,952	3,655
	6,611	6,498

Printing Unit

During the month, 700 copies of the new Plant Organization Directory were completed and delivered. Some other significant printing jobs completed during the month were:

Hanford Safety Report 1954
Bus Card (Secure Your Area) AEC
Poster (Secure Your Area) AEC
Bus Card (Check Identification) AEC
Poster (Check Identification) AEC
60,000 Copies, form G-59-DS - For Enclosure Slip
60,000 Copies, form DT-149-DS - Authorization for Use of Motor Pool Vehicle.

A general improved packing procedure for printed forms and other material distributed by Stores was instituted. The new procedure provides breakdowns in the count by more frequent and varied interleafing thus saving Stores' personnel counting time, preventing waste of forms and more accurate accountability records.

Printing Unit (Contin.)

Work Completed	January	February
Orders received	411	389
Orders completed	372	382
Average orders on hand	74.1	85.8
Copies printed	1,133,223	1,097,345
Negatives masked	664	723
Negatives processed	701	886
Photo copy prepared	421	341
Litho plates processed	752	903

Stenographic Unit

Five stenographers and two stenographer-typists were assigned to the Stenographic Unit in February allowing five transfers to permanent assignments. Work assignments sent to the Unit were heavier than usual, allowing only sixteen loan assignments to be made. Many requests were made for long term (for example, two employees for two months) temporary assignments which were impossible to grant due to small number of employees and the heavy work load.

Large or particular rush assignments during the month included a two and a half day deadline on 292 duplimats for Salary Administration; 54 hours on classified tape recording transcription for AEC; 73.5 hours on typing duplimats, collating and binding manuals for Plant Engineering for a Welding Instruction lecture course; 131.5 hours typing duplimat and xerographic masters for Manufacturing Cost; 171.5 hours of tape recording transcription of Radiological Sciences Department training lectures; 165 hours for Chemical Development Sub-Section operating manual; 54.5 hours typing duplimats, letters and other miscellaneous work for Reactor Process; 92 hours for Radiological Standards Unit on letters, duplimats and other miscellaneous work.

Breakdown of Hours	January	February
Holiday and vacation time	112	48
Meeting time	4	6.5
Absentee time	0	12
Machine transcription	17.5	260.5
Letters	7.5	58.5
Rough drafts	77.5	0
Dittos, duplimats and xerography	330	445.5
Miscellaneous	365	289
Training	242	144
Unassigned time	23.5	37
Total	1,179	1,301
Employees on loan to other units	965	812
Grand Total	2,144	2,113

Duplicating Unit

On February 21, the duplicating office located in 101 Building, 3000 Area, was transferred to 1171 Building. The move was made at the request of Transportation Section supervision in order to assist them in obtaining priority duplicating service on bus schedule changes, etc. The new location should also be more convenient to Central Stores personnel. Rental costs will be reduced, since less space is being utilized.

Steadily increasing workloads in 100-K Area made it necessary to install one additional model 80 duplicator at that location this month. To illustrate the growth, 36,417 copies were reproduced in 100-K in December, 61,101 copies in January, and 71,324 copies in February. The machine installed was moved from 760 Building, thereby avoiding the necessity of purchasing additional equipment.

A total of 943,609 copies were reproduced in all Duplicating Unit offices this month. This figure is higher than any of those previously reported during this fiscal year, and reflects a general increase in workloads throughout the past six months.

	January	February
Orders Received	3,295	3,710
Orders Completed	3,251	3,683
Orders on Hand	189	201
Offset Plates	14,882	15,904
Offset Copies	857,110	943,609
Verifax Masters	2,192	3,030
Verifax Copies	7,302	11,575
Ditto Masters	261	285
Ditto Copies	3,513	4,846
Xerox plates	1,480	1,560
Ozalid Masters	9	27
Ozalid Copies	32	84

Office Equipment Unit

Office Furniture

The Fiscal 57 and Revised Fiscal 56 Budget for HAPO office furniture and machines was submitted to Financial Department.

A survey of warehouse space required to house office furniture inventory stocks was made with Stores personnel to determine future space requirements. It was estimated that approximately 25% of space now being used could be released as of July 1, 1955.

Approximately 50% of furniture requirements for 200-East Purex facilities was delivered during the month.

The expendable office furniture inventory account 93 was valued at $18,830 on January 31, 1955, or an average of 3.2 months supply on hand.

There was a total of 769 debit and credit store orders processed through Stores during the month or an average of 43 orders per working day.

Office Furniture (Contin.)

Installation of special modification kit on fireproof file cabinets is approximately 75% complete.

The following is a detail of number of pieces of furniture handled during the month:

Item	Issued	Received	Salvage
Bookcase	3	1	0
Blackboard	16	0	0
Chairs	337	229	42
Costumer	43	14	3
Card File	7	13	0
Cabinet	77	72	32
Desk	136	111	7
Table	93	152	3
Daveno	16	4	0
Miscellaneous	426	136	0

Fifty-six locksmith and 38 routine minor maintenance service and work orders were issued during the month.

Office Machines

Total office machines in service and stock as of the 20th of February, 1955, was 4,685 or a net reduction of 229. One hundred and one machines were excessed from General Electric Stock and 135 machines excessed by Kaiser Engineers.

One ozamatic ozalid machine was received and installed in Stores Receiving Unit. This machine will be used to copy a receiving report master from purchase order and reproduce necessary copies for distribution at time of receiving material.

A new model Victor Multiplier Adder was shown to a group of procedure, cost and financial employees. The demonstration was given by the McMullen Office Supply representative.

Office Machine Repair Unit

Arrangements were made to obtain Safety Unit's assistance in attempting to educate field users of office equipment not to use two conductor extension cords with three prong office machines. Some difficulty is being experienced with the third prong being removed from the equipment after Office Machine Repair has stood the expense of converting from two prong to three prong according to standards.

Royal Typewriter Company has furnished us with 25 new type micro-switch damping mechanisms for installation on certain models of their machines to prevent excessive carriage return impact which has caused a serious maintenance problem. Two test assemblies have been installed and early indications are that improvements will be obtained.

Semi-annual and quarterly inspections were made on hospital scales and attendance time recorders respectively during the period.

Office Machine Repair Unit (Contin.)

All well house water meters were checked in preparation for increased Spring and Summer water useage.

Repair tickets were processed as follows:	January	February
	570	591

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

CA-606 Additional Office Space - Central Stores Warehouse: Rough draft of preliminary study of office and warehouse space requirements, as requested in AEC letter dated January 18, 1955, has been submitted for review.

--- Roads, Walks and Storm Sewers - 700 Area: Project proposal forwarded for review, signature of Manager, Finance, and submission to AEC.

Eleven office moves were made during the month.

Eight Hauserman partition installations were made in the 700 Area and partitions were provided for one installation in 300 Area and one in 100 Area.

Approximately 670 lineal feet of partition is scheduled for shipment about March 20.

Photography Unit was moved from 69-X to 717-A Building.

Employee Communications and Public Relations Section was moved from 705 to 770-A Building, and 705 Building space was assigned to Employee Practices Section.

Graphics Unit personnel is scheduled to move to 717-A in March. Space which they vacate in 713 Building will accommodate personnel increases in Procedures and Computing Section.

The AEC advises that their Operations group is adding seven to eight employees and have requested space vacated by special study group in third wing of 703 Building.

Engineering personnel transferred in from outer operating areas were housed by rearranging space in Buildings 762 and 760, and by assignment to temporary office quarters in 723 Building.

General Maintenance

Fire alarm system was revised and 90 feet of shelving installed in 717-A Building. Interior cycle painting program was completed in this building.

Two Hauserman office enclosures were installed in 713-A Building.

Hauserman partitioning was installed in 770-A Building, lights and electrical circuits were revised, and buzzer system was installed. Interior cycle painting of this building was completed.

Office enclosures in 705 Building were rearranged, using 36 feet of Hauserman partitioning. Three doors were rehung, two pass windows installed, and radiators were relocated.

General Maintenance (Contin.)

First floor ladies' restroom in 761 Building is being remodeled to provide increased lounge space.

Hardware cloth, on studs, was installed in north end of 703 Building basement to provide space for Patrol winter clothing storage. Hanger rods and cabinets were also provided.

Approximately 40 lineal feet of filler was installed over Hauserman partitions in 702 Building to provide enclosures for supervisors.

Staggered plywood screens were installed in aisleway of 760 Building drafting room to reduce distraction of draftsmen. Small Hauserman enclosure was installed to segregate receptionist from drafting room proper.

Maintenance work at the Transportation Facility included replacement of a door between office and shops section; rehanging of a metal door in connection with building fire protection; installing abrasive safety strips on shower room floors; installing cooling extensions on oil burner Fyr-eye controls, installing alarm system on 1171 Building boiler, set to ring when pressure drops below normal; installing emergency lamp circuit in Heavy Equipment shop and outlet circuits in bus lane pits; replacing lids on underground trash pits in outdoor bus lanes; installing 12 bus Kimstarts.

Two truck gates and 50 lineal feet of hog wire fence were installed at the Stores Excess Yard.

Fence enclosing 700 Area was checked, and broken posts were stubbed and banded. One thousand survey stakes were fabricated for Survey group.

Cross walks inside the outer areas were repainted for improved safety.

Stairwell in fourth wing of 703 Building was repainted.

A number of items of office furniture were repainted.

Miscellaneous sign work and glazing was performed for 700, 1100 and outer areas.

Repairs were made to two Hauserman panels, damaged by lift truck at Central Stores warehouse.

Stainless steel packing sleeves were fabricated for Community irrigation pumps, and one set of journals was made for domestic well pump.

Hydrostatic tests were made on seven air compressors for Heavy Equipment.

One tube was replaced in No. 4 boiler in 784 Building.

Seasonal repadding of air conditioners is approximately 30% complete.

Scheduled locksmith work for the 100-K Area is approximately 90% complete.

Vault door combinations in 234-5 Building were repaired.

Five safes were opened and repaired in the 100-K Area.

General Maintenance (Contin.)

Alterations and installations of door locks in the 713 Building were made. Twenty extension cords and 30 portable tools were inspected and repaired for Transportation Facility.

Repairs were made to hot plates and muffle furnace in the Bio-Assay Laboratory.

Personnel from our mechanical crafts were made available to Manufacturing, on overtime basis, to assist in performance of special work in the operating areas.

Building Services

Floors in 770-A Building were resealed.

Linoleum and asphalt tile floor covering in 717-A Building was scrubbed and sealed.

At the request of Transportation Section an additional janitor has been requisitioned for the 1170 and 1171 Buildings, inasmuch as work volume is greater than originally estimated.

Steam Operation

Nos. 1, 2 and 3 boilers were in service at the beginning of the month, with No. 4 in reserve.

On February 8, No. 4 boiler was placed in service and No. 1 removed from the line for several minor repairs. Nos. 2, 3 and 4 boilers remained in service for the remainder of the month, with No. 1 in reserve.

The quantity of steam generated at the 784 plant was 2.5% greater than for the same period of the previous year.

The flexible joint air line at the acid tank car-unloading platform was replaced with an air hose to facilitate connecting lines when unloading a tank car of acid. Flexible joints removed in above change were then installed on acid loading line used when exporting acid from our storage tank to 300 Area.

Coal Consumed: 1,775.60 net tons.

Steam generated:	25,284.5 M. lbs.
Steam leaving plant:	21,991.9 M. lbs.
Steam delivered:	19,841.5 M. lbs.
Total water softened:	3,277,000 gallons
Total soft water sent to Kadlec Hospital:	77,110 gallons
Total soft water sent to 784 Heating Plant:	3,199,890 gallons

TELEPHONE SUB-SECTION

Two representatives of the Telephone Sub-Section met with representatives of the Atomic Energy Commission and Army to review Army plans for expanding their telephone cable system in North Richland and made recommendations for release of two unused project cables for immediate reuse by the Army.

Telephone (Contin.)

Telephone supervisors conferred with the Plant Accounting Unit regarding methods of classifying and costing telephone capital items in connection with the establishment of Telephone Plant Accounts in accordance with F.C.C. Approved System of Accounts for Telephone Companies.

A new edition of the Plant telephone directory was received from the printer on February 28 and will be distributed on Saturday, March 5.

The Atomic Energy Commission was informed by the Automatic Electric Company, supplier of the equipment for the 100-K area exchange, that they would be unable to complete the installation by April 4, the contract date. A new date was not established.

Two minor injuries occurred during the month.

The Stromberg-Carlson Company, supplier of equipment for the new 700 Area exchange, is making satisfactory progress in the installation work.

Information was received from the Atomic Energy Commission indicating that the North Richland exchange building would be transferred to the Army on July 1, 1955 and that the telephone equipment should be removed as soon thereafter as possible.

During February there was a decrease of 58 telephones in service for major construction activities.

Plant Telephone Operations

Tested and tied-in a 26-pair cable lateral which was installed by Minor Construction to serve the 306 Building. Three dial lines and five telephones ware installed to provide service initially required.

Relocated a cable terminal at Minor Construction headquarters in White Bluffs to eliminate a hazardous work location and provide better wiring access.

In accordance with plans being made to relocate personnel in the 300 Area to the 3706 Building, the cable distribution system within the building was expanded to meet the expected requirements in addition to new facilities installed. Several sub-terminals were provided to eliminate the necessity for entering the building attic where radiation contamination exists.

Installed a 16-pair cable terminal at 200-East for use in providing service to several small buildings at the Purex Plant location.

Removed four direct trunks from service between 300 Area and North Richland exchanges and made revisions required to route this traffic through the Richland exchange.

Three man days were spent doing maintenance work on the 234-5 Building PAX system. This work is being performed on a non-routine basis and as the need is determined by Z-Plant operating supervision.

Completed readjustment of all uninstalled Automatic Electric Company switches intended for use in the 100-KBC dial exchange.

Plant Telephone Operations (Contin.)

Installed three additional voice-frequency repeaters in the 506-C Building.

Repaired sheath damage caused by an "A" frame hitting a 303-pair cable near the 2704-E Building.

Completed the installation of about 90% of the permanent telephones in 100-K Area

A 6-pair cable was installed to replace multiple drop wires serving the 717-A Building.

Cost estimates for replacing the T-Plant sound-powered PBX system with PAX system were furnished to the T-Plant Operations Unit.

An inspection was made on February 18, 1955, of tie-in and tip cables installed on Project CA-533 by Empire Electric Company. Minor exceptions noted have since been cleared. Start of electrical tests and tie-in of these cables is being purposely delayed to eliminate work interference with Stromberg-Carlson Company at the MDF and trouble from accidental tripping of heat coil springs.

Prepared Job Specification P-55-21 to cover cable tie-in of the 26-pair cable feeding the 306 Building, 300 Area.

Prepared report on cost, completion estimates and scheduling for proposed consolidation of Area Patrol radio rooms.

Completed revision of Inter-Area Trunk Cable Key Map and index (H-5-465).

Prepared Job Specification P-55-22 to cover installation of a 16 pair terminal in the 200 East area.

