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58372

MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

FOR

MARCH 1955

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U.S. Atomic Energy Commission

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By [signature] 5/21/92
PM Eck 5-21-92

Compiled By
DEPARTMENT MANAGERS

April 20, 1955

RICHLAND, WASHINGTON

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

MARCH 1955

GENERAL SUMMARY

PRODUCTION OPERATION

Operation of the KW Reactor after the January incident was resumed at 11:23 A.M. on March 11, 1955. Operating levels are currently being limited to a tube power of 500 kilowatts pending evaluation of front face pigtail integrity. A maximum operating level of 1060 MW was achieved by month end. The loading of KE reactor was started on March 15 and completed, together with the appropriate technical tests, on March 27. At month end, equipment checking and flow tests were in progress.

The Redox plant, with an operating efficiency of 91 percent, achieved an all time record for instantaneous feed rates and total monthly uranium throughput. A rate of 10 tons uranium per day was sustained for a period of 83 hours with a total of 245 tons of uranium being processed for the month.

ENGINEERING TECHNOLOGY

Low power level operation of KW Pile with low graphite temperatures caused concern with respect to physical distortion of the graphite and a dangerous stored energy condition. Application of available data on physical property changes in irradiated graphite indicates that no serious problem exists.

A study of the technical feasibility of recovering U-233 in the Redox plant is in progress. It appears that about 50 tons/mo. of thorium could be processed (with no thorium recovery) with few changes in plant and equipment.

Preliminary scope was completed for the changes to the Purex Plant to attain an expansion up to a capacity of 2.75 times instantaneous design rate. This report provided the basis for a request to the AEC for authorization of design and procurement funds for increasing the capacity of the Purex Plant. AEC authorization for design and procurement was received March 21, 1955.

Minor Construction forces attained a record on March 29, 1955, of 2,000,000 manhours without a lost-time injury.

PERSONNEL & SERVICES

An interpretive routine capable of assembling program instruction in connection with the electronic data processing (702) machine has been developed. This is an original contribution to automatic programming and has created considerable interest among other operators of computing installations. It is estimated that this system may reduce programming time in some applications by as much as 90%.

The Attitude Survey was administered on March 25 without any serious incident, and participation among those available to participate was achieved.

A change in the housing policy was approved by the Atomic Energy Commission, to be made effective April 4, wherein female heads of families who are full-time employees on the Project, and whose employers have quotas, are eligible for government-owned housing.

1267235

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
MARCH 31, 1955

DEPARTMENT	EXEMPT		OTHER		TOTAL	
	3-31-55	2-28-55	3-31-55	2-28-55	3-31-55	2-28-55
Counsel	3	3	2	2	5	5
Operations Research Study	6	6	1	1	7	7
Special Study	-	3	-	3	-	6
Employee & Public Relations						
General	8	9	8	7	16	16
Salary & Wage Administration	11	11	11	10	22	21
Personnel Practices	14	14	41	39	55	53
Education & Training	6	6	35	42	41	48
Emp. Comm. & Pub. Rel.	10	10	41	43	51	53
Union Relations	5	5	1	1	6	6
Aux. Oper. & Plant Prot.	115	115	803	805	918	920
Community	84	84	336	329	420	413
Health & Safety	51	53	194	196	245	249
Engineering Department						
Engineering Administration	39	39	86	89	125	128
Advance Engineering	9	9	1	1	10	10
Design	181	181	123	121	304	302
Project	196	208	163	155	359	363
Pile Technology	231	227	146	146	377	373
Separations Technology	167	164	85	88	252	252
Manufacturing Department						
General	21	21	8	7	29	28
Reactor	299	293	1 356	1 347	1 655	1 640
Separations	289	283	1 562	1 442	1 851	1 725
Metal Preparation	103	101	544	552	647	653
Transportation	43	41	448	445	491	486
Purchasing & Stores	55	54	206	203	261	257
Electrical Utility	15	15	75	74	90	89
Financial Department						
General	9	9	3	4	12	13
Budgets & Measurements	4	4	4	4	8	8
Contract Cost	24	23	97	97	121	120
General Accounting	9	9	63	65	72	74
Property Accounting	15	16	43	45	58	61
Auditing	14	15	2	2	16	17
SF Accountability	10	10	27	26	37	36
Personnel Accounting	9	8	49	51	58	59
Procedures & Computing	29	26	49	52	78	78
Radiological Sciences Department						
General	5	5	-	-	5	5
Records & Standards	27	26	163	157	190	183
Biophysics	53	53	69	67	122	120
Biology	34	34	38	38	72	72
Engineering	6	6	1	1	7	7
Adm. & Communications	3	3	5	5	8	8
Grand Total	2 212	2 202	6 889	6 762	9 101	8 964