Completed traffic study on a total of 57 official telephone lines during the month of February.

Commercial Telephone Operations

Prepared ten engineering jobs for outside plant improvement.

Installed GFP-8708, a four-wire circuit to the AEC Airport. It is identical to and supersedes L-9818.

Completed 51 miscellaneous maintenance jobs whose need was discovered by inspection of outside plant and station installations.

Tagged and spliced the new tip cable in the Richland exchange to the tie cable to the 700 Area exchange (Cable 24).

Pulled in and spliced a 202-pair cable extending from Manhole A to Manhole No. 3. This separates the 770 Building service from downtown service from Manhole A on out. At the time of the 700 area exchange cutover, this will increase downtown distribution facilities by 101 pairs.

Replaced dial tone feed resistors with condensers in all local first selectors in the Richland Exchange.

Commercial Telephone Operations (Contin.)

Installed ten additional paystation adapters in the Richland exchange.

Without warning to the exchange maintenance personnel, the 440-volt 3-phase service to the Richland exchange was interrupted in order to test the emergency procedure. Execution of the emergency procedure was very satisfactory.

The Business Office Supervisor met with the partners of the Spencer-Kirkpatrick Insurance Company to explain the application and operating features of the 1A key telephone system. An order was received for the installation of a key system appropriate for their business.

Radio System Operations

On February 21, 1955, tests were made from the Civil Defense Mobile Control Unit located at the Prosser Barricade to a car located approximately three miles south of the Yakima barricade to determine if radio communications were possible between these two locations. It was found that the signals were not strong enough for communication between the two sites.

Recorded Science Forum programs on February 2, 9, 16 and 23.

Relocated paging and intercommunication master control station in 760 Building. (Drafting Room).

Moved master intercommunication station in 705 Building from Room 125 to Room 127.

Made special recordings on Columbia River near McNary Dam for "Inside Hanford" program.

Four radio station outages occurred during the month: KGB 513, Station No. 4 (Richland Electrical) was out of service from 3:40 PM to 4:15 PM (2-8-55) due to a defective relay; KKE 624, Station No. 5 (100D Patrol) was out of service from 8:45 AM to 9:54 AM (2-8-55) due to a tube failure; KKE 624, Station No. 15 (100-K Patrol) was out of service from 1:16 AM to 9:50 AM (2-16-55) due to tube failure -- reported at 8:05 AM; KGB 513, No. 1 was out of service from 9:45 PM to 10:25 PM on 2-25-55 due to tube trouble.

Statistical Data

	At 20th of February	Change From Previous Month	Change From Year Ago
Residential Subscribers	6011	- 29	≠ 170
Business Subscribers	482	- 4	- 23
Paystation Telephones	71	- 1	≠ 5
Official Subscribers:			
Richland Exchange	988	≠ 1	≠ 3
North Richland Exchange	236		≠ 19
Process Area Exchanges	1752	- 46	- 42
		- 79	≠ 132

Telephone

Statistical Data (Contin.)

New Service Requests Received During the Month:

For Residential Service	77
For Business Service	9
TOTAL	86

Backlog of Service Requests:

For New Residential Telephones	290
For New Business Telephones	0
For Residential Outside Moves	15
For Business Outside Moves	0
TOTAL	305

Service Orders Processed:

In connection with Residential and Business Service	376
In Connection with Official Service	446
TOTAL	822

Facilities - Installed, In Service and Available:

	Exchange Lines			Party Lines
	Installed	In Service	Available	Available
Richland	4050	3981	69	347
North Richland	600	424	175	110
Process Areas	2050	1648	410	---
	6700	6053	654	457

Radio Stations:	At 20th of February	Change from Previous Month	Change From Year Ago
Fixed Stations	35	0	∕ 17
Mobile Stations	155	0	∕ 11
	190	0	∕ 28

SECURITY AND PATROL SUB-SECTION

Document Report

Number of classified documents and prints unaccounted for as of February 1: 337
(104 of the above 337 documents are chargeable to E. I. du Pont de Nemours and Company)

Number of classified documents and prints reported as unaccounted for during February: 0

Number of classified documents and prints either recovered or downgraded in classification during February: 8
(None of the eight documents are chargeable to E. I. du Pont de Nemours & Company)

Number of classified documents and prints remaining unaccounted for as of March 1: 329
(104 of the above 329 documents are chargeable to E. I. du Pont de Nemours & Company)

The Non-Technical Document Review Board held two meetings during February and reviewed a total of 80 documents and five prints. Of this number

31 had their classification retained,
44 had their classification downgraded to "Official Use Only",
5 prints were downgraded to "Official Use Only",
4 were declassified, and
1 was not within the scope of the Board.

Security Education

Four items concerning security appeared in the GE NEWS during the month

There were 349 security meetings held and attended by 4,865 HAPO employees. A representative of the Plant Protection Services Unit showed one of the security films at some of these meetings as indicated below:

"Turn Left Across the Bridge" was shown at 20 security meetings, with an average attendance of 29 employees at each meeting.

"Words Are Weapons" was shown at five meetings, each with an average of 19 employees present.

"The Tallest Shadow" was shown at four meetings, each with an average attendance of 25 employees.

"Signal 99" was shown at one meeting with 50 people present.

"Only the River" was shown at two meetings, each with an average attendance of 22 people.

"The Man on the Left" was shown at four security meetings, each with an average attendance of 40 employees.

"The Case of the Smokeless Chimney" was shown at one meeting with 49 people present.

Security Education (Contin.)

GE Security Bulletin No. 91 entitled "Don't Forget to Remember" was issued February 17, 1955.

650 posters with the slogan "Check Identification" were posted in the plant areas during February.

100 copies of the poster with the security slogan "You Are the Key to Security" which was furnished by the Department of Defense, Washington, D.C., were posted in the areas.

1,100 leaflets with the same slogan "You Are the Key to Security" also furnished by the Department of Defense, were distributed to employees.

2,000 copies of the "A-B-C" pamphlet with the slogan "Demand Identification" were distributed to employees during February.

Five security poster boards were installed in the 200-E Area. 28 poster boards have been prepared for the 100-K Area and will be installed as soon as the carpenters are available. Security posters have been temporarily posted throughout the area.

"Parrot" mobiles were hung in the 100-D, 100-F, 200-W, and 300 Areas during February.

Organization and Policy Guide 15.3, entitled "Classified and/or Radioactive Material Pass", was issued February 7, establishing the policy for utilization of a pass for facilitating the movement of classified and/or radioactive materials (without inspection) within and between areas and perimeter barricades.

A procedure was established with the Traffic Unit and the Works Cashier's Office to attach a reminder to employee's expense checks and Confirmation of Travel to assure all necessary security clearances have been arranged for visit. This should eliminate delays and expense on the part of employees who have in the past failed to request AEC clearance prior to their departure.

Effective February 25, 1955, the 189-D Building, 100-D Area, was declassified as an "exclusion" area. However, during off-shift periods, regular inspections will be conducted by Patrol.

The list of Hanford Atomic Products Operation positions recommended for class "L" security clearance, previously submitted to the Hanford Operations Office, has been approved with the exception of four positions within the Power and Maintenance Sub-Section.

The annual inventory of "secret" Research and Development Reports is being conducted in accordance with General Manager Bulletin GM-SEC-5.

Seventy-eight employees of the General Electric Company received a "Q" security orientation talk and 16 employees received an "L" security orientation talk from either a representative of the Plant Protection Services Unit or a Patrol Supervisor during the month of February.

Statistical Report of Security Patrol Activities

	100-B	100-D	100-F	100-H	100-K	200-W	300
Pat Searches	84	84	47	74	48*	0	1
Escorts	20	17	11	124	78	19	59
Ambulance runs	1	1	2	1	4	2	8
Passes issued:							
One day temporary	20	10	6	7	7	41	71
Travel	0	0	0	0	0	0	88
Red Tag	130	109	150	16	38	439	70
Telephonic	0	0	0	0	0	0	16
Supervisor's Post Contacts	380	216	201	122	326	648	459

*Red Tag Pass procedure established February 8, 1955, in 100-K.

Other Patrol Activities (Computed by Hours):							300 & 700
Security File Check	153	219	191.3	388	287	304	2,072
Building Check	341	70.5	181	882	287	304	672

Arrest Report

Violations	Number of Violations	Cont'd Cases from Jan.	Cases Cleared	Pending	Fined
Illegal Parking	2	0	2	0	2
No Driver's License	0	1	0	1	0
Speeding	1	1	1	1	1
Total	3	2	3	2	3

Citation Tickets issued	3
Warning Tickets issued	47
Verbal Warnings	0

Patrol Training Activities

440 Patrolmen received classroom instruction during the reporting period.

193 Patrolmen attended firearms training during the same period.

Patrol Post Changes

On February 15, 1955, the 181-H Tower Post, 100-H Area, was discontinued and moved to 100-K Area.

On February 15, 1955, the 181-K Tower Post, 100-K Area, was established, having been moved from 100-H Area.

General

As a result of information received from the Atomic Energy Commission Security Division on February 1, the Hanford Atomic Products Operation established a special alert against sabotage, particularly in regard to sabotage devices within the plant areas.

All members of Security Patrol were realerted immediately. Production and Engineering Department Section Managers were also contacted in regard to this alert in order to disseminate the information among plant employees. A subsequent review of plant security meeting minutes reveals that the information was effectively disseminated. Until further notice, all Security Patrol personnel will be realerted a minimum of four times each month.

At 12:01 A.M., February 8, the 100-K Construction Area was converted to an Operations Area. At the same time, the classification was made as a security "limited" area, and the Red Tag Pass procedure was established at the 105-KE and 105-KW "exclusion" areas.

On February 26, Patrol Headquarters for the 200 Areas moved from 200-West area to 200-East area.

Work on repairing the Remington Rand filing cabinets in the 700 and 1100 Areas was completed. However, work in the other areas was approximately 65% complete at the end of the month.

The Security Audit and Investigation Unit to date has audited the classified holdings of 544 employees of the General Electric Company. A general investigation of security practices is also conducted in each case at the time of the audit in order that security performance may be individually evaluated and recorded. Audits are scheduled on an annual basis. In addition, audits and inspections of facilities involving sensitive operations are being conducted on a minimum of once a year.

Security Administration

Daily Badge Log Entries	2,467
"Q" Clearances	78
"L" Clearances	16
Formal "P" clearance issued	13
"P" Approval clearances issued	32
Category Access granted	32
Category Access withdrawn	53
Category Access revised	51
Number of Photographs for "A" badges	704
Number of Photographs for "B" badges	506
Number of persons rephotographed	78

Total of 696 Photo Identification Passes were laminated and issued.
Total of 704 "A" badges were assembled and distributed to the areas.
Total of 367 "A" badges were received from the areas.
Total of 134 "A" badges were received from the areas for repair.

Top Secret Clearances

Clearances for 43 employees were cancelled
69 employees were granted clearance by AEC Security
78 employees were requested for clearance.

HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING FEBRUARY 28, 1955

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT							
I. Visitors to this Works							
J. S. Smith General Electric Company New York, New York	Discuss public relations matters	G. L. Brown, Jr. K. F. Priest	2-14-55	2-17-55	X		100-F XXX 100-K 105-KW 300-L 303
II. Visits to other Installations							
J. J. Tagen to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Wage and salary classification conferences	J. Woodward	2-14-55	2-14-55	X		
J. J. Tagen to: Sandia Corporation Albuquerque, New Mexico	Wage and salary classification conferences	L. Fuller	2-14-55	2-14-55	X		
J. J. Tagen to: Bendix Aviation Corp. Kansas City, Missouri	Wage and salary classification conferences	B. Walter	2-15-55	2-16-55	X		
J. J. Tagen to: National Lead Company Fernald, Ohio	Wage and salary classification conferences	A. L. Culbertson	2-16-55	2-18-55	X		
J. J. Tagen to: Carbide and Carbon Oak Ridge, Tennessee	Wage and salary classification conferences	D. A. Overton	2-18-55	2-18-55	X		
J. J. Wagen to: Goodyear Atomic Corp. Waverly, Ohio	Wage and salary classification conferences	L. F. Lauxterman	2-18-55	2-18-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. J. Tagen to: Knolls Atomic Power Lab. Schenectady, New York	Wage and salary classification conferences	W. G. Urbon	2-21-55	2-21-55	X		
J. J. Tagen to: Argonne National Lab. Lemont, Illinois	Wage and salary classification conferences	A. F. Miller	2-28-55	3-1-55	X		
J. J. Tagen to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Wage and salary classification conferences	M. M. Bean	3-1-55	3-2-55	X		
ENGINEERING DEPARTMENT - ADVANCED ENGINEERING SECTION							
I. Visits to other Installations							
R. M. Fryar to: Knolls Atomic Power Lab. Schenectady, New York	Conference on sodium technology	F. E. Crever	2-7-55	2-10-55	X		
P. F. Gast to: Atomic Power Study Group Schenectady, New York	Discuss atomic power problems	B. R. Prentice	2-2-55	2-8-55	X		
W. K. Woods to: North American Aviation Downey, California	Attend sodium reactor experiment review meeting	R. K. Holbrook	2-3-55	2-4-55	X		
W. K. Woods to: Atomic Power Study Group Schenectady, New York	Discuss atomic power problems	B. R. Prentice	2-7-55	2-8-55	X		
W. K. Woods to: Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL assistance to Hanford Program	R. D. Bennett	2-8-55	2-8-55	X		
ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION							
I. Visitors to this Works							

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. Barnard Guided Missiles General Electric Company Schenectady, New York	Conference on engineering test reactor	R. J. Schier	2-28-55	3-1-55	X		100-K 105-KW 300-L 303
II. Visits to other Installations							
A. B. Greninger to: Knolls Atomic Power Lab. Schenectady, New York	Engineering consultation on assistance to Hanford Program	F. K. McCune K. R. Van Tassel	2-7-55	2-11-55	X		
A. B. Greninger to: Atomic Energy Commission Nevada Test Site Yucca Flats	Observations of weapons testing	not applicable	2-20-55	2-25-55	X		
ENGINEERING DEPARTMENT - DESIGN SECTION							
I. Visits to other Installations							
E. L. Armstrong to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on reactor technology	V. D. Nixon	2-23-55	3-5-55	X		
E. L. Armstrong to: Atomic Power Study Group Schenectady, New York	Consultation on reactor technology	J. R. Wolcott	2-23-55	3-5-55	X		
R. A. Huggins to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on reactor technology	V. D. Nixon	2-23-55	3-5-55	X		
R. A. Huggins to: Atomic Power Study Group Schenectady, New York	Consultation on reactor technology	J. R. Wolcott	2-23-55	3-5-55	X		
A. J. McCrocklin to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on reactor technology	V. D. Nixon	2-23-55	3-5-55	X		

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
A. J. McCrocklin to: Atomic Power Study Group Schenectady, New York	Consultation on reactor technology	J. R. Wolcott	2-23-55	3-5-55	X		
W. H. Clymer to: Knolls Atomic Power Lab. Schenectady, New York	Conference on contract methods and procedures	W. W. Smith	2-24-55	2-25-55	X		
ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS							
I. Visitors to this Works							
M. B. Andrew Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss waste handling, decontamination and fuel handling	O. H. Greager	2-23-55	2-25-55	X		700
N. E. Berry Mallinckrodt Chemical Works St. Louis, Missouri	Discuss uranium fuel element technology	V. R. Cooper J. M. Fouts	2-24-55	2-24-55	X		100-K 105-KE
W. M. Cashin Knolls Atomic Power Laboratory Schenectady, New York	Discuss Hanford Assistance Program	A. G. Blasewitz V. R. Cooper	2-28-55	3-4-55	X		100-D XXX 202-A 200-W Redox 300-L 303; 700
J. G. Christ Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss non-destructive testing	E. C. Wood	1-31-55	2-5-55	X		100-B 105-B 300-L 303; 700
D. H. Cornell Knolls Atomic Power Laboratory Schenectady, New York	Conference on KAPL-120 in-pile water loop modification	G. E. Wade	2-17-55	2-18-55	X		100-D XXX 100-H 105 100-K 105-KW; 700
R. W. Coyle Aircraft Nuclear Propulsion Idaho Falls, Idaho	Maintain liaison pertinent to establishment of in-pile loop facility	J. A. Berberet	1-1-55	6-30-55	X		100-B 105-C 100-D XXX 100-K 105-KW 300-L XXX; 700
P. C. Daly Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss LSR in-pile water loop facilities	J. A. Berberet	2-14-55	2-16-55	X		100-D 105 100-K 105-KE,KW 100-H 105 300-L XXX; 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
M. R. Fenske Penn. State College State College, Pennsylvania	Discussion on contract AT(30-811)	R. B. Richards	2-14-55	2-18-55	X		100-D 105 202-A 300-L XXX; 700
R. L. Geddes Stone and Webster Eng. Corp. Pittsburgh, Pennsylvania	Discuss waste handling, decontamination and fuel handling	O. H. Greager	2-23-55	2-25-55		X	700
T. J. E. Glasson Knolls Atomic Power Laboratory Schenectady, New York	Conference on KAPL-120 in-pile water loop modification	G. E. Wade	2-17-55	2-18-55		X	100-D XXX 100-H 105 100-K 105-KW; 700
A. N. Holden Knolls Atomic Power Laboratory Schenectady, New York	Discuss Hanford Assistance Program	A. G. Blasewitz V. R. Cooper	2-28-55	3-4-55		X	100-D XXX 202-A; 200-W Redox 300-L 303; 700
D. J. Holtslag Aircraft Nuclear Propulsion Cincinnati, Ohio	Assist in heat transfer calculation for ANP at Hanford	J. A. Berberet	2-7-55	2-8-55		X	100-B 105-B,105-C 100-D XXX 100-K 105-KW 300-L 303; 700
M. Kratzer U. S. Atomic Energy Comm. Washington, D. C.	Thorex discussion and isotopic composition limits for uranium metal	V. R. Cooper G. Sege R. J. Sloat	2-1-55	2-1-55		X	300-L XXX
J. R. LaPointe Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss waste handling, decontamination and fuel handling	O. H. Greager	2-23-55	2-25-55		X	700
W. M. Leaders Mallinckrodt Chemical Works St. Louis, Missouri	Discuss uranium fuel element technology	V. R. Cooper J. M. Fouts	2-24-55	2-24-55		X	100-K 105-KE
R. R. Lee Aircraft Nuclear Propulsion Cincinnati, Ohio	Coordinate experiments between Hanford and GE-ANP	J. A. Berberet	1-13-55	6-30-55		X	100-B 105-B,105-C
P. Loewenstein Nuclear Metals, Inc. New York, New York	Discuss zirconium	V. R. Cooper E. A. Eschbach	2-8-55	2-9-55		X	300-L 303 700

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
H. Lowenberg Vitro Engineering Division Vitro Corporation New York, New York	Discuss Pu-metal isolation in connection with their Reactor Handbook project	R. B. Richards	2-28-55	3-2-55	X		202-A 200-W 234, 235 300-L XXX; 700
T. T. Magel Nuclear Metals, Incorporated New York, New York	Discuss zirconium	V. R. Cooper E. A. Eschbach	2-8-55	2-9-55	X		300-L 303 700
R. C. Regier Phillips Petroleum Company Idaho Falls, Idaho	Analytical consultation	M. J. Sanderson	1-31-55	2-2-55	X		200-W XXX 300-L XXX 700
R. H. Simon Knolls Atomic Power Laboratory Schenectady, New York	Discuss reactor core instrumentation	M. W. Carbon S. S. Jones	2-28-55	3-1-55	X		300-L XXX
J. Singer Bridgeport Brass Company Bridgeport, Connecticut	Effects of fabrication processes on crystallographic orientation or uranium	S. H. Bush W. V. Cummings	2-15-55	2-16-55	X		100-D 105 300-L 303
T. M. Snyder Knolls Atomic Power Laboratory Schenectady, New York	Discuss Hanford Assistance Program and instrumentation	A. G. Blasewitz V. R. Cooper	3-2-55	3-4-55	X		100-D XXX 202-A 200-W Redox 300-L 303; 700
K. R. Street, Jr. Radiation Laboratory University of California Berkeley, California	Chemical fabrication and HAPO assistance on Whitney Project	J. J. Cadwell	2-1-55	2-2-55	X		200-W 234, 235 300-L XXX
A. D. Tevebaugh Knolls Atomic Power Laboratory Schenectady, New York	Discuss Hanford Assistance Program and instrumentation	A. G. Blasewitz V. R. Cooper	3-2-55	3-4-55	X		100-D XXX 202-A 200-W Redox 300-L 303; 700
P. A. Walker, Jr. Pennsylvania State College State College, Pennsylvania	Graphite oxidation studies on contract AT (30-1)-1710	L. P. Bupp	2-10-55	2-12-55	X		100-H 105 300-L XXX

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
D. M. Wilsey All States Employee Schenectady, New York	Instrumentation work on in-pile water loop	G. E. Wade	12-31-54	5-1-55	X		100-B 105-B,105-C 100-D XXX 100-F XXX 100-H 105 100-K 105-KW 300-L XXX
II. Visits to other Installations							
J. M. Atwood to: Argonne National Lab. Lemont, Illinois	Planning committee for AEC Corrosion Symposium	W. E. Ruther	2-3-55	2-4-55	X		
L. A. Hartcorn to: National Lead Company Fernald, Ohio	Attend meeting to discuss preparation of standard inclusion rate chart for uranium	A. E. Guay	2-23-55	2-24-55	X		
H. A. Johnson to: Mallinckrodt Chemical Wks. St. Louis, Missouri	Consultation regarding feed materials	A. E. Ruehle J. A. Fellows	2-20-55	2-26-55	X		
H. A. Johnson to: National Lead Company Fernald, Ohio	Consultation regarding feed materials	C. E. Polson	2-20-55	2-26-55	X		
R. S. Paul to: Radiation Counter Lab. Chicago, Illinois	Consultation on spectrometer for projects CG-578 and 579	Dr. Wakefield	2-5-55	2-5-55	X		
R. S. Paul to: Atomic Energy of Canada Chalk River, Ontario, Canada	Attend Reactor instrumentation meeting	-	2-7-55	2-9-55	X		
R. B. Richards to: Argonne National Lab. Lemont, Illinois	Attend Reactor Handbook Volume Editor's meeting	A. F. Owings	2-26-55	2-28-55	X		
J. W. Riches to: Bridgeport Brass Company Adrian, Michigan	Consultations on metallurgy of uranium	R. M. Treco R. M. Treco	2-11-55 2-14-55	2-11-55 2-18-55	X 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: Nuclear Metals, Inc. Boston, Massachusetts	Consultation on metallurgy of uranium	A. R. Kaufman	2-15-55	2-15-55	X		
A. E. Smith to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Process and product consultation	R. D. Baker W. W. Carter G. H. Tenney	2-28-55	3-5-55	X		
A. E. Smith to: Dow Chemical Company Rocky Flats Laboratory Boulder, Colorado	Process and product consultations	I. B. Venable E. J. Walko	2-28-55	3-5-55	X		
MANAGEMENT							
I. Visits to other Installations							
W. E. Johnson to: U. S. Atomic Energy Comm. Nevada Test Site Yucca Flats, Nevada	Observation of weapons testing	not applicable	2-27-55	3-3-55	X		
MANUFACTURING DEPARTMENT							
I. Visitors to this Works							
N. E. Berry Mallinckrodt Chemical Works St. Louis, Missouri	Consultation on fuel element preparation	W. M. Mathis	2-23-55	2-25-55	X		100-B 105-C 202-A 200-W Redox, 221-U 300-L 303
W. M. Leaders Mallinckrodt Chemical Works St. Louis, Missouri	Consultation on fuel element preparation	W. M. Mathis	2-23-55	2-25-55	X		100-B 105-C 202-A 200-W Redox, 221-U 300-L 303
II. Visits to other Installations							
W. G. Albert to: Rand Corporation Santa Monica, California	Using Rand computing equipment for production scheduling operations research program	J. D. Madden M. L. Jancosa W. Orchard-Hays D. M. Fort	2-21-55	2-25-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
D. McDonald to: Rand Corporation Santa Monica, California	Using Rand computing equipment for production scheduling operations research program	J. D. Madden M. L. Jancosa W. Orchard-Hays D. M. Fort	2-21-55	2-25-55	X		
E. G. Pierick to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Consultation on process equipment and product	R. D. Baker W. W. Carter G. H. Tenney	2-28-55	3-5-55	X		
E. G. Pierick to: Dow Chemical Company Rocky Flats Laboratory Boulder, Colorado	Consultation on process equipment and product	I. B. Venable E. J. Walko	2-28-55	3-5-55	X		
OPERATIONS RESEARCH STUDY							
I. Visits to other Installations							
L. W. Smith, Jr. to: Rand Corporation Santa Monica, California	Discuss mathematical formulations on production scheduling operations research program	J. D. Madden M. L. Jancosa W. Orchard-Hays D. M. Fort	2-14-55	2-15-55	X		
P. M. Thompson to: Rand Corporation Santa Monica, California	Using Rand computing equipment on production scheduling operations research program	J. D. Madden M. L. Jancosa W. Orchard-Hays D. M. Fort	2-21-55	2-25-55	X		
LEGAL SECTION							
I. Visits to other Installations							
G. C. Butler to: Knolls Atomic Power Lab. Schenectady, New York	Legal work and contracts	F. K. McCune	2-28-55	3-11-55	X		
RADIOLOGICAL SCIENCES DEPARTMENT							
I. Visitors to this Works							

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
M. E. Ensminger State College of Washington Pullman, Washington	Consultation on current sheep and pig experiments	H. A. Kornberg	2-2-55	2-2-55	X		100-F 108-F
C. P. Straub U. S. Public Health Services Oak Ridge National Laboratory Oak Ridge, Tennessee	Discuss waste disposal practices and problems	H. M. Parker D. W. Pearce Z. E. Carey	2-14-55	2-15-55	X		209-W 221-U 300-L XXX 700
II. Visits to other Installations							
L. K. Bustad to: U. S. Atomic Energy Comm. Nevada Test Site Yucca Flats, Nevada	Observe tests as requested by Commission on hazards of atomic bomb fall-out to animals	S. Woodruff	2-28-55	3-5-55	X		
G. E. Driver to: U. S. Atomic Energy Comm. Nevada Test Site Yucca Flats, Nevada	Assignment to Program 30	R. W. Johnston	2-17-55	4-18-55	X		
P. W. Nickola to: U. S. Atomic Energy Comm. Nevada Test Site Yucca Flats, Mercury, Nevada	Meteorological consultation on phenomena of radioactive fall-out in Project 37.2 CETG	K. H. Larson	1-29-55	4-20-55	X		

RADIOLOGICAL SCIENCES DEPARTMENT

FEBRUARY 1955

SUMMARY

Thirty-two informal, 6 Class I and 2 Class II radiation incidents were recorded. Neither Class II incident was of major significance. The high exposure of the previous month, expected to produce a radiation reaction, did not do so. One of the Class I incidents involved an internal deposition of plutonium of about 25% of the permissible limit.

Although there was no significant release of radioruthenium through the stack monitors, ground deposition, both local to the stack, and in residential areas, apparently increased by a factor of two; more favorable survey conditions could have contributed in part to the observed increase.

The main interest in stack emission returned to the former field of I^{131}. Throughout the month, emission from both Redox and T Plants was above the desirable limit. Continuation of such releases would require modification of production plans.

Relief from the formal limit for P^{32} contamination of whitefish has been sought by measurement of uptake directly from fish tissue. No useful reduction compared with the conventional uptake from inorganic phosphate feeding was obtained.

Additional cases were found in which uptake of a specific nuclide was increased, rather than decreased, by the presence of carrier isotope. This may have fundamental significance in many waste disposal studies as well as requiring a critical re-evaluation of many tracer studies. Waste disposal studies continue the trend of denying the suitability for ground disposal of various wastes. Acceleration of hydrological studies in this area of activity is currently limited by the inadequate well-drilling program.

RADIOLOGICAL SCIENCES DEPARTMENT

FEBRUARY 1955

The month end force of 395 included 38 supervisors, 89 engineers and scientists, 23 clerical and 245 other personnel.

Number of Employees on Payroll

Beginning of month	387
End of month	395
Net increase	8

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

Name	Title of Invention
F. E. Adley, D. A. Campbell, R. H. Scott, and L. D. Test	A particle velocimeter

Radiation incident frequency fell to more customary levels with a total of 40, including 6 Class I and 2 Class II incidents. Neither of the Class II incidents was of major consequence. One of the Class I incidents involved internal deposition of plutonium to about 25% of the permissible limit. The expected radiation reaction in an exposure case last month did not occur.

There was no drastic change in the ruthenium particulate contamination problem. Nominally, the deposition density both near the Redox Plant and in residential areas such as Richland approximately doubled. Part of the observed increase may have resulted from better weather which modifies the effective detection limit in the arbitrary system used. However, the emission of ammonium nitrate from the Redox stack increased from about 25 to 180 lbs. per day in mid-month. Such emissions are potential carriers of primary ruthenium particulates. Of about 5,000 personnel surveys for particle contamination, only 8 positive cases were found; none represented appreciable exposure. Of 900 vehicle surveys, some degree of contamination occurred in 98 cases.

Emission of I^{131} continued to exceed appropriate limits, with a daily average of close to 3 curies, and a rising trend at month end. As production schedules lead to the anticipation of still further increases, the matter is being carefully reviewed with the Manufacturing Department. At the present time, the resultant vegetation contamination in surrounding areas is just below the proposed limit. However, isolated values above the limit are recorded in Richland,

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Radiological Sciences Department

Benton City, Ringold, Horseheaven Hills, Wahluke Slope, and surprisingly, as far afield as Toppenish and Union Gap. There is evidence that a strong emission travelled the wrong way, (that is, westwards) and contaminated a significant area that has not been well surveyed in the subject period.