AREA PERSONNEL DISTRIBUTION
MARCH, 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	25	66	-	13	19	-	50	61	276	313	823
Other	12	26	2	72	20	-	19	28	207	218	604
Total	37	92	2	85	39	-	69	89	483	531	1 427
Manufacturing Department											
Exempt	60	55	67	66	53	-	59	246	104	115	825
Other	275	294	304	256	236	-	279	1 305	545	705	4 199
Total	335	349	371	322	289	-	338	1 551	649	820	5 024
Financial Department											
Exempt	-	-	-	1	-	-	1	3	5	113	123
Other	-	-	-	3	-	-	-	13	12	309	337
Total	-	-	-	4	-	-	1	16	17	422	460
Employee & Public Relations											
Exempt	22	6	7	10	9	-	3	13	11	223	304
Other	50	45	83	41	74	11	34	121	110	901	1 470
Total	72	51	90	51	83	11	37	134	121	1 124	1 774
Radiological Sciences											
Exempt	2	-	36	-	-	-	2	18	57	13	128
Other	6	-	40	-	-	-	15	17	177	21	276
Total	8	-	76	-	-	-	17	35	234	34	404
General											
Exempt	-	-	-	-	-	-	-	-	-	9	9
Other	-	-	-	-	-	-	-	-	-	3	3
Total	-	-	-	-	-	-	-	-	-	12	12
Total Exempt	109	127	110	90	81	-	115	341	453	786	2 212
Total Other	343	365	429	372	330	11	347	1 484	1 051	2 157	6 889
Grand Total	452	492	539	462	411	11	462	1 825	1 504	2 943	9 101

MANUFACTURING DEPARTMENT
MONTH OF MARCH, 1955

METAL PREPARATION SECTION

A net production of 421 tons of acceptable slugs, including 17 tons of cored slugs, was achieved in March. The production was 114 percent of forecast.

The canning yield for the solid and cored slugs was 79 and 75 percent respectively, with an overall yield of 79 percent. The major causes for rejection were bad welds, poor bonds and marred surfaces. The bad weld reject rate, reflecting primarily the occurrence of dimples in the weld bead, varied from five to 15 percent. Investigation of process variables that could contribute to the condition was continuing at month end.

Inventories of both bare and finished slugs remained below minimum during the month. Due to the uranium shortage every effort was made to return uranium scrap and oxides, and approximately 80 tons of the material were returned during the month to the Feed Materials Preparation center.

There were no autoclave failures in March.

A total of 1087 "C" slugs were canned during the month with 493 being canned by the hot press method.

REACTOR SECTION

The reactor input production for plutonium was 113.2 percent of the official forecast and a new production record was established as a result of the KW Reactor resuming operation on March 11. The reactor time operated efficiency was 83.6 percent which was 20 percent higher than that of February and the highest efficiency since September, 1954. The improvement resulted principally from the absence of major maintenance outages during the month and from the re-authorization to resume recovery from scrams on a modified hot start-up procedure.

The plutonium output production was 43.4 percent above the forecast as a result of discharging from H Reactor a large number of Production Test tubes that had reached exposures well above the goal and were believed to be near the rupture threshold. Tonnages of material discharged during the month were 154 and 104 of low and high concentration respectively.

During March, no new maximum reactor power levels were established, except for the initial rise in level at KW Reactor. The absence of new maximum levels was the result of increasing river water temperatures together with the fact that maximum exploitation has been made of power level gains permitted by the present effluent water temperature limits.

The KW reactor was started up for production operation at 11:23 a.m. on March 11. Operating levels are currently being limited to a tube power of 500 kilowatts pending evaluation of front face pigtail integrity. A maximum operating level of 1060 MW was achieved by month end. The loading of KE reactor was started on March 15 and completed, together with the appropriate technical tests, on March 27. At month end, equipment checking and flow tests were in progress.

Six slug failures occurred in March. These included three regular uranium slugs, one "C" piece and two production test pieces (one a cored uranium slug and one an unbonded slug with point closure.) The outage time required for removal of the ruptured slugs was 186 hours.

Twenty-two reactor scrams occurred during March. Of these, 13 at C, D, DR, F, and H Reactors were caused by normal Panellit system variables. Six Beckman scrams occurred, four at F Reactor and two at KW Reactor. Four of the scrams were due to faulty Beckman instruments, and two to the by-passing of three Beckmans at one time while adjusting trip settings. Three manual scrams, two at C Reactor and one at B Reactor, occurred as the result of indicated high tube temperatures. One of the C Reactor scrams resulted from a heat cycling condition which followed recovery from a Panellit scram. In the other two cases, the indicated high tube temperatures resulted from faulty thermocouples. Total outage time attributed to these scrams was 111 hours.

One process tube leak occurred at the C Reactor and resulted from a sheared rear Van Stone flange. The leak resulted in about 2200 gallons of water entering the reactor; however, collection rates were normal at month end.

At D Reactor one horizontal rod with a leaking thimble was replaced with a new thimbleless type half-rod. Two other rods in D, one leaking and one with a leaking thimble, were removed from service pending replacement during a later shutdown. In H Reactor one rod with a leaking thimble was removed from service.

The U-233 input production was 287 percent of forecast due to the cancellation of a discharge of an enriched thorium loading because of a revision in customer requirements. The input tritium production was 119.4 percent of the forecast. By month end the enriched lithium loadings in all tritium producing tubes in DR and C Reactors had been replaced with normal uranium, thus ending the tritium production program.

SEPARATIONS SECTION

The production of low ngs plutonium during March established a record with both Redox and T plant processing this type of material. The production would have been greater had not high Iodine 131 stack emission resulted in the diversion of T plant capacity to production test runs to permit an increase in the age of its regular production feed material. The production of the plants was 148.8 percent and 71.5 percent respectively of their official forecasts with Redox making up the T plant deficit for the official forecast.