An interesting comparison between strontium isotope emission from the separations plants and from atomic bomb debris has been made. The monthly emission of Sr^{89} and Sr^{90} is equal to that deposited on 3 square miles by the "hot rain" of 1953. For the more dangerous component Sr^{90}, which is relatively more abundant in stack effluent, the equivalent area is 30 square miles. Since the local hot rain was of trivial activity compared with bomb debris deposition in large areas of the country, the Hanford contribution to the serious world-wide ecological problem with Sr^{90} is not of serious consequence.

Two experiments in earth sciences provided pilot data for important decisions in waste disposal. In one, the slow movement of so-called retained strontium in a soil column later saturated with water was related to a plausible mathematical equation; this experiment covered a 3-year span. In the other, rate of motion of a wetted front was also related to an equation, which can be applied to field cases in which retention in liquids held in previously unsaturated soils, rather than some form of transfer of radioelements to soil particles, is the protective factor.

Direct field work in earth sciences was seriously impeded by the delayed program of well drilling by the U.S.G.S. In view of the urgency for expansion of this program, other methods of obtaining wells will have to be sought.

Practical applications of waste disposal data mostly led to denial of suitability for ground disposal. Wastes affected included TBP scavenged material, slurries from BY tanks and T Plant scavenged first cycle wastes.

The abnormal concentrations of uranium in river water below the 300 Area fell from values 30 to 50 times higher than normal in January to the range of 5 to 10 times normal in early February; the current readings are only twice normal. A completely satisfactory reason for the high transients has not been reported.

As part of the needed program for improving radioanalysis of reactor effluent as the Columbia River contamination approaches permissible limits, a promising rapid separation of Na^{24} was achieved by passing the effluent through a resin column with conditions chosen to absorb virtually all other radioelements. A similar technique should apply to Cs^{137}, an isotope of major concern in waste disposal to ground.

Another phase of the river problem was resolved, unfortunately in the unfavorable direction. The permissible concentration of P^{32} in the river has been shown to be limited by the human hazard of consumption of contaminated fish. It was hoped that the body uptake of P^{32} incorporated in fish tissue, used as food, would be substantially lower than the uptake of P^{32} from the inorganic phosphates normally used in uptake measurements. As measured in rats, the observed reduction was insufficient to justify a change of limits.

The activity density of river organisms was generally similar to January values. A finding that may significantly affect the river picture in the future was the appearance of a population of minute floating animals (zooplankton) in the McNary reservoir. The plankton population of the river has heretofore been almost exclusively confined to diatoms. The total activity transported on planktonic forms may change as the new population develops. These forms are an important first step in many food chains in the river, and provide a mechanism for downstream transport of concentrated foci of contamination.

Many of the areas of pig skin exposed to radioactive particles in November and December have now healed. At the lower range of exposure (up to 400 microcurie-hours), the course of the reactions has been well-behaved. It now seems to be safe to obtain similar data on human skin. If the human reactions are similar in this range, one can assume that the human effect of higher exposures could be deduced from the pig experience. As the ruthenium particle problem has persisted for a year without the appearance of a human reaction, it now seems unnecessary to push the deliberate exposures beyond a comfortably safe level.

In some long range studies on genetic effects of internally deposited radioelements, yeast is grown on a medium, which is deficient in sulfur. Under these conditions, the incorporation of S^{35} is almost constant as the carrier inert sulfur is varied from ten times to one million times the S^{35} content. Similar effects were recently found in the uptake of trace quantities of several radioelements by plants. These findings have two important results: (1) Tracer work in any biological system has to be regarded with suspicion, if the total amount of the traced element is below the demands of the organism. In the local field work, this can occur frequently in studies of aquatic organisms and of plants. (2) Under these conditions, protection against uptake by isotopic dilution, which has been considered for iodine release to the atmosphere, phosphorus release to the river and strontium release to ground, could be useless. In fact, it could produce more than normal uptake. This conclusion so fundamentally affects our reserve defenses against a mistake in various forms of waste disposal that the whole topic will have to be systematically investigated.

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Radiological Sciences Department

The possible suitability of graphite as shielding for a room with minimum background, for precision measurements of internal deposition of radioelements was mentioned last month. The radioactive contamination of available graphite was found to be surprisingly high. The local concrete showed about 10^{-12} gm Ra per gm; graphite showed about 3×10^{-13} gm Ra per gm. Since these data were obtained by measurements that did not exclude other possible contaminants (e.g. K^{40}), chemical analysis of the graphite was performed. The results were compatible with the stated radium content. Plastic materials wholly compounded from constituents that have passed through a gaseous phase in manufacture are usually free from radioactive contaminants other than inevitable traces of C^{14} and tritium. A plastic igloo or a water tank room thickly lined with plastic may be needed.

H M Parker

Director
RADIOLOGICAL SCIENCES DEPARTMENT

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APPENDIX

1. Condensed Exposure Records

Type	Number of Readings	Potential High Results	Confirmed High Results
Pocket chambers - gamma	293,505	16	1
Pocket chambers - slow neutron	646	0	0
Film badges - beta-gamma	51,978	19	0
Neutron film	685	1	0
Pu bioassay	1,000	17	2
F. P. bioassay	1,083	2	0
U bioassay	359	0*	0
Alpha hand counts	54,131	5	0
Beta hand counts	53,345	5	0

*Limit for Pu and FP taken as any positive result. For uranium, taken as 25% of estimated maximum permissible deposition. There have been 128 positive uranium cases to date in 1955.

2. Regional Monitoring Records

Sample Type and Location	Activity Type	Average Activity Density /uc/cc	Trend* Factor
Drinking Water and Related Materials			
Benton City Water Company Well	alpha	1.3×10^{-8}	--
Richland, N. Richland, Benton City Wells	alpha	$(<0.5 \text{ to } 1.5) \times 10^{-8}$	--
100 Areas	beta	$(<0.5 \text{ to } 5.2) \times 10^{-7}$	--

Radiological Sciences Department

Sample Type and Location	Activity Type	Average Activity Density /uc/cc	Trend* Factor
Other Waters and Related Materials			
300 Area Wells #1, 2, 3	alpha	(<0.5 to 7.4) x 10^{-8}	--
300 Area Well #4	alpha	4.4 x 10^{-8}	--
Well #4 measured as uranium	U	1.8 x 10^{-8}	--
Other Wells on the Reservation	beta	(<0.5 to 5.1) x 10^{-7}	--
Columbia River - Hanford Ferry	beta	1.8 x 10^{-5}	--
Columbia River - below reactors	beta	1.8 x 10^{-5}	--
Columbia River - Patterson to McNary	beta	4.9 x 10^{-7}	--
Columbia River - shore mud	beta	(0.24 to 1.3) x 10^{-4} /uc/g	--
Raw Water - Operating areas	beta	(0.05 to 2.3) x 10^{-6} /uc/sec/reactor	--
Reactor Effluent Retention Basins to River	beta	14,000 to 27,000 (5.1 to 6.6) x 10^{-3}	--
Reactor Effluent Retention Basins to River	alpha	<0.03 /uc/sec/reactor <5 x 10^{-9}	--
I-131 in farm wastes to river	I-131	24 /uc/day 5.0 x 10^{-7}	-2 -2**
Iodine in Columbia River - Hanford	I-131	9.6 x 10^{-8}	--
Atmospheric Pollution			
Gross Alpha Emitters	alpha	(< 4 to 9) x 10^{-15}	--
Gross Dose Rate - Separations Areas	beta - gamma	0.6 to 3.0 mrad/day	--
Gross Dose Rate - Residential Areas	beta - gamma	0.4 to 0.9 mrad/day	--
Active Particles - Separations Areas	beta	(2.1 to 6.7) x 10^{-13}	--
I-131 Separations Areas	I-131	(1.0 to 6.6) x 10^{-13}	--
I-131 Separations Stacks	I-131	2.7 curies/day	--
Ruthenium - Separations Stacks	$Ru^{103,106}$	0.08 curie/day	--
Active Particles - Wash., Idaho, Ore., Mont.	--	0.001 to 0.006 ptle/m^3	-11
Active Particles - HAPO	--	0.005 to 0.075 ptle/m^3	--
Tritium (as oxides) - reactor stacks	T	0.25 curie/day	-2

Radiological Sciences Department

Sample Type and Location	Activity Type	Average Activity Density μc/cc	Trend* Factor
Vegetation			
Environs of Separations Areas	I-131	$(0.05 \text{ to } 1.2) \times 10^{-4}$ μc/g	--
Residential Areas	I-131	$(<3.0 \text{ to } 4.0) \times 10^{-6}$ μc/g	--
Eastern Washington and Oregon	I-131	$<3.0 \times 10^{-6}$ μc/g	--
Non-Volatile Beta Emitters- Wash. and Ore.	beta	$(4.8 \text{ to } 7.1) \times 10^{-5}$ μc/g	--
Alpha Emitters - Separations Areas	alpha	$(1.4 \text{ to } 5.8) \times 10^{-7}$ μc/g	--
Alpha Emitters - 300 Area	alpha	2.1×10^{-6} μc/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.

**The value reported last month as the activity density of I-131 in Animal Farm Waste should have been 1.2×10^{-6} instead of 1.2×10^{-7} μc/cc.

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FINANCIAL DEPARTMENT MONTHLY REPORT
FEBRUARY, 1955

Preparation of the budget for the fiscal year 1957 and revision of the budget for the fiscal year 1956 were delayed pending receipt of revised assumptions from the Commission. Normally all budget programs are expected to be in the hands of the AEC by April 1 but may be late because of this delay.

In response to the Financial Department's request for verification of UO_3 billing prices, a revised price scale was received from the Commission for use during FY 1955. As a result, an additional billing of over $3,500,000 was issued on UO_3 shipments for the first seven months of FY 1955, and current unit cost statements for the first seven months are being revised downward.

An Analysis of Work in Process Inventory price and quantity changes from September 30, 1954 to December 31, 1954 was completed and results included in Document HW-35041--"Work in Process Inventory - Comparison September 30, 1954 and December 31, 1954."

One of the recommended changes in the Product Cost Report mentioned last month has been approved by the Office of the Controller for Accounting, AEC, Washington, D.C. Retroactive to July 1, 1954, reactor basin inventories are to be consolidated, with only low and high NGS segregation. After the transition is completed, basin reports will be simplified and unit costs of transfers to Separations will contain less fluctuation as transfers will be made at average basin value.

An analog type computer has been developed for the Metal Preparation Section through the joint efforts of the Manufacturing Engineering Unit and the financial representative for the Metal Preparation Section. This computer can be used to calculate the unit cost for the preparation of uranium slugs based on various production levels and canning yields, and provides ready and reasonably accurate answers for use in preparing bogey estimates, goal forecasts or for evaluating new programs.

Contract Cost personnel attended meetings throughout the month with representatives of Manufacturing and Engineering Departments on proposed plant and equipment budget items for FY 1957. A budget package containing data sheets and summary, scheduled to reach the Financial Department on February 25, had not been received at the month's end. Indications are that receipt of the package will be delayed until March 10.

Agreements reached with representatives of the Project Section relative to the detailed cost estimates for Project CG-558 resulted in a letter to the Atomic Energy Commission stating that our monthly detailed cost report on this project would include an estimate to complete for each cost code in the project. This is to be effective with the report covering February costs.

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A change in the assignment of time clocks from the Financial Department to the Instrument Maintenance Unit will require a change in the liquidation of costs of the Unit. Costs of maintaining time clocks in the past have been liquidated on a cost-per-hour basis. These costs will now be recovered by charging a standard rental rate for each time clock in service.

Gross cash disbursements for the month of February, 1955 amounted to $8,356,000 and cash receipts totaled $380,000. Disbursements were higher than normal this month due to the payment of the 1954 Company contribution to the Pension Fund in the amount of $1,943,000.

Outstanding commitments at the month-end, including a reserve for construction close-out of $1,300,000, amounted to $15,000,000. Of this amount, $585,000 represented unpaid bills on hand.

Cash on hand totaled $2,525,000.

In round figures, 20,000 active accounts receivable were handled during the month, consisting of 7000 telephone, 7000 rent, 4000 electricity and 1500 hospital accounts. Billings for the month totaled over $650,000 and uncollected balances at the month-end amounted to $300,000. A 10% reserve to cover uncollectible accounts has been booked against the balance. Disconnect notices were sent to 77 electricity customers and to 159 telephone subscribers. At the end of the grace period, these accounts had been paid except for 13 electricity and 8 telephone accounts, and service to these customers was discontinued.

A controversy as to whether increased pension awards made by the State Department of Labor and Industries should be paid from State or HAPO funds was resolved and a refund in the amount of $17,812 was received from the State this month. For the years 1951 through 1954 these payments had been erroneously paid by the State from our contract funds.

Representatives of the General Accounting Office continued their audit at HAPO with the review of overall procedures of the Accounts Payable and General Books Units, obtaining copies of financial reports issued, and the review of accounting procedures and cost reports of the Manufacturing Cost Unit for the Metal Preparation Section as they applied to the manufacture of uranium slugs and other special products.

Charges from HAPO to the Overhead Allowance in February totaled $1,675. These are represented by travel and living expense variation - $991, conference expense - $530, visual aids for G.E. management - $127, special absence allowance - $20, and mailing costs for the Tri-City Army Advisory Committee - $7.

Four mathematical programming routines for the electronic data processing machine were successfully tested by IBM personnel on the 702 machine at the IBM factory at Poughkeepsie, N.Y., and a representative of the Numerical Analysis Unit went to Poughkeepsie to participate in a test on interpretative routine and two parts of the weekly payroll program. Representatives of

G.E.'s Electronic Data Processing Section, Accounting Operations Department, and the Schenectady IBM office are taking part in these tests for the experience which will be gained.

A combined purchase order and receiving report form went into use on February 21. It is estimated that it will result in a reduction of 25% in clerical labor in receiving work.

The Procedural Analysis Unit continued an investigation of the type and number of forms duplicated in area duplicating offices. Approximately 30,000 forms a month are being duplicated, some of which are in violation of organization and policy guides relating to security and forms control. Violations are referred to responsible supervision.

The conversion of records for the classified files to an IBM system continued in February. A major phase of classified document control was completed, with some 112,000 unit records processed to establish a uniform arrangement of serial numbers for documents created at sites other than HAPO. On February 14 the function of key punching and verifying IBM cards for classified document control was transferred from the Procedures and Computing Section to the Technical Information Unit, two employees being transferred to operate the machines.

The balancing of plant and equipment sub-accounts to detail property records was completed during the month. Sub-accounts will be balanced to detail records monthly from this date forward.

The review of depreciation rates (composite) for plant and equipment accounts, not included in a previous depreciation study, was completed during the month. The review was required as the result of a memorandum from AEC-Washington, stating that changes in composite depreciation rates must be approved at the Washington level. Therefore, all rate changes from the date of plant appraisal to the current date were included in the study and submitted to G.E. management.

Property records were reviewed and equipment listed applicable to commercial facilities in North Richland. Lists were forwarded to AEC for use in disposing of equipment, concurrent with severance of contracts with North Richland commercial facility operators.

The second annual physical inventory program of all materials (exclusive of source and fissionable materials) in inventory accounts in the custody of HAPO, which began in January, 1954, was completed in January, 1955.

The third annual physical inventory of transportation fuel and lubricants was taken as scheduled on February 10. Tentative results of this inventory reflect a net shortage of $13 under the reconciled book value of $13,881. The final report of this inventory will be issued in March.

Final arrangements have been made for the transfer of the White Bluffs machine shop from Kaiser Engineers to General Electric Company. The date of turnover of the shop and contained equipment to Minor Construction is to be March 1, 1955.

Seventeen appropriation requests totaling $276,751 were approved during the month.

Project proposals and informal requests approved by Department Managers and the General Manager for transmission to the AEC during the month amounted to $387,000.

SF Accountability Section planning, scheduling and integration of unit activities is the subject of a special report now approximately 50% complete. The review includes section schedule, breakdown of unit assignments, brief narrative, time table for completion and ultimate correlation of section schedule to exempt employee appraisal form. Completion is scheduled for March 15, 1955.

An integrated review program including accounting, measurement, and accounting procedure related to "J" slug shipments was completed prior to the resumption of shipments. Subsequent postponement of the initial shipment of this new series has been due to AEC action. The revised schedule now starts on March 7, 1955 and will continue through September, with two shipments per week.

A comprehensive report covering normal uranium scrap or inactive material in the custody of the Metal Preparation Section has been prepared. This survey was conducted at the request of the USAEC for purposes of assistance in locating stockpiles, sources and potential sources of high grade scrap for return to production channels. A similar review covering Technical holdings is now in progress and is scheduled for completion in early March.

A new account was established covering Depleted Uranium-AEC code D-38 in order to comply with regulations. This material is appreciably depleted in U-235 and is used wherever feasible as a substitute for high-cost material. It is anticipated that its use will increase, particularly in Technical Section activities.

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 $8,650,000 and $5,400,000, respectively, by the Atomic Energy Commission) for the months of February, 1955 and January, 1955, is shown below:

Disbursements	February	January
Payrolls (net)	$2 934 986	$2 929 912
Employers Contribution to Pension Plan for 1954	1 942 936	-0-
Materials and Freight	1 460 701	1 508 382
Payroll Taxes	777 091	636 814
Payments to Subcontractors	543 445	504 252
United States Savings Bonds	301 789	97 090
Group Insurance Premium	146 525	145 834
Pension Plan - Employees' Portion	100 844	133 952
Travel Advances to Employees	43 056	50 148
All Other	104 690	124 480
Total	8 356 063	6 130 864
Receipts		
Rent	120 599	151 545
Electricity	76 416	91 736
Hospital	53 028	53 768
Telephone	52 288	58 127
Sundry Accounts Receivable	25 960	12 614
Refund of Travel Advances to Employees	10 729	8 403
Sales to AEC Cost-type Contractors	8 323	17 963
Bus Fares	7 925	9 012
Refunds from Vendors	2 668	5 683
Other	23 054	6 782
Total	380 990	415 633
Net Disbursements	$7 975 073	$5 715 231

Outstanding advances as of February 28, 1955 and January 31, 1955 were as follows:

	February	January
Cash in Bank - Contract Accounts	$2 218 614	$1 543 779
Cash in Bank - Salary Accounts	15 000	15 000
Total	$2 233 614	$1 558 779

AUDITING SECTION
MONTHLY REPORT - FEBRUARY, 1955

Reports were issued for the completed audits listed below:
- Accounts Receivable - Safety Shoes, AEC Cost-Type Contractors, Equipment Sales to Facilities, Loans to Employees, and Sundry
- Accounts Receivable - Rent
- Accounts Receivable - Electricity
- Cost Accounting (Technology Cost)
- Cost Accounting (Part II)
- Costs - Hanson-VanWinkle-Munning Company - Purchase Order HWC 7073

A letter report was issued for an audit review of a physical inventory of spare parts and equipment made November 22, 1954 under the direction of Inventory Accounting Unit.

At month-end, reports were being prepared for audits of:
- Management of Capital Assets
- Excess, Salvage and Scrap
- Accounts Receivable - Telephone

Field work was continued on the following audits:
- Accounts Receivable - Kadlec Hospital
- Classified Files
- General Electric Pension Plan
- General Electric Insurance Plan

The following audits were started during the month:
- General Electric Employees Savings and Stock Bonus Plan
- Weekly Payroll Preparation and Distribution
- Procurement Activities.

A follow-up was made to determine the extent of compliance with recommendations made as a result of the audit of material and package passes.

A partial follow-up was also made of the audit of timekeeping practices. The purpose of this follow-up was to determine extent of improvement in timekeeping practices since the audit and the amount of supervisors' time which could be saved by installing time clocks in the 100 and 200 Areas.

Four employee information meetings of exempt employees were held during the month.

BUDGETS AND MEASUREMENTS SECTION
MONTHLY REPORT - FEBRUARY, 1955

General

The Section Manager represented the Financial Department at the regular monthly meeting of the Suggestion Board where one Financial Department suggestion was presented and approved.

A meeting of all section managers was called to review open exempt positions in the Procedures and Computing Section. Selections were made and appointments were effective for five positions on March 1. These positions were filled from promotion of non-exempt employees and two were transfers of employees already on the exempt rolls in other sections of the Department.

One candidate for employment was interviewed and section managers advised of qualifications.

Budgets

Major work was temporarily halted pending receipt of changed budget assumptions from HOO-AEC. These are not expected until early in March.

Regular monthly reports of consolidated cost, bogey estimates and analyses to the General Manager were issued as scheduled.

Measurements

Work progressed on the inventory of HAPO measurements. Complete report to General Management is scheduled for sometime in March.

CONTRACT COST SECTION
MONTHLY REPORT - FEBRUARY, 1955

Three employees, one exempt and two non-exempt, were made available during the month for transfer to the Procedures and Computing Section to fill vacancies created by emphasis on programming and scheduling procedures for 702 machine application.

During the month job descriptions for all non-exempt employees were completed and forwarded to Wage Rates in accordance with the time schedule previously agreed upon.

A new form entitled "Request for Transfer of Charges" was prepared and will be distributed to area personnel to be used in transferring work order charges. In the past, request for transfers have been received on almost every size paper on the plant with no uniformity in appearance. This form meets all requirements of the Internal Audit Group and will expedite greatly the actual transfers by the Manufacturing Cost Unit.

The preparation of an accounting procedure for Overtime Lunches was started and is scheduled to be completed in March.

One employee of the Community Cost Unit was transferred to General Books on February 14 without replacement. This reduction may require a small additional amount of overtime, but an annual savings of approximately $4 500 is expected.

A book on statistics relative to possible transfer of the community and hospital to public entities prepared last year for the General Manager was brought up to date and resubmitted. The Accountant - Employee & Public Relations Cost Unit collaborated with the Specialist - Community Transfer Study in preparing and assembling the book.

Special cost information has been furnished to Design Section personnel to assist in the planning for Design Development expenditures during the balance of this fiscal year. Design Development funds not required will be made available to the Technology Sections.

Employee and Public Relations Cost

All cost reports for the Employee and Public Relations Department were completed and issued by the end of the second day following receipt of the final cost entry. All other reports were completed in advance of the normal date through special effort put forth by the various sub-units of the Employee and Public Relations Cost Unit.

An audit report on office equipment recommended that a study of office machine rental rates be conducted with the view in mind of adjusting such rates to conform more closely to costs actually incurred in the maintenance of the various types of equipment; present rates being based on government supply contracts adjusted to Hanford problems.

The study was made as recommended and as a result, a new rate schedule was prepared and will be used effective with March liquidations.

General and Consolidations Cost

A special analysis of the IBM machine rental accrual was completed in order to determine the proper accrual for the balance of the fiscal year so that all costs would be liquidated in the year in which they are incurred.

Engineering Cost

Meetings were held with representatives of the Engineering Department in "firming up" personnel requirements and justifications for the Revision of FY 1956 Budget and Budget for FY 1957. Forecasts were resolved and submitted to Consolidations on February 9, 1955. Balance of budget preparation is progressing at a satisfactory rate and it is expected all deadlines will be met.

Discussions were held with representatives of Project Section in order to arrive at adequate standard rates for liquidating reproduction expenses during FY 1956. An average standard rate of .075 per square foot was established. The adoption of this liquidating rate will result in an increase in the cost of several types of reproduction to customers. New rates for reproduction services will be published as soon as studies now in progress are completed.

Budget for "Equipment Not Included in Construction Funds" for FY 1956 and FY 1957 for the Engineering Department was completed and submitted to Property Management during the month. There were no significant changes from previous periods noted in the equipment requirements.

The FY 1956 and 1957 budget for inventories was completed and submitted during February. The most significant item in the inventory was the requirements by the Pile Technology Section for Zirconium. During FY 1956, 7 264 pounds will be requested and 10 254 pounds for 1957. This material will be used for Process Development work in connection with possible uses as process tubes and cans for fuel elements.

The above zirconium requirements were provided to AEC Budget Division in order that an early submittal could be made to Washington-AEC for special material allocation purposes.

A discussion was held during the month with Internal Audit in regard to the report resulting from the audit of Technology Cost. It was agreed that certain recommendations made by the Internal Auditors would be adopted in their entirety while others would be accepted on a trial basis or further investigated before adoption.

Manufacturing Cost

The Reactor Section Financial Representative conducted that Section's monthly cost meeting in the absence of the Section Manager and represented the Reactor Section in the Manufacturing Department cost meeting held in February.

Charges to Project Engineering for Power Services and other miscellaneous charges from Manufacturing formerly transferred on a billing form have been placed on IBM and will be included with work order billing. This will eliminate some cleri-

cal and typing work and make additional use of IBM facilities.

The Separations Section Financial Representative and Cost Clerk attended a meeting on the Purex process which was presented for the purpose of acquainting Separations personnel with the equipment and processes to be utilized in Purex facility.

Forecasts of Manufacturing Department personnel, overtime hours, and justifications were submitted to the Budget and Measurements Section for the FY 1957 Budget and Revision of FY 1956. A reduction in personnel estimates was accomplished during management review and revised personnel schedules were issued by this Unit. Salary and material figures are being converted into dollar amounts. However, during the latter part of the month, notice of revised assumptions were received and at present all work has been discontinued on plants which may be affected by the assumption changes.

In order to eliminate the detailed segregation of the budget into months, it has been agreed to include only quarterly budget amounts on future operating reports. This will save considerable clerical effort and should cut future overtime in the Budget Group.

GENERAL ACCOUNTING SECTION
MONTHLY REPORT--FEBRUARY, 1955

ADMINISTRATIVE PLANNING

A total of 14 new or revised organization and policy guides were published during February, 1955. Of these, eight were organization guides, five were instruction-type guides, and one was a revised index to the instruction portion of the OPG's.

Of the five instruction-type guides, one, 14.9, deals with the safety information program; one, 15.3, with classified and/or radiological material passes; and the balance, 04.5.2, 21.4 and 21.10, deal with property management subjects.

A revised instruction dealing with the HAPO Organization and Policy Guide system was approved by the General Manager. This OPG revises the HAPO system to conform with Company directive policies.

Three Company announcements were prepared and sent to the Maqua Company for publication. These concerned the appointment of R. J. Gandy as Manager - Purchasing and Stores; the discontinuance of the Special Study and the appointment of W. K. MacCready as Manager - Reactor.

One Office Letter, #208, Washington's Birthday Holiday, was processed.

A report was made summarizing AEC transmittals received during January, 1955.

One hundred seventy extra copies of OPG's were distributed to individuals requesting them.

At the month's end, a total of 19 OPG's were in the process of being duplicated and distributed.

ACCOUNTS PAYABLE UNIT

The volume of vouchers booked in Accounts Payable during the month numbered 3624 and amounted to $4,949,266. This recording of vouchers was lower than any one month since February of 1954.

On February 15th time was spent with Mr. Gibson of the General Accounting Office in discussing procedures and controls currently in effect in Accounts Payable and reviewing reports and reconciliations issued by the unit.

Active contracts handled by Accounts Payable, excluding requirements contracts, numbered 27, and payments on these contracts in February totaled $75,254. Requirements contract orders placed during February numbered 10 in the amount of $386,906, and payments under requirements contracts for the month totaled $464,792.

ACCOUNTS PAYABLE UNIT (Continued)

Following is statistical information relating to the accounts payable operation:

Accounts Payable:	February	January
Balance at beginning of month	$ 767 103	$ 717 281
Vouchers entered	4 949 266	3 138 295
Accrual for inventories	20 726	36 433
Cash receipts	2 668	5 683
	5 739 763	3 897 692
Less:		
Vouchers paid	5 119 286	3 103 870
Reversal of accruals	36 433	26 719
	5 155 719	3 130 589
Balance at end of month	$ 584 044	$ 767 103
Other Statistics:		
Number of vouchers recorded	3 624	3 991
Number of checks issued	2 435	2 439
Number of freight bills paid	1 338	1 489
Amount of freight bills paid	$258 482	$284 024
Number of purchase orders received	1 994	2 030
Amount of purchase orders received	$1 309 899	$2 112 840
Amount of cash discount earned	$5 685	$5 146

ACCOUNTS RECEIVABLE UNIT

The gross accounts receivable balance increased a net amount of $36,106 during the month. Details may be summarized as follows:

Increases:	
Electricity	$25 651
AEC Cost-type Contractors	8 634
Kadlec Hospital	8 063
Telephone	6 291
Others	1 120
Total increase	49 759
Decreases:	
Sundry	12 747
Others	906
Total decrease	13 653
Net Increase	$36 106

ACCOUNTS RECEIVABLE UNIT (Continued)

Although cash collections in February applicable to electricity, $77,333, is above our monthly average, total billings during the month aggregated $102,984, resulting in an increase in account balance at February 28 of $25,651. Total billings during the month of $102,984 were considerably higher than an average month, due primarily to billing in February of approximately 95% of all customers whose houses are electrically heated. The account balance should revert to a normal month-end balance, approximately $35,000, at March 31.

Reports covering audits made by internal auditing of (1) accounts receivable - electricity, (2) accounts receivable - rent, and (3) accounts receivable - sundry and other miscellaneous accounts were received during the month. For the most part, the recommendations have been effected, and all others will be put into effect as soon as possible.

Disconnect notices were mailed to 159 telephone subscribers during the month, and the service of 8 subscribers was suspended due to non-payment of bills. During the month 383 delinquent notices and 77 final notices were mailed to electricity customers. The service of 13 electricity consumers was suspended due to non-payment of bills.

In connection with audit report IA-79 concerning "Procurement and Control of Reference Material," a procedure was formulated in conjunction with Technical Library personnel for control of and billing for lost or damaged Technical Library books.