The Redox plant, with an operating efficiency of 91 percent, achievel an all-time record for instantaneous feed rates and total monthly uranium throughput. A rate of 10 tons uranium per day was sustained for a period of 83 hours with a total of 245 tons of uranium being processed for the month. Three shutdowns totalling 63 hours were taken to replace a failed 2-A column feed pump, to flush columns because of poor decontamination, and to recover from a power failure affecting column instrumentation. The operating rate was adversely affected by the necessity for frequent regeneration or replacement of the silver reactors, difficulty with a centrifuge feed jet assembly which required replacement, and partial restrictions in the waste line which required periodic hot caustic flushes. For the month, the average production rate per operating day was 8.6 tons.

The T Plant production was seriously affected during the month by high Iodine 131 emission from the stack. Following excessive emissions on March 17 and 18, the dissolvers were shut down and an intensive program was initiated to determine the cause. Subsequent processing of long aged 300 MWD/ton production test material was started on March 23 and continued to the end of the month. The silver reactors were charged and regenerated, but higher than normal emissions continued.

A 24 hour scheduled shutdown at the TBP plant for work on the intercycle stripper was extended into a 112 hour shutdown due to difficulties experienced with jumper leaks and jumper make-up. Production rate increases achieved through equipment improvement offset the lost operating time and resulted in production which exceeded the forecast by six percent.

The UO_3 plant production was 115 percent of the forecast although operating rates were reduced periodically because of lack of feed material. A total of ten cars of powder were shipped offsite.

All material processed in the Isolation Building was of low level concentration. The plant exceeded the forecast by 28 percent. No operation was scheduled for the Metal Fabrication Building where the installation of new equipment in the Purification and Reduction Tasks was nearing completion. Pre-startup flushing and testing were in progress at month end.

The West Area evaporator operated during the month with T Plant first cycle and TBP wastes being processed with a volume reduction of 56.8 percent. The East Area facility remained in standby.

The removal of waste metal was limited by pump difficulties and final cleanout operations. At month end, preparations were being made to start sluicing operations of the one year old waste in West Area U Farm.

GENERAL

Personnel

On Roll March 1, 1955	4878
Net Increase	146
On Roll March 31, 1955	5024

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

[redacted]

MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY
FOR
MONTH OF MARCH, 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

1207202

[redacted]

HW-35891 DEL

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[redacted]

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Ea-3

[redacted]

April 6, 1955

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
March, 1955

I. RESPONSIBILITY

There was no change in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

	March	February	Year to Date
Total Acceptable Slugs Canned (Tons)	421	396	1223
Composite Canning Yield (%)	79	79	78
Efficiency (%) (Canning Through-Put)	94	96	94
Forecast Achievement (Current Commitment)	114	107	107
Net Acceptable Solid Slugs (Tons)	404	381	1169
Slugs Returned from Reactor (Tons)	3.33	2.27	13.82
Canning Yield (%)	79	79	79
Net Acceptable Cored Slugs (Tons)	17	15	54
Slugs Returned from Reactor (Tons)	0	0	0
Canning Yield (%)	75	73	71
Autoclave Failure - Solid (No./M)	.00	.02	.01
Autoclave Failure - Cored (No./M)	.00	.00	.00
Acceptable C-4 Slugs Canned (Pieces)	806	156	1728
Acceptable Pb-Cd Slugs Canned (Pieces)	1131	2461	7624
Acceptable 10-66 Slugs Canned (Pieces)	46	0	46
Average Steam Generated (M lbs/hr)	56.7	58.5	
Maximum Steam Generated (M lbs/hr)	90.0	78.0	
Total Steam Generated (M lbs)	42,234	39,326	
Coal Consumed (Tons)	2,658	2,563	
Sanitary Water from 3000 Area(Million Gals.)	55.0	49.5	
Total Water from 3000 Area (Avg.Rate-GPM)	1,233	1,228	

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2. Activities

A net production of 421 tons of acceptable finished slugs, which included 17 tons of cored material, was achieved during March. This was 114 percent of forecast. Three-shift operation was discontinued on March 14 and canning line-shifts were reduced from seven to six. The three canning lines were operated on a two-shift minimum relief basis during the remainder of the month. A significant reduction in reactor fuel requirements, due to start-up delays in K reactor and changes in the low concentration program, were responsible for the production cutback.

The composite yield remained at 79 percent in March. The quality of incoming bare uranium cores continued to be good and a significant improvement in the variability of reactivity of blended uranium has been noted. The major causes for rejection were bad welds, poor bonds and marred surfaces. The bad weld reject rate, reflecting primarily the occurrence of dimples in the weld bead, varied erratically from approximately five to fifteen percent. Investigation of the many process variables which could contribute to this condition was continuing at month-end.

Approximately 44 tons of cored slugs, 3300 enriched uranium-aluminum alloy slugs, and 3000 lead-cadmium slugs were shipped to reactor during the month.

Inventories of both bare and finished slugs remained below minimum during the month, requiring close liaison between the Reactor and Metal Preparation Sections to maintain production continuity. In order to supply the Feed Material Production Center with as much feed material as possible, every effort was made to return uranium scrap and oxides. Approximately 80 tons of this material was returned during the month.

Tap water corrosion tests of several hot press enriched uranium-aluminum alloy slug dummies revealed that localized corrosion occurred on the can wall near the cap end. Further analysis indicated that iron was present and it was assumed that the accepted practice of polishing enriched uranium-aluminum alloy slugs with steel wool prior to welding may have imbedded minute particles of iron in the can wall. In order to avoid any possible unsatisfactory performance due to this condition, it is planned to remove the iron deposits by etching present inventories of enriched uranium-aluminum alloy slugs in a chromic acid bath.

No autoclaves failures occurred during the month.

All steam generation equipment, compressed air equipment, sanitary water pumping equipment and laboratory area heating and ventilation equipment have been inventoried, maintenance schedules established, and cost codes assigned. The Productive Maintenance Program is in effect for the equipment.

Lectures and laboratory sessions on the four electronic testing instruments to be used for production testing are now completed. The classes were presented by E. C. Woods, Testing Methods, Fuel Technology Sub-section and covered the instruments and maintenance problems.

3. Special Operations

A total of 1087 enriched uranium-aluminum alloy slugs were canned during the month. Of this total, 493 were canned by the h[redacted]

3. Special Operations - continued

A total of 1324 lead-cadmium slugs were canned by the "C" process during the month with a yield of 85 percent.

Forty-six acceptable thorium slugs were recovered from storage and canned.

The cored slug welding equipment was relocated in the old 313 Building switch gear room during the month. Welding continued satisfactorily and the closer proximity of the pickle and canning operations has made it easier to coordinate the preparation and delivery of cored material to canning.

4. Schedule Variance

Acceptable canned slug production was 114 percent of forecast due to a change in the production schedule which significantly reduced the March commitment.

B. Equipment Experience

1. Operating Continuity

The canning line efficiency was maintained at 94 percent during the month, a decrease of two percent from the high of 96 percent in February. The reduced efficiency was due to planned production down-time to permit additional information and training meetings to be held.

Transformation tester difficulties occurred during the month at a rate of once every four hours. Causes included interference, broken and wet crystals, motor overload due to frequent starting and power supply, and scope failures. Corrective action has been taken on all these causes.

2. Inspection, Maintenance and Replacements

On March 10, 1955 the first induction furnace used in the new canning area failed due to cracked refractory in the induction channels. Metal had worked through this small crack and leaked between the case and the refractory. One of the vertical channels was plugged but because of the material's conductivity, the furnace had continued to function. It was necessary to dismantle the furnace, remove the lower case, and replace the refractory of the unit. Samples of the foreign material from the channels were found to contain strong amounts of aluminum, iron, lead and silicon.

The new penetration etch machine was placed in service on March 21, 1955. Some increase in the marred surface rejection category was experienced due to the absence of Teflon on the slug-supporting surfaces of a few of the new etch baskets.

In 384 Building, the new instrument air compressor is supplying excellent quality air to the control instruments and substantially reducing the frequency of overhauls.

Six failures of 200 ampere fuses, located in the power circuits to the new induction furnaces, briefly interrupted operations during the month. This was the first incident of this nature since the furnaces were accepted and placed into operation. Investigation was continuing at month-end.

1267252

2. Inspection, Maintenance and Replacements - continued

A high water level alarm was installed in the upper autoclave sump during the month. This alarm will indicate a pump or drain failure and is activated soon enough so that corrective action can be taken before serious consequences result.

Time clocks were installed and placed in service at the autoclave station during the month to provide an accurate and easy method of timing the autoclave test process.

All pressure release valves in the 300 Area have been inventoried, valve codes established, operating and relief pressures established and approximately 30% have been recalibrated. All motors, starters, switchgear breakers and relays for the 300 Area have been covered by a maintenance guide.

Preliminary work for the installation of more Tocco units in 314 Building is nearing completion. This work involved fabricating headers, running supply lines, enlarging water inlet piping and changing of steam lines. This job is approximately 95% complete mechanically and 80% complete electrically.

C. Improvement Experience

1. Production Tests

PT-313-47MT "Cored Slugs From Extruded Blanks and Rolled Rods" (HW-33189)
A total of 17.1 tons of finished cored slugs was produced with a yield of 75 percent. Bad welds and poor bonds continue to be the major causes for rejection. Production was limited by the quantity of cores and plugs available for canning.

Development was completed by Fuel Technology on crimped uranium plugs and pressed aluminum plugs. Supplements to the production test are being prepared to process approximately 3,000 cored slugs using crimped uranium plugs and a corresponding number using aluminum plugs for pile evaluation. Components for crimped uranium plugging have been ordered from Fernald. Arrangements are being made to utilize approximately 3,000 drilled slugs in storage for evaluation of aluminum plugs.

Recent production re-scheduling for the Hanford reactors has necessitated a temporary reduction in the cored slug program. Production of drilled cored slugs has been reduced to approximately forty tons per month until August, 1955, and the extruded cored slug program has been reduced to development work only, with a maximum of five tons per month until August. At that time, the extruded program will be re-appraised, and the entire cored slug program will be increased.

A total of 43½ tons of finished cored slugs was shipped to KE reactor and included in the initial charge. Three tubes of measured drilled and extruded cored slugs were charged in D pile on March 7.