Our collection agencies were requested to review their files to return accounts which we have placed with them for collection and upon which they feel there is little or no chance of collection. Several accounts were returned and will be subsequently assigned to the Atomic Energy Commission.

Statistics for accounts receivable activities are summarized on the following page.

ACCOUNTS RECEIVABLE UNIT (Continued)

Account	Balance 1-31-55	Net Charges	Collections	Balance 2-28-55	Bills Issued in Feb.
Kadlec Hospital:					
Active	$ 97 911	$ 65 750	$ 55 574	$108 087	1 416
Collection Agencies (86 Accounts)	11 223		2 113	9 110	
Sundry:					
Active	39 300	12 887	25 939	26 248	432
Collection Agencies (177 Accounts)*	8 305	438	133	8 610	
Electricity	34 622	102 984	77 333	60 273	3 967
Telephone	32 196	59 916	53 625	38 487	6 849
Equipment sales to Facilities (1 Account)	23 034		349	22 685	
Rent	28 950	391 428	390 587	29 791	6 831
Sales to Cost-type Contractors	11 551	16 957	8 323	20 185	25
Safety Shoes	1 956	1 777	2 334	1 399	354
Loans to Employees (2 Accounts)	255	300	21	534	
Sub-total	289 303	$652 437	$616 331	325 409	19 874
Reserve for Bad Debts	30 972			29 916	
General Ledger Balance	$258 331			$295 493	

*Includes all utility and rental accounts.

CONTRACT REIMBURSEMENTS

The January "Summary of Disbursements," transmitted to the Commission through the Chief of its Finance Division, covered disbursements of $5,715,231, which are detailed as follows:

Payrolls and Payroll Deductions Disbursed	$3 881 040
Material (including payments on requirements contracts) and Freight	1 865 841
Subcontracts and agreements	146 793
Advances for Traveling and Living Expenses	50 148
Miscellaneous Payments	187 042
Gross Disbursements	$6 130 864
Less: Revenue	415 633
Net Disbursements	$5 715 231

CONTRACT REIMBURSEMENTS (Continued)

In preparing this report, a review was made of each of 215 items which comprised "Miscellaneous" to establish their propriety, while all other expenditures were analyzed, classified and summarized to disclose the nature of all of the disbursements made by HAPO during the month.

Five letters, written in accordance with OPG 05.4 ("Work or Expenditures Which Require AEC Reimbursement Authorization or Letter Approval"), were approved by the Commission in February. The Contract Reimbursements group handled 13 inquiries on reimbursement problems during the month, seven of them from personnel outside the Financial Department.

Special assignments completed included an analysis of delegations of authority issued by the Manager of the Hanford Operations Office of the AEC to determine that they are in accordance with the recently issued Section 0103.67 of the AEC Manual, and the preparation of a schedule of HAPO's purchases of stationery, office supplies, publications and similar materials from General Electric during the calendar year 1954. Assignments under way at the close of the month included the integration of the various endorsements to group insurance policies with the policies themselves to provide working copies for day-to-day reference.

GENERAL BOOKS UNIT

A check in the amount of $17,813 was received from the State of Washington representing a refund of the increased amount of pension award payments made to former du Pont employees from January, 1951 to December, 1954. The increase in monthly pension payments for this period was paid from the Washington State Pension Awards Reserve Bank Account, whereas the State legislature, in the act enacted June 11, 1947, had provided for these increased payments to be paid from State funds. A controversy had existed between the State and General Electric and the Commission regarding interpretation of the contract concerning Workmen's Compensation which was recently settled in favor of General Electric and the Commission, which resulted in the refund.

A new report to be issued monthly, which provides information relative to attendance at meetings of professional and trade societies, was initiated in February. Budgeted amounts and actual expenses incurred are indicated in order that the report may be used for control purposes.

As a result of reassignment of work, no overtime was necessary during February to receipt cash payments received in the Works Cashier's Office. In previous months, an average of 70 overtime hours was usually required to record these payments.

Month-end contract bank account balances totaled $2,218,614 as compared with the previous month's ending balance of $1,558,779. In order to increase the bank account balances to $2,000,000, advances from the Commission were requested in the amount of $8,650,000 to cover estimated net disbursements of $8,100,000; however, since net disbursements for February totaled $7,975,000, the contemplated ending balance was exceeded in the amount of $218,614.

GENERAL BOOKS UNIT (Continued)

The balance of outstanding commitments decreased $1,951,000 during February, principally as a result of a $1,943,000 expenditure representing payment of the calendar year 1954 company portion of pension plan costs. Shown below are outstanding commitments at the end of February:

	Outstanding Commitments February 28
Payrolls	$ 1 934
Materials	6 212
Subcontracts	1 161
Continuity of Service	1 571
Travel and Living	39
Close Out Expense	1 287
Miscellaneous	1 123
	13 327
Revenue	(296)
	$13 031

A continuing decrease since October in both the amount and number of travel advances issued indicates that travel and living expense and variation expense incurred may be considerably less than FY 1955 budget amounts for these costs. For comparison, the amounts of travel advances issued in corresponding months of FY 1954 and FY 1955 are shown below:

	FY 1955		FY 1954
Month	Number Issued	Amount	Amount
October	317	$74 609	$71 912
November	306	67 392	65 083
December	231	47 452	52 485
January	259	50 246	67 939
February	196	43 056	59 417

The decrease in advances issued is principally due to reduction of the number of off-site inspectors from 69 in October to 46 in February.

Variation expense for FY-1955 to date totals $2,356, as compared with the FY-1955 budget of $16,000. At the going rate, the total variation expense for the year will not exceed $5,000.

Statistical data for February and the previous month follows:

	February	January
Advances from A.E.C.		
Balance at beginning of month	$ 1 558 779	$1 874 010
Advances received from A.E.C.	8 650 000	5 400 000
Other cash receipts	380 899	415 633
	10 589 678	7 689 643
Less disbursements	8 356 064	6 130 864
Balance at end of month	$ 2 233 614	$1 558 779
Advances requested for subsequent month	$ 5 900 000	$8 650 000

GENERAL BOOKS UNIT (Continued)

	February	January
Travel Advances to Employees		
Balance at beginning of month	$48 346	$ 54 395
Advanced to employees	43 056	50 247
	91 402	104 642
Less:		
Travel, living and conference expenses reported by employees	42 040	47 893
Cash refunded by employees	10 729	8 403
	52 769	56 296
Balance at end of month	$38 633	$ 48 346
Outstanding Travel Advances to Employees		
Current	$35 131	$ 45 060
Outstanding over 30 days	3 502	3 286
Total	$38 633	$ 48 346
Travel, Living and Conference Expenses		
Travel and living expenses		
Off-site inspectors	$16 959	$ 18 198
Others	24 015	29 165
	40 974	47 363
Conference expenses	1 066	530
Total	42 040	47 893
Less:		
Expenses for trips which included attendance at Association Island conferences, temporarily transferred to Undistributed Costs	$ -0-	$ (940)
Expenses charged to other G.E. components and carriers	2 578	4 348
Living expenses in excess of $9 per diem	518	991
Conference expenses	1 066	530
	4 162	4 929
Amounts determined to be payable by A.E.C.	$37 878	$ 42 964
Number of expense reports submitted by employees	217	226

PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT - FEBRUARY, 1955

Special Absence Frequency Reports on individual non-exempt employees were prepared and distributed to Section Managers covering absences during the quarter ended December 31, 1954. Reports were issued on 584 employees as compared to 385 reports for the third quarter of 1954, or an increase of 97% in the number of employees involved. These reports are issued on male employees having an absence frequency of 3 and female employees having an absence frequency of 4.

The procedure for handling payroll deduction authorizations for safety shoes was revised in February. Under the new procedure, IBM punched cards used in the payroll procedure for safety shoes deductions are prepared directly from the payroll deduction authorization. Under the former procedure, a list of authorizations was prepared by Accounts Receivable Unit and transmitted to Payroll for use in preparing IBM deduction cards. This listing has been eliminated. In addition, the key punching of deduction cards is spread over several days, thus avoiding a peak load in the key punching operation.

The first payroll deductions for GESA and HAPO credit union shares were made in February. Only 79 weekly paid employees and 48 monthly employees authorized deductions.

Annuity certificates were received from Connecticut General Life Insurance Company for three employees who transferred to General Electric from du Pont at Hanford on September 1, 1946. The certificates were delivered to employees in February on the 15th anniversary of their du Pont service date. A total of 110 such certificates have been issued to date.

Payment to the General Electric Pension Trust in the amount of $1,942,936 was made in February covering the HAPO portion of the 1954 General Electric Pension Plan costs for future service annuities.

During the short work week resulting from the holiday on February 22, salary checks were distributed at the usual time, and it was not necessary for Personnel Accounting to work either on the holiday or overtime. Office Letter Number 208 was issued covering the plant closing on the holiday and setting forth instructions for completing time cards for shift workers who observed the holiday on a day other than February 22.

In an effort to reduce mutilation of IBM punched card salary checks and thus reduce the cost of check reconciliations an article was published in the Hanford Works News in February. Appropriate pictures were also published in the News showing the machine processing of card checks and indicating the difficulties encountered as a result of mutilated cards.

STATISTICS

Personnel Accounting Section

Number of HAPO Employees	Total	Monthly Payroll	Weekly Payroll
Changes during month			
Employees on payroll at beginning of month	8 918	2 256	6 662
Additions and transfers in	117	8	109
Removals and transfers out	(71)	(12)	(59)
Transfers from weekly to monthly payroll	-	7	(7)
Transfers from monthly to weekly payroll	-	(12)	12
Employees on Payroll at end of month	8 964	2 247	6 717

	February		January	
Overtime Payments During Month	Number	Amount	Number	Amount
Weekly Paid Employees	6 322	$136 548-a)	6 034	$102 577-a)
Monthly Paid Employees	388	40 741	350	31 022
Total	6 710	$177 289	6 384	$133 599

Number of Changes in Salary Rates and Job Classifications	February	January
Temporary Changes	56	126
Retroactive Changes	22	20
Normal Changes	705	921
Total	783	1 067

Gross Payroll Paid During Month	February	January
Engineering	$ 778 056	$ 793 715
Manufacturing	2 325 199	2 288 805
Other	1 122 154	1 123 237
Total	$4 225 409 -a)	$4 205 757 -a)

(a- Payments to weekly paid employees are for four week periods.

Employee Benefit Plans	Number Participating		Percent Participation	
Participation in Benefit Plans at Month End	February	January	February	January
Pension Plan	7 968	7 960	98.2%	98.2%
Insurance Plan				
Personal coverage	8 907	8 859	99.4	99.3
Dependent coverage	6 325	6 289	-	-
U. S. Savings Bonds				
Stock Bonus Plan	4 562	4 525	50.9	50.7
Savings Plan	1 199	1 194	13.4	13.3
Both Plans	5 185	5 153	57.8	57.8

Pension Plan	February	January
Number retired	3	5
Number who became eligible for participation	49	37
Number who applied for participation	46	36
Number who elected not to participate	1	0
Replies not received	2	1
Insurance Plan - Number of Claim Payments		
Employee Life Insurance	0	2
Employee accident and health insurance	443	479
Dependent accident and health insurance	343	408
Total	786	889
Good Neighbor Fund		
Number participating	6 356	6 324
Percent of participation	70.9%	70.9%
Suggestion Awards		
Number of awards	72	2
Total amount of awards	$2 045	$460
Preferential Rates		
Number (eliminated) or added	0	(1)
Number currently in effect	560	560
Number of Military Allowance Payments	2	10
Number of Payroll Deductions - Other than Taxes		
Barracks rent	14	14
Dormitory rent	516	512
Good Neighbor Fund	11 220	11 004
Hospital	478	417
House rent	5 119	5 051
Insurance	9 010	8 969
Pension	25 300-a)	25 200-a)
Safety Shoes	525	473
Savings Bonds	16 156	15 607
Trailer space	145	140
Union dues	2 131	2 068
Other	170	174
Total	70 784	69 629

(a- Approximate number rounded to nearest hundred.

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - FEBRUARY 1955

GENERAL

Four mathematical programming routines for the electronic data processing machine were successfully tested by IBM personnel at Poughkeepsie, New York on the 702 machine at the IBM factory. A representative of the Numerical Analysis Unit has gone to Poughkeepsie to test an interpretative routine and two parts of the weekly payroll program. A representative of the Electronic Data Processing Section of the Accounting Operations Department and a representative of the Schenectady IBM Office are participating in these tests for the experience which will be gained.

To expedite conversion of existing punched card procedures to the electronic data processing machine, a programming group was established during the month. This group is composed of business and technical graduates.

A major phase of classified document control was completed in February. Some 112,000 unit records were processed to establish uniform arrangement of serial numbers for documents created at sites other than HAPO.

Effective February 14, 1955 the function of key punching and verifying IBM cards for classified document control was transferred from the Procedures and Computing Section to the Technical Information Unit.

PROCEDURAL ANALYSIS

Forms control reviewed 354 orders during February covering 1,327,450 forms; 18 orders, amounting to 33,675 forms were rejected; 110 new forms were designed.

"702" Program

Standards for drawing flow charts of EDPM logic have been developed and are now in use by programmers. These illustrate by symbolism the methods used by the 702 in interpreting and processing data.

A programmer's manual is being written for use at HAPO. A rough draft of the first five chapters, totalling 40 pages, has been assembled to date.

Instruction in programming logic, special techniques, and short cut methods was given to intermediate and advanced programmers and analysts during February.

The program and flow chart for converting Classified Files Hanford accountability records from cards to tape records via the 702 was completed for testing.

Employee & Public Relations Department

Procedures for producing informational reports on exempt salaries and office machines are now operating satisfactorily. Testing and "housekeeping" work was performed on these procedures during February. No major changes were required.

An analysis of clerical procedures of the Hospital Sub-Section was completed during February. The results were reviewed with the Hospital Administrator for his comments and will be forwarded to the Manager - Employee and Public Relations the first part of March.

Engineering Department

The conversion procedures for establishing controls of Off-Site Documents were written, tested, and put into use. This now permits machine accountability for all copies of each document received at HAPO. The machine records indicate disposition of all documents handled by Classified Files.

Financial Department

Drafts of the proposed new Plant Record Unit History Record form were completed and reviewed with Plant Accounting. Detailed descriptions of the procedure were submitted to IBM to verify the ability of the typewriter/tape punch and tape to card punch to process the forms as they are now designed.

The revised work order procedure was completed and installed in the Machine Room. Assistance was given the Scheduling Unit in setting up new controls and balancing the first revised reports.

Manufacturing Department

A combined Purchase Order and Receiving Report form was put into use February 21, 1955. This new form is designed to prepare a Receiving Report on a translucent sheet as a by-product of typing the Purchase Order. Placing strip carbon in the set leaves blank spaces on the Receiving Report form for completion when material is received. Distribution of copies of the Receiving Report are produced from the translucency by a contact printer. This system eliminates copying descriptive or accounting information from a separate Purchase Order form. The estimated reduction of clerical labor in Receiving is 25%.