PT-313-53MT "Effect of Slug Heat Treating Modifications Upon In-Pile Stability of Slugs" (HW-35590)
A production test was issued during the period to evaluate the effect of delayed quenching on the heat treating of as-rolled slugs in chloride salt. Existing slug heat treating equipment has been modified to meet the requirements of the test and processing will be initiated [illegible]

1207253

2. Process Tests and Revisions

The elimination of lift truck handling of autoclave nests and a 20 percent increase in the autoclave capacity made possible by the new 313 Building autoclave facilities is estimated, on the basis of time study, to yield a $6000 annual savings at present production levels.

Reduction of freight charges through the purchase of full carloads of aluminum caps and cans rather than partial carloads has resulted in a gross savings of approximately $3000 during the past three months. This has been the result of careful scheduling and a slight increase of cap and can inventories. Future savings will be reported in subsequent reports.

The cost of flameproofing Company-issue coveralls worn in the 303 Area has been reduced by treating only those coveralls which are worn in hazardous areas. It is estimated that 60 percent of the coveralls formerly flameproofed no longer need to be treated. Savings will be estimated as further experience is gained.

Approximately 1300 slugs were canned on the 45-second cycle during the month to provide additional material for evaluation purposes. No canning difficulties were experienced and operator acceptance of the faster cycle appeared good.

In an effort to increase reactivity in the Hanford reactors, a shipment of 10,000 bare slugs with a nominal diameter three mils greater than the standard size will be received in April and evaluated for canning and reactor performance.

The problem of external noise interference to the transformation tester is being studied. A noise dampening circuit has been designed and material for experimental testing has been ordered. A completely redesigned crystal mount has been completed by Engineering and is being tested for evaluation under operating conditions. A new crystal holder and saddle is also being designed for the units.

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 unchanged.

2. Material Variance

Material unit costs are expected to decrease .005 per unit due to slight increase in yields.

3. Other Costs

Other costs will decrease .005 per unit as a result of a 6% increase in production.

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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 by General Electric Company total $4,294,000 as of March 13, 1955. Construction is 74% complete as of March 31, 1955. The new cost estimate is $5,900,000. Present plans are for the Plant Maintenance forces to assume responsibility for placing all equipment in operation. The pickle machines have been placed in their final location. The wiring, piping and duct work is progressing with preliminary start-up expected in early May. The drain trench and floor have been made ready for the cap and can preparation equipment. The two machines have been positioned in the building and are being installed. The motor control and instrument panels have been set and are being wired. The overhead conveyor system in the canning area is approximately 65% complete. Supports for this equipment have now been installed in the old portion of the building. Studies relative to the ventilation problem in the canning area have resulted in complete drawings for a prototype installation. Installation will begin as soon as funds are available. One automatic quench machine has been modified and is now in operation. Alterations to the second machine are in progress. Difficulty is being encountered in attempts to obtain a satisfactory collet liner for the Acme-Gridley cut-off machine. Glass phenolic collet liners are being tested at present. Difficulty encountered with the synchronization of the three conveyors on the finishing line has been overcome by changing the system to a single continuous chain conveyor. Alterations to the west finishing line conveyor are essentially complete. Installation of the radiography machine was completed at month end. The general and supporting facilities are approximately 86% complete.

Modification of the 3706 Building is approximately 80% complete. The new facilities for the 300 Area First Aid unit in the 3706 Building have been completed. The move to the new location will be completed by April 2, 1955.

Project CG-610 "Replacement of Existing 313 Building Roof"
Project authorized funds total $55,000. Detailed design is 20% complete. Construction starting date is contingent upon progress of Project CA-514. Present conditions indicate that the starting date will be in the latter part of May, 1955.

Project CG-614 "Hanford 4-X Program - 300 Area Production Increase"
The estimated cost is $130,000. Scoping is 100% complete and detailed design is in progress. All major equipment has been purchased or is out for bids.

Project CA-590 "Fly Ash Collection Equipment - 384 Building" ($33,500)
Scoping and preliminary design are complete. The project proposal has been revised to include additional points of justification.

Project ER-A-3113 "Development of Independent Water Supply Source - 300 Area."
Estimated cost $32,000. Scoping is 100% complete. The proposal is being routed for necessary approvals within the Company.

F. Significant Reports Issued

1. Routine

Number	Title	Author	Date
HW-35594	Monthly Report, Metal Preparation Section, Process Sub-Section Feb. 1955	EW O'Rorke	3-3-55
HW-35633	Monthly Report, New Fuel Element Production Program	WA Blanton	3-4-55
HW-35771	Monthly Cost Report, Metal Preparation Section	FK Peck	3-15-55

2. Non-Routine

HW-35750	Individual Canned Slug Identification	SM Gill	3-8-55
HW-35790	Reynolds Metals Co., Vendor Evalnation-Aluminum for Can & Cap Fabrication	TD Naylor	3-16-55
HW-35707	Monthly Report, Metal Preparation Section, Operations Sub-Section Feb. 1955	WW Windsheimer	3-9-55
HW-35781	Proposed Changes to the HAPO Uranium Slug Core Specifications	SM Gill	3-17-55
HW-35811	Nitric Acid Loss in New Udylite Penetration Etch Machine	HL Brandt	3-17-55
HW-35877	Progress Report, Effect of Welding Variables on the Dimple Reject Rate	JE Ruffin	3-22-55

III. PERSONNEL

A. Organization

No change.

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	2	2	0
Operations	208	198	-10
Power & Maintenance	331	333	+ 2
Process	97	101	+ 4
Projects & Personnel	13	13	0
	651	647	- 4

C. Safety Experience

There were no major or sub-major injuries during the month. One near-serious incident was experienced on March 14, at 2:30 a.m. when two power operators were overcome by carbon monoxide during the ash sluicing operation. Modification to equipment and procedures have been made to insure more thorough quenching of the ashes before sluicing and increased ventilation of the sluicing pit.

D. Radiation Experience

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

E. Personnel Activities

1. Visits and Visitors

S. M. Gill visited the National Lead Company of Ohio at Cincinnati to discuss uranium quality control.

R. E. Olson attended the annual Western Regional Meeting of the American Society for Metals (Western Metal Congress and Exposition) in Los Angeles.

E. W. O'Rorke attended the Metal Quality Advisory Committee meeting in St. Louis.

2. Meetings

Fifty safety and security meetings and forty-seven round-table and information meetings were held for exempt and non-exempt members of the Section. Twelve exempt members attended two sessions of Work Simplification Training. Six people completed the Job Instruction Training Course.

Richland, Washington
April 7, 1955

MANUFACTURING DEPARTMENT
REACTOR SECTION
MONTHLY REPORT
MARCH, 1955

I. RESPONSIBILITY

There were no changes in Reactor Section responsibilities during March.

II. ACHIEVEMENT

A. Operating Experience

Total and plutonium input productions established new record highs in March, in both cases approximately 11 per cent higher than the previous records of January, 1955. Production resulting from operation of KW Reactor was primarily responsible for the attainment of the new records. Reactor time operated efficiency, 83.6 per cent, represented significant improvement over the 64.4 per cent efficiency in February, and was the highest since September, 1954. The improvement resulted from an absence of major maintenance outages in March, and from the reauthorization, late in February, of a modified hot start-up procedure which reduced the amount of outage time resulting from scrams.

A. Operating Experience (Continued)

Total and plutonium input productions were 114.7 and 113.2 per cent, respectively, above forecast as the result of KW Reactor production, which had not been included in the forecast, and the postponement of a 10 day horizontal rod replacement outage at H Reactor considered in the March forecast.

Mint input production was 119.4 per cent of forecast as the combined result of continuing the program longer than originally anticipated, and a higher than forecast operating efficiency at DR Reactor. Late in March, the remaining J-N tubes in C and DR Reactors were discharged, completing the Mint program. Thorium input production was 287.1 per cent of forecast due to the cancellation of a scheduled discharge of J-Q tubes because of a revision in customer requirements. Production charged to the Mint program at C and DR Reactors was 0.8 and 9.2 per cent, respectively. Production charged to thorium irradiation at C and H Reactors was 7.8 and 4.2 per cent, respectively.

Plutonium megawatt day output production was approximately 143.4 per cent of forecast in March due to the discharge of a large number of Production Test tubes at H Reactor, as described under "Improvement Experience," and a carry over of material discharged during the latter part of February.

During March, goal concentration of material discharged was increased to base goal plus 300 megawatt days per ton at all reactors except D Reactor where a pilot program at an increased concentration of base goal plus 400 megawatt days per ton is in progress, and at C Reactor which continued to produce low concentration material at a slightly higher concentration, 43.3 per cent of base goal. Tonnages of low and production concentration material discharged during March were 154 and 104, respectively. The latter figure includes approximately 7 tons discharged at D Reactor at essentially base goal plus 400 megawatt days per ton.

During March, no new maximum reactor power levels were established, except for the initial rise in level at KW Reactor, which at month end had reached a maximum of 1060 megawatts including burnout. The absence of new maximum levels was the result of increasing river water temperatures together with the fact that maximum exploitation has been made of power level gains permitted by the present effluent water temperature limits.

A. Operating Experience (Continued)

Six confirmed slug failures occurred in March as detailed below.

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

*One failure each from:
PT-105-570-A "Irradiation of Cored Uranium Slugs"
PT-105-580-A "Irradiation of Unbonded Slugs With Point Closures"

At KW Reactor, pre-start-up checks and tests were completed, and operation was resumed on March 11, as described under "Activities." At KE Reactor, pre-start-up tests and checks, and reactor loading continued throughout the month as described under "Activities."

1. Statistics

Operating statistics are summarized in the table on Page 4.

2. Activities

KW Reactor was started up for production operation at 11:23 a.m. on March 11. Operating levels have been limited by a tube power of 500 kilowatts necessitated by "pigtail limits" pending installation of more nearly satisfactory pigtails, and by the conditions outlined in Document HW-35690, "Initial Operation - KW Reactor." A maximum operating level of 1060 megawatts was achieved. Prior to start-up, all vital reactor components were thoroughly tested to assure satisfactory operation within the limits prescribed by Process Standards. Complete details relative to pre-start-up tests at KW Reactor are contained in Document HW-36092, "Monthly Report Reactor Section - Operations Sub-Section, March, 1955." Of particular note, was the replacement of carbon steel balls in 14 fringe hoppers with boron steel balls to insure safe operation of the reactor at its design level. This action resulted from analysis of pre-start-up reactivity tests at KE Reactor with the reactor fully loaded, fully enriched and dry.