The type and number of forms being duplicated in area duplicating offices is being investigated. Records compiled over a three month period indicate approximately 30,000 forms a month are being duplicated. Some of these forms are in violation of CPG's covering Security and Forms Control. Violations which are discovered are referred to responsible supervision.

A study of Data Processing procedures in the Reactor Maintenance Sub-Section was begun. The major part of the investigation will be conducted in the 100-B Area.

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Employee and Public Relations Department	6	Standard	Storage	Cartons
Engineering Department	26	"	"	"
Financial Department	98	"	"	"
Manufacturing Department	99	"	"	"
Radiological Sciences Department	28	"	"	"
	257			

Two hundred&forty-six cartons of records were destroyed.

Request for Authorization of Records Disposal Number 205, "Radiation Measurement Instrument Calibrations Records" and Number 206 "Radiation Exposure Incident Investigation Records" consisting of twenty-six individual records were developed and submitted to Radiological Sciences for internal approval.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-35530-W.

COMPUTING OPERATIONS

During the month of February the following non-routine assignments were completed for customers:

Atomic Energy Commission	1
Engineering	18
Financial	16
Manufacturing	10
Operations Research	1
Radiological Sciences	1
	47

Service charges for the month amounted to $45,452.65. Services, by customer, were as follows:

Atomic Energy Commission	$ 441.71	1%*
Employee & Public Relations	394.66	1 *
Engineering	15 125.82	33
Financial	27 178.99	60
Manufacturing	1 786.81	4
Operations Research	198.90	0 *
Radiological Sciences	325.76	1 *
	$45 452.65	100%

* Less than 1%

PROPERTY ACCOUNTING SECTION
MONTHLY REPORT - FEBRUARY 1955

Plant Accounting Unit

The Standardization of Nomenclatures and assignment of Commodity Cost Codes was completed for machine tools and will be put into effect with March business.

Balancing of plant and equipment sub-accounts to detail records was completed during the month. Sub-accounts will be balanced to detail records monthly from this date forward.

Reconciliation of a physical inventory of 108-B equipment was completed during the month and transfer to Plant and Equipment Held for Future Use was effected.

The Minor Construction Small Tools account was reconciled to physical inventory and adjusted (increased) in the amount of $111,849. The increase in asset value was offset by an increase in reserve accounts in the same amount. The small tools account was segregated (through use of subsidiary accounts) to distinguish between cataloged, uncataloged and expense items. As a result of increasing the asset amount (upon which monthly depreciation accruals are based), monthly depreciation expense and accruals also increased by $4,348. This additional depreciation is distributed to project costs monthly. The overage discovered through physical inventory was attributed to the inheritance of small tools of an expense nature from other CPFF Contractors in connection with clear-up activities for newly constructed facilities.

Reconciliation of Spare Equipment Held in Storage was completed during the month. An adjustment (increase) of $60,600 was made to the account as a result of physical inventory. The net increase in Spare Equipment Held in Storage was attributed to a combination of the following: The removal of equipment without knowledge of Stores personnel, confusion during inventory between classification of spares as equipment or parts, and improper coding of documents to captions as well as to inventory or equipment accounts.

The review of depreciation rates (composite) for plant and equipment accounts, not included in a previous depreciation study, were completed during the month. The review was required as the result of a memorandum from AEC-Washington, stating that changes in composite depreciation rates must be approved at the Washington level. Therefore, all rate changes from the plant appraisal to the current date were included in the study and submitted to GE Management.

The segregation of the electrical system between Community and Operations was completed during the month. That portion of the system applicable to operating areas (700 Area, Salvage Yard, and Central Stores) was transferred from Community Facility accounts to General Facility accounts. The electrical system applicable to Community was reduced from $3,085,000 to $2,291,000 as a result of segregation.

Plant Accounting Unit - continued

Project Unitization Reports completed and distributed in February include:

IR-167	Irrigation System - Jefferson Playground	$ 16,877
IR-175	Expansion of Riverside Park	6,621
CA-394	Plot Plans and Utilities - Hanford Works Laboratory Area	1,403,479
CA-516	1952 Hanford Expansion - Gable Butte Railroad	76,341
		$1,503,318

Completion of unitizations for both 100-K and Purex facilities is estimated at May 15, 1955. Actual costs through February 1955, plus estimated costs to complete, will be used as the total cost of project unitization reports. Addendums to final unitizations reports will be issued as required to balance with financial closing notices.

A study of the Redox Laboratory was completed at the request of Process Engineering Sub-Section. A percentage split of the building and equipment was made between Manufacturing (65%), and Engineering (35%). A detailed analysis of the records confirmed these figures.

A recap of the data used in preparing the Semi-Annual Domestic Manufacturing Plants Report (plant area square feet) was forwarded to respective landlords to be used by them in preparing and submitting data for the next semi-annual report.

Plant and equipment values at February 28, 1955, are:

	(In Thousands) Asset	Reserve	Net
Completed Plant and Equipment	$742,127	$302,013	$440,114
Construction Work in Progress	39,440		39,440
Total Cost Recorded (GE Books)	781,567	302,013	479,554
AEC and Other Contractor Costs			
Land and Land Rights	5,476		5,476
Construction Work in Progress-1)	202,688		202,688
Total Plant	$989,731	$302,013	$687,718

		(In Dollars) This Month	Last Month
1)	Kaiser	$119,766,675	$122,416,242
	Blaw-Knox	60,196,751	57,313,588
	AEC	22,724,472	22,762,883
	Total	$202,687,898	$202,492,713

Inventory Accounting Unit

The second annual physical inventory program which began in January 1954, of all materials (exclusive of source and fissionable materials) in inventory accounts in the custody of HAPO was completed in January 1955.

In all there were sixteen physical inventories, inclusive of 72,000 line items in 226 locations throughout the plant. Results of the physical inventory are summarized below.

Physical Inventory Value	$11,788,771
Reconciled Book Value	11,607,081
Net Overage	$ 181,690

The net overage consisted of:

Overages	
Coal-Manufacturing	$ 62,304
General Supplies-Stores	62,553
Spare Parts-Stores	61,445
Other Inventories	38,220
Total Overages	224,522
Shortages	
Essential Materials	42,485
Other Inventories	347
Total Shortages	42,832
	$ 181,690

With respect to the physical inventory program for calendar year 1955, a schedule was prepared and submitted to the AEC Finance Division showing the months in which the individual physical inventories would be taken. The program developed is essentially the same as that established for calendar year 1954.

The third annual physical inventory of transportation Fuel and Lubricants was taken as scheduled on February 10, 1955. Tentative results of this inventory reflect a net shortage of $13 under the reconciled book value of $13,881. The final report of this inventory will be issued in March 1955.

Preparatory work was begun during the month in making the necessary arrangements with personnel of both the Manufacturing and Employee and Public Relations Departments for taking the physical inventory of our coal supply. This inventory is scheduled to begin on March 23, 1955.

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 February 28, 1955, with results reported to Inventory Accounting by March 10, 1955, for reconciliation with accounting records.

Inventory Accounting Unit - continued

Following is a summary showing inventory account balances for the months of January and February 1955, together with amount of change.

(In Thousands)	Book Balance 1/31/55	Book Balance 2/28/55	Increase (Decrease)
Current Inventories			
General Supplies	$ 1,560	$ 1,581	$ 21
Fuel and Lubricants	73	- 73	0
Essential Materials	3,823	3,956	133
Total Current Inventories	5,456	5,610	154
Special Materials	1,352	1,360	8
Spare Parts	3,133	3,166	33
Standby	48	48	0
Excess Materials	445	478	33
Total Inventories - Gross	10,434	10,662	228
Less: Spare Parts Inventory Reserve	726	725	(1)
Standby Inventory Reserve	12	12	0
Excess Inventory Reserve	150	172	22
Total Inventories - Net	$ 9,546	$ 9,753	$ 207
As a Memo: Excess Equipment	$ 462	$ 505	43
Excess Equipment Reserve	(241)	(258)	17

Property Management Unit

The Equipment Budget for fiscal year 1957 has been under review with interested

Property Management Unit - continued

3. Recommendations for storing and disbursing material not now warehoused.

It is expected that Property Management will assist in this study.

In connection with the transfer of North Richland to the Army, all leases on privately owned buildings terminated on February 28, 1955. The tenants have 120 days to remove the buildings and clean up the lots. Extensions may be granted upon request of the tenant and posting of proper bond. All Government owned buildings will be vacated by May 31, 1955. Necessary arrangements have been made to insure the proper transfer of property carried in General Electric Company accounts.

An OPG on the Accountability and Control of Research and Development Equipment has been prepared and submitted to the Engineering Department for concurrence. The purpose of the proposed guide is to set forth the controls necessary to prevent the commingling, with the resulting confusion in plant investment records, of identical items of equipment, one of which is purchased as capital and the other as Research and Development Expense Equipment (RDX Equipment); to establish the procedures for the transfer of RDX equipment to the capital investment account; and to provide records which will result in the better utilization of RDX equipment that has served the purpose for which it was initially purchased.

Eighty-five requests for the disposal of property were investigated, processed and approved during the month.

Seventeen appropriation requests totaling $276,751 were approved during the month.

APPROPRIATIONS UNIT

The following Plant and Equipment projects were processed through the Appropriations Unit during the month. GE and AEC approval action was as indicated below:

Project Number	Title	Amount of This Request	Total*	Date to AEC	Disposition
CA-513	Expansion of 200 Area Facilities	- - -	- - -	- -	Work Authorities issued during month increased GE funds from $6,665,000 to $6,787,000
CA-539 Rev. 6	Additional Waste Storage Facilities for Redox	$ 47,000 GE	$3,622,000 755,000	2-4-55	AEC-38, Mod. 6, dated 2-25-55 authorized AEC $3,622,000
CA-546 Rev. 2	Fuel Element Pilot Plant	- - -	- - -	1-19-55	AEC-41, Mod. 5, dated 2-16-55 authorized AEC requested change of scope. Work Authority dated 2-21-55 authorized GE requested change of scope
CA-601 Rev. 1	General Grounds Improvements - 300 Area	96,000 GE 22,500	96,000 22,500	2-7-55	To be forwarded to AEC, Washington, for approval
CA-606	Additional Office Space - Central Stores Warehouse	125,000 GE 10,000	125,000 10,000	11-3-54	AEC letter dated 1-18-55 requested long-range study of office space
CA-612 Rev. 1	Alteration of Building 713 for Electronic Data Processing Machine	165,000 GE 75,000	171,000 75,000	12-8-54	AEC-54, Mod. 2, dated 2-8-55 authorized AEC $180,000. Work Authority dated 2-10-55 authorized GE $75,000
CA-615	Mechanical Maintenance Shop Centralization - 100 Areas	92,000 GE 42,000	92,000 42,000	1-12-55	To be returned to GE
CG-618	Replacement of Steam Line Support Poles	95,000	95,000	1-17-55	Forwarded to AEC, Washington, for approval 2-9-55
CG-620	Melt Plant Modifications - 314 Building	24,000	24,000	2-3-55	Deferred to AEC meeting 3-3-55
CG-621	Redox Contamination Control Facilities	48,000	48,000	2-4-55	HW-351 dated 2-15-55 authorized $48,000

Project Number	Title	Amount of This Request	Total*	Date to AEC	Disposition
CG-622	Replacement of Discharge Chute Liners, 100-B, D, and F Areas	$172,000	$172,000	2-16-55	AEC agenda 3-3-55
IR-176	Comfort Station, Sewage Lift Station, Chlorination Station, Riverside Park	- - -	- - -	1-25-55	Relocation of building and extension of time authorized by AEC 2-24-55
IR-184	Expansion of Facility for Testing Fuel Elements by Induction Heating - 314 Bldg.	- - -	- - -	2-24-55	Request for extension of time
IR-187	Protective Screens for Central Viewers, 105-C, DR & H	11,300	11,300	1-6-55	Approved by AEC 1-31-55

*Total previous authorizations plus this request.

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SF ACCOUNTABILITY SECTION
MONTHLY REPORT - FEBRUARY, 1955

SF Accountability Section Planning, Scheduling and Integration of Unit activities is the subject of a special report now approximately 50% complete. The review includes Section schedule, breakdown of Unit assignments, brief narrative, time table for completion and ultimate correlation of Section Schedule to Exempt Employee Appraisal Form. Completion is scheduled for March 15, 1955.

An integrated review program including accounting, measurement, and accounting procedure related to "J" slug shipments was completed prior to the resumption of shipments. Subsequent postponement of the initial shipment of this new series has been due to AEC action. The revised schedule now starts on March 7, 1955 and will continue through September with two shipments per week.

Metal Preparation Area-SF Accountability Unit

A comprehensive report covering Normal Uranium scrap or inactive material in the custody of the Metal Preparation Section has been prepared. This survey was conducted at the request of the USAEC for purposes of assistance in locating stockpiles, sources and potential sources of high grade scrap for return to production channels. A similar review covering Technical holdings is now in progress and is scheduled for completion in early March.

Improvement in the Thorium-U-233 account has been accomplished by the removal of negative inventory items and by the subdivision of burn out to the period covered by the report.

Shipping charges associated with Technical Section's requests can now be charged to their codes. This improvement in cost assignments has been made possible by the receipt of authorization to assign their codes where applicable.

Separations Areas-SF Accountability Unit

No movements of SF materials were reported for Task I or Recuplex. In addition, 234-5 Bldg. has been shutdown for equipment installation. Shutdowns are expected to continue through March.

Process and weight diagrams were prepared, in rough draft form, covering the Tank Farm accounts. This data is required as a preliminary step in the establishment of double entry books based on the standard accounting system now being installed. These accounts are integrated to the TBP-UO_3 accounts which are on a similar basis.

A new account was established covering Depleted Uranium-AEC code D-38 in order to comply with regulations. This material is appreciably depleted in U-235 and is used wherever feasible as a substitute for high cost material. It is anticipated that its use will increase particularly in Technical Section activities.

The problem of TBP-UO_3 source data has been improved by the direct use of transfer slips which eliminates summarization by operations.

Potential transfers to higher classification jobs in other Sections of the Financial Department have created a personnel shortage problem. The major problem at the present moment is that of personnel.

Separations Areas-SF Accountability Unit - continued

Operating plants are anticipated to show appreciable increases in Material Unaccounted For due to process vessel hold-up. This pattern is consistent with previous operating experience. It will be recalled that numerous plant clean outs took place in January. The return to normal operations results in the replenishment of process vessel heels and other hold-up not capable of inventory control. The accounts have not as yet been summarized by the development of increased Material Unaccounted For is expected.

SF Reactor Area-SF Accountability Unit

Cooperative activities of the SF Accounting Unit and of the SF Reactor Unit were directed towards the preliminary development of Reactor Area-SF Accountability procedures. Activities have been restricted to Depleted Uranium and to Plutonium with less important items to be taken up at a later date.