Due to the priority assigned the KW Reactor start-up program, equipment inspection and testing was curtailed at

1. Statistics

	B	C	D	DR	F	H	KE	KW	Total or Average
Reactor Time Operated Efficiency (%)	84.6	69.5	73.9	93.0	95.6	78.5	-	93.4	83.6
Reactor Outage Time (Hrs)									
Plutonium Production	114.7	131.4	188.3	33.5	32.5	88.0	-	32.5	620.9
Special Irradiations and Tests	-	95.2	5.7	18.4	-	71.8	-	-	191.1
Total	114.7	226.6	194.0	51.9	32.5	159.8	-	32.5	812.0
Reactor Unscheduled Outage Time (Hrs)	35.8	226.6	38.0	35.4	2.1	32.2	-	32.5	402.6
Metal Discharged (Tons)	52.0	34.8	88.1	14.3	1.1	63.8	-	4.1	258
Water Quality (ppm Iron)									
Raw Water - Average	0.19	0.19	- *	0.20	0.14	0.22	-	0.34	
Raw Water - Maximum	0.93	0.65	- *	0.68	0.37	1.21	-	1.07	
Process Water - Average	0.007	0.009	- *	0.006	0.005	0.006	-	- *	
Process Water - Maximum	0.013	0.015	- *	0.011	0.008	0.008	-	- *	
Water Pumped (MM Gals)									
Bldg. 190 to Reactor	1906	2848	1995	1768	2009	1987	-	4201	16714
Bldg. 182 to 200 Areas					367				367
Bldg. 181		5409		4505	2722	2382	-	4522	19540
Steam Generated (MM Lbs)		172		240	159	111	-	25	707
Coal Consumed (Tons)		10855		15201	9726	7592			43374
Oil Consumed (Gals)							-	257831	257831

* No analyses made. Process Standard - Reactor Cooling Water 183-A-D10, "Aluminum Sulfate Coagulant Addition," establishes the microphotometer as the primary method of determining residual iron through turbidity measurements, and places the boildown method on an optional basis except where microphotometers are not available. Since all water plants are now equipped with microphotometers, and as experience is using them is gained, the number of areas reporting iron analyses may be expected to decrease. Consideration is being given to reporting turbidity measurements rather than iron analyses as an indication of water quality.

A. Operating Experience

2. Activities (Continued)

KE Reactor until March 11. Immediately thereafter, a full-scale testing program was initiated and continued throughout the balance of the month. Complete details of this testing program are contained in Document HW-36092. Loading of KE Reactor was started on March 15, and completed, together with appropriate technical tests, on March 27. At month end, flow tests are in progress.

At month end, operation at B, DR, F and H Reactors is limited by temporary outlet water limits as specified in Process Standard 105-A-040, "Process Tube Outlet Water Temperature Limits - Trip Before Instability." In addition, B and H Reactors are limited by maximum allowable graphite temperatures with maximum allowable helium as established by Process Standard 105-C-050, "Graphite Temperature Limits." C Reactor is operating under limits established by Production Test 105-548-E, "C Pile Graphite Burnout Experiment" to provide a graphite temperature of 600 C. D Reactor is operating under limits established by Production Test 105-546-A, "The Effect of Helium on D Pile Distortion." KW Reactor operation is limited jointly by limits specified in Documents HW-32869, "100-KW Start-Up Program," and HW-35701, "Process Change Authorization RP-14, Special Limitations for Initial Operation of KW Reactor."

Charge-discharge activities in March associated with major special irradiation programs included the discharge, without recharging of Mint material, of 285 J-N tubes at DR Reactor and 70 J-N tubes at C Reactor, completing the Mint program, and the discharge, without recharging thorium, of 44 J-Q tubes at H Reactor. The month end balance of J-Q tubes at C and H Reactors was 156 and 50 tubes, respectively.

At H Reactor, the KAPL recirculation loop was removed from the reactor and transported to a special pool of water for further technical studies. The removal was accomplished without incident despite extrapolated dose rates of 9,000 to 12,000 r/hr at one foot. Cleanup work is in progress preparatory to the installation of a new loop.

Addition of activated silica as a coagulant aid was started at all water plants during the week of March 7, as the result of the seasonal decline in river water quality.

The training of four 10-man Reactor Section rescue crews was started in March, with each crew receiving the first 16 of the planned 56 hours of training. An additional four crews will be trained later in the year.

[redacted]

A. Operating Experience

2. Activities (Continued)

The 1955 third party inspection of unfired pressure vessels and boilers in Reactor Section facilities was started in March.

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

	Tubes Charged	Tubes Discharged	Casks Shipped
Production Tests	8	155*	0
Mint (flattening)	36	28	0
Chemical 10-66	0	12	4
Rala	0	7	0
"B" Material	5	0	0
Totals	49	202	4

* The unusually high number of Production Test tubes discharged in March resulted from the discharge of 140 tubes at H Reactor under Production Test 105-539-E, "Slug Exposure at a Concentration of 900 MWD/Ton," as explained in detail under "Improvement Experience."