One of the major technical problems is associated with the adaptation of theoretical values and calculations to the accounting records. Unfortunately the theory does not provide straight-line functions with the result average values introduce errors when the range of values used exceeds narrow limits. The only feasible control is to increase the subdivisions to alarming proportions. Ways and means of control of the work load involved constitute a major problem for which the solution is not as yet evident.

Planning, Scheduling and Integration of SF Reactor Area Unit covering calendar year 1955 was completed and incorporated in the Section Schedule.

Due to the fact the SF Reactor Area Unit is a new function, the problem of original source data has been a subject of importance. Major items appear capable of adequate coverage. Relations with Manufacturing Operations Planning and Scheduling have been very satisfactory and no major problems are anticipated.

The format of Material Transfer Forms covering the SF shipments to the 200 Areas is currently under review. Copy coverage appears to be the only major revision. Resolution of the problem is expected in March.

SF Accounting Unit

Numerous items associated with the establishment of SF Accounting records for the Reactor Areas have been reviewed and are currently under development. C. P. Doriss is currently on full time assignment.

In anticipation of Overtime control a procedure was devised and placed in operation for inclusion in the Force Report. Following receipt of the regulations the procedure can then be used for determination of allowable overtime within regulation limits.

Recommendation for control of bias adjustments were formulated and submitted to the AEC. These regulations were directed towards the consistency of source data and SF Accounting records. The AEC, however, indicates that they are unwilling to accept this procedure. Difficulties in audit are expected as the result of this adverse decision.

SF Accounting Unit - continued

A substantial increase in work load resulted from AEC request for Production Rates. This information is being provided on schedule.

AEC Survey #12 has been initiated. Considerable assistance in the form of scheduling and reconciliation of books to inventory have been provided and have drawn AEC comments of a favorable nature.

Deadline dates for submission of the Monthly Material Balance Repot have been revised to the 11th working day of the month. A time schedule will be prepared covering Unit functions in compliance with the AEC directive.

SF Measurements Unit

The problem of Redox dissolver heels has been one of the inventory items requiring improved control. Equipment installation and calibration work on Dissolvers B and C is now complete. Improvements in control are expected.

Continued difficulties with fluorimeter analysis show a bias on the low side of 15 to 20%. This is a reduction of the problem but further progress is required. The effect of the low analysis is to understate the SF content of wastes. The problem is exclusively analytical and results in biased source data. In common to all bias problems the correction is an extremely complicated problem and complete elimination is not expected for some time.

Numerous miscellaneous improvements in measurements were made during February. Calibration tables were applied to H-7 and E-12, oils in the manometers were changed and excellent recovery of standard samples for E-12 assay established.

Sample frequency is the subject of a measurement review and will involve frequency, reliability and potential reduction of work load.

F. J. Zelley was transferred into the Unit in the position of SF Analyst.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION

FEBRUARY, 1955

	Current Month	Prior Month
Personnel Changes During Month		
Employees at beginning of month	469	467
Additions and transfers in	10	9
Removals and transfers out	(13)	(7)
Employees at end of month	466	469
Personnel by Component at Month - End		
General	11	10
Auditing Section	17	17
Budgets and Measurements Section	8	8
Contract Cost Section		
General and Consolidations Cost Unit	11	11
Engineering Cost Unit		
General	5	4
Design Cost	7	7
Project Cost	19	17
Technical Cost	10	11
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	10	10
Community Cost	6	6
Medical Cost	3	3
Manufacturing Cost Unit		
General	2	2
Financial Representatives	8	7
Budgets and Control	17	17
Reports and Records	18	19
Analysis and Studies	3	3
	121	119
General Accounting Section		
Accounts Payable Unit	25	26
Accounts Receivable Unit	21	21
General Books Unit	19	19
Administrative Planning	3	3
Contract Reimbursements	5	5
	73	74

	Current Month	Prior Month
Personnel Accounting Section		
Payroll Planning and Analysis Unit	5	6
Weekly Payroll Unit	17	18
Monthly Payroll Unit	12	11
Benefit Plans Accounting Unit	11	12
Payroll Reports Unit	7	7
Weekly Payroll Records Unit	6	8
	58	62
Procedures and Computing Section		
Computing Operations Unit	21	23
Numerical Analysis Unit	11	11
Procedural Analysis Unit	16	14
Scheduling Unit	24	26
Records Unit	8	8
	80	82
Property Accounting Section		
Appropriations Unit	5	5
Inventory Accounting Unit	12	12
Plant Accounting Unit	40	40
Property Management Unit	3	4
	60	61
SF Accountability Section		
Reactor Area - SF Accountability Unit	2	2
Separations Area - SF Accountability Unit	12	11
Metal Preparation Area - SF Accountability Unit	7	8
SF Accounting Unit	6	6
SF Measurements Unit	9	7
	36	34
Rotational Trainees	2	2
	466	469

[redacted] HW-35530-W [redacted]

PROCEDURES & COMPUTING SECTION
MONTHLY REPORT - FEBRUARY 1955

GENERAL

Four mathematical programming routines for the electronic data processing machine were successfully tested by IBM personnel at Poughkeepsie, New York on the 702 machine at the IBM factory. A representative of the Numerical Analysis Unit has gone to Poughkeepsie to test an interpretative routine and two parts of the weekly payroll program. A representative of the Electronic Data Processing Section of the Accounting Operations Department and a representative of the Schenectady IBM Office are participating in these tests for the experience which will be gained.

To expedite conversion of existing punched card procedures to the electronic data processing machine, a programming group was established during the month. This group is composed of business and technical graduates.

A major phase of classified document control was completed in February. Some 112,000 unit records were processed to establish uniform arrangement of serial numbers for documents created at sites other than HAPO.

Effective February 14, 1955 the function of key punching and verifying IBM cards for classified document control was transferred from the Procedures and Computing Section to the Technical Information Unit.

PROCEDURAL ANALYSIS

Forms control reviewed 354 orders during February covering 1,327,450 forms; 18 orders, amounting to 33,675 forms were rejected; 110 new forms were designed.

"702" Program

Standards for drawing flow charts of EDPM logic have been developed and are now in use by programmers. These illustrate by symbolism the methods used by the 702 in interpreting and processing data.

A programmer's manual is being written for use at HAPO. A rough draft of the first five chapters, totalling 40 pages, has been assembled to date.

Instruction in programming logic, special techniques, and short cut methods was given to intermediate and advanced programmers and analysts during February.

The program and flow chart for converting Classified Files Hanford accountability records from cards to tape records via the 702 was completed for testing.

Employee & Public Relations Department

Procedures for producing informational reports on exempt salaries and office machines are now operating satisfactorily. Testing and "housekeeping" work was performed on these procedures during February. No major changes were required.

An analysis of clerical procedures of the Hospital Sub-Section was completed during February. The results were reviewed with the Hospital Administrator for his comments and will be forwarded to the Manager - Employee and Public Relations the first part of March.

[redacted]

PROCEDURAL ANALYSIS (continued)

Engineering Department

The conversion procedures for establishing controls of Off-Site Documents were written, tested, and put into use. This now permits machine accountability for all copies of each document received at HAPO. The machine records indicate disposition of all documents handled by Classified Files.

Financial Department

Drafts of the proposed new Plant Record Unit History Record form were completed and reviewed with Plant Accounting. Detailed descriptions of the procedure were submitted to IBM to verify the ability of the typewriter/tape punch and tape to card punch to process the forms as they are now designed.

The revised work order procedure was completed and installed in the Machine Room. Assistance was given the Scheduling Unit in setting up new controls and balancing the first revised reports.

Manufacturing Department

A combined Purchase Order and Receiving Report form was put into use February 21, 1955. This new form is designed to prepare a Receiving Report on a translucent sheet as a by-product of typing the Purchase Order. Placing strip carbon in the set leaves blank spaces on the Receiving Report form for completion when material is received. Distribution of copies of the Receiving Report are produced from the translucency by a contact printer. This system eliminates copying descriptive or accounting information from a separate Purchase Order form. The estimated reduction of clerical labor in Receiving is 25%.

The type and number of forms being duplicated in area duplicating offices is being investigated. Records compiled over a three month period indicate approximately 30,000 forms a month are being duplicated. Some of these forms are in violation of CPG's covering Security and Forms Control. Violations which are discovered are referred to responsible supervision.

A study of Data Processing procedures in the Reactor Maintenance Sub-Section was begun. The major part of the investigation will be conducted in the 100-B Area.

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Employee and Public Relations Department	6	Standard	Storage	Cartons
Engineering Department	26	"	"	"
Financial Department	98	"	"	"
Manufacturing Department	99	"	"	"
Radiological Sciences Department	28	"	"	"
	257			

Two hundred and forty-six cartons of records were destroyed.

RECORDS OPERATIONS (continued)

Request for Authorization of Records Disposal Number 205, "Radiation Measurement Instrument Calibrations Records" and Number 206 "Radiation Exposure Incident Investigation Records" consisting of twenty-six individual records were developed and submitted to Radiological Sciences for internal approval.

NUMERICAL ANALYSIS

The routine processing of D-Reactor Data for the purposes of operating this reactor under "trip before instability" limits was initiated this month. Data is received weekly, combined with data on panalit gage base changes, and the required reports are available the day following receipt of the data. These reports are used in operating the reactor at a higher power level than previously possible, and at the same time furnish valuable information on the new operating philosophy.

The final calculations on the single-column experiment at C Reactor have been completed. Energy calculations (megawatt minutes) were completed for all 30,000 points of data, and summed over day, week, period of the experiment. The resulting exposure differed from that obtained by hand integration of control room data by 1.3% which is well within the error limits previously established. Additional listings of power and flow were also supplied. The latter will be used for studying tube flow and the efficiency of a purge made while the experiment was in progress.

The solution of some 100 sets of simultaneous equations has been completed. Each set consisted of six equations in six unknowns, and the calculations were done on the card-programmed-calculator, using a standard deck. The work was done in connection with a correlation study of process tube variables.

Routine calculations for the Radiological Sciences Department consisted of wind and weather calculations, sheep thyroid and radioanalysis calculations, and aquatic biology calculations. A meeting was held with representatives of the Biophysics Section to discuss the application of the 702 EDPM to the regional survey data processing problem. It was tentatively agreed to start converting data to punched cards as soon as possible to provide a backlog of data for initial 702 processing.

Work on the coordination of five year's wind station data and its application to the problem of stack gas dilution is continuing. All wind data has been transcribed to standard card forms and calculations on temperature gradient data have been completed. The results will be tabulated and frequency distributions made in the near future.

The routine Hanford Release report was completed. A revision of the computational procedure was made which makes it possible to perform all the necessary calculations on the card-programmed-calculator. Previously, a large portion of the calculations was done by hand. Further revision of the procedure is expected in the near future to include an additional phase of this program.

Work on the tabulation of collision density functions is continuing. During the month the functions πn (X,T) were calculated for X= 1 and N= 3 and X = 2 and N = 1,2, and 3. The corresponding probability functions were also calculated. The general nature of these functions is somewhat different from that expected. A test was made of the hypothesis that if the nth distribution is constant, then the n / 1st distribution will also be constant. The calculations indicate this is not the case. Work has started on the calculation of the functions for X = 0.5 and X = 1.5.

NUMERICAL ANALYSIS (continued)

Work on the preparation of mathematical subroutines for use with the 702 is continuing. Subroutines for fixed-decimal sine, square root, and exponential, and for floating-decimal addition, multiplication, and division have been tested on the Poughkeepsie 702 with good results. In addition, subroutines for floating decimal sine, cosine, and square root have been written.

The general purpose assembly routine for use in converting abbreviated coding to actual 702 codes was completed and tested at Poughkeepsie. This routine has been named SCRIPT (Scientific and Commercial 702 Subroutine Interpreter and Program Translator) for easier reference. The SCRIPT routine consists of some 800 machine instructions, and the machine test revealed less than 10 coding errors, a remarkably low percentage. The SCRIPT routine will be used in all further testing of programs.

As part of the conversion of the payroll procedure to the 702 a program for printing the voucher proof register was written. Storage limitations required the careful selection of methods for performing this operation. The program is being checked at Poughkeepsie.

A demonstration of the Donner electronic analog computer was held on February 10, 1955 for members of the Procedures and Computing Section. This computer is a small inexpensive device which was obtained through the auspices of the Engineering Department for training and orientation purposes. The computer is "programmed" by wiring passive electrical elements into a detachable problem board, and will be available on a loan basis to interested groups.

COMPUTING OPERATIONS

During the month of February the following non-routine assignments were completed for customers:

Atomic Energy Commission	1
Engineering	18
Financial	16
Manufacturing	10
Operations Research	1
Radiological Sciences	1
	47

Service charges for the month amounted to $45,452.65. Services, by customer, were as follows:

Atomic Energy Commission	$ 441.71	1%*
Employee & Public Relations	394.66	1 *
Engineering	15 125.82	33
Financial	27 178.99	60
Manufacturing	1 786.81	4
Operations Research	198.90	0 *
Radiological Sciences	325.76	1 *
	$45 452.65	100%

* Less than 1%

OPERATIONS RESEARCH STUDY

MONTHLY REPORT
FEBRUARY, 1955

The following is the month end summary of personnel:

	As of 1-31-55			As of 2-28-55			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. C. A. Bennett gave an invitational talk for the Seattle Section of the American Society for Quality Control, on February 8, 1955, in Seattle, Washington. On February 14, Mr. Bennett gave an invitational talk to the Cleveland Section of the American Statistical Association in Cleveland, Ohio. On February 15, Mr. Bennett gave another invitational talk at the 11th Annual Clinic, Rochester Society for Quality Control which was held in Rochester, New York. Mr. Bennett visited the Management Consultation Services Division and the Employee and Plant Community Relations Services Division of the General Electric Company in New York City on February 17, 1955.

Mr. L. W. Smith, Jr. visited the RAND Corporation of Santa Monica, California to discuss mathematical planning techniques relevant to the production scheduling operations research program, on February 14, 1955. On February 16, Mr. Smith visited with Professor A. H. Bowker of Stanford University.

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 February 21st through March 3rd.

Production Planning

Training of Manufacturing Department personnel in the use of mathematical planning techniques started during February. A series of conferences were held with production planning and scheduling personnel at which a new matrix was constructed incorporating current data which would yield a production plan parallel to a current production forecast. Personnel from the Manufacturing Department witnessed the solution of the linear programming system on the 701 computer at the RAND Corporation. Preparation for solution of linear programming problems on the Hanford 702 computer when it arrives is progressing rapidly.

As more complex planning models become necessary, new methods of solution must be found or existing methods improved. This involves a long-range program of mathematical research and development. Certain phases of this program are now being actively pursued.

Transportation

rations research relative to transportation of General Electric employees between Richland and the outer areas has been completed. Cost reductions depend upon the alternatives selected. Tangible cost savings must be weighed against possible deleterious employee relations resulting from shift revisions, additional limitations on the use of government vehicles, and changes in the status of the city shuttle system.