B. Equipment Experience

Twenty-two reactor scrams occurred during March. Of these, 13 at C, D, DR, F and H Reactors were caused by normal Panellit system variables. Six Beckman scrams occurred, four at F Reactor and two at KW Reactor. Four of the scrams were due to faulty Beckman instruments, and two to inadvertent by-passing of three Beckmans at one time while adjusting trip settings. Three manual scrams, two at C Reactor and one at B Reactor, occurred as the result of indicated high tube temperatures. One of the C Reactor scrams resulted from a heat cycling condition which followed recovery from a Panellit scram. In the other two cases, the indicated high tube temperatures resulted from faulty thermocouples. Total outage time attributed to these scrams was 111.1 hours.

One process tube leak, at C Reactor, occurred in March, and resulted from a sheared rear Van Stone flange. The leak was detected by high dryer room and drip leg water collection rates, and resulted in approximately 2200 gallons of water entering the reactor. Collection rates were normal at month end. The installation of "O" rings between rear Van Stone flanges and gunbarrels at F Reactor in February has reduced water collection rates from approximately 70 to 10 gallons per day. Additional improvement is expected when rings are placed on 156 tubes which presently have stuck gunbarrels.

[redacted]

B. Equipment Experience (Continued)

Horizontal rod work in March included; at D Reactor, the replacing of No. 8 rod, due to a leaking thimble, with a half-rod of the new thimbleless type, the placing of No. 5 rod on an emergency status when it was found to be leaking, and the removal from service of No. 2 rod due to a leaking thimble whose removal was unsuccessfully attempted; and at H Reactor, the removing from service of No. 5 rod due to a leaking thimble.

At B Reactor, additional material, including timbers and steel plate which had broken loose, were removed from the cushion chamber and junction box. An inspection of the D Reactor cushion chamber revealed a similar washing out of timbers and chamber lining. At month end, the chamber was being pumped down for removal of loose material and a thorough inspection.

Two additional failures of oil deflection plates in the fluid drive of Building 190-C pump units occurred during March. A representative of the vendor, American Blower Company, visited the plant and recommended that the aluminum deflector plates be replaced with stress-relieved steel plates. This recommendation is being followed.

Panellit gage reliability checks at four reactors during March revealed 10 faulty trips as detailed below.

	High Trips	Low Trips	Misc.	Total
B Reactor	0	2	0	2
C Reactor	0	0	0	0
D Reactor	3	1	2	6
H Reactor	2	0	0	2
Totals	5	3	2	10

On the basis of the above results, continued improvement in the level of gage performance was experienced in March.

C. Improvement Experience

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

PT-105-525-E (The Effect of Water Quality on Pile Operation) This Production Test, which has been in effect since January, 1954, to determine the effects of water of varying quality on reactor operation, was concluded in March, and the five tubes involved were returned to the normal process water system.

C. Improvement Experience (Continued)

PT-105-539-E (Slug Exposure at a Concentration of 900 MWD/Ton) In March, the 140 remaining B lot tubes at H Reactor reached an average exposure of 1135 megawatt days per ton with two of the authorized ruptures yet to occur. A test group of tubes was discharged to inspect the condition of the slugs. Many of these tubes were discharged with difficulty, and it was decided to discharge all 140 tubes, concluding the test. An additional 24 tubes of similar material not under the test were also discharged.

PT-105-567-A (Preliminary Irradiation of J-Q Columns) In March, this material reached an exposure approximately equivalent to 1380 megawatt days per ton for uranium tubes which is 82 per cent of the requested goal. One tube was discharged and recharged with J-Q material.

PT-105-579-A (Quantity Irradiation of J-Q Columns) Forty-four J-Q tubes were discharged at H Reactor and recharged with normal uranium. The month end balance of J-Q tubes at C and H Reactors under this test was 156 and 50, respectively.

PT-105-548-E (C Pile Graphite Burnout Experiement) This test, started at C Reactor in March, permits a full reactor graphite temperature of 600 C to study the effect of higher temperatures on graphite burnout.

Two revised Process Standards - Reactor were approved and issued during March. These were standards titled "Process Tube Outlet Water Temperature and Tube Power Limits - Slug Rupture," and "Properties of Vertical Rods." The first standard respecified the slug core tube power limit, previously specified to minimize slug failures due to core behavior, as a rate of increase of tube power which would apply whenever the previous maximum tube power at a reactor is exceeded. This was based upon recent good slug failure experience which indicated that the previous limit could be relaxed safely. The second standard respecified pneumatic cylinder air pressure trip settings for K Reactor vertical rods to overcome Mercoid switch limitations. The higher trip settings will not significantly affect reactor safety.

At D Reactor, an instrument designed to continuously monitor the exit water temperatures of 24 tubes on a six second cycle was used during a start-up in March. The instrument operated satisfactorily, although several adjustments and refinements will be necessary before it can be adopted for regular use. Capable of being used on any 24 tubes selected for monitoring the instrument contains an alarm circuit which will provide an audible signal when any one of the tubes exceeds a previously set temperature.

C. Improvement Experience (Continued)

At C Reactor, following satisfactory testing on mock-up facilities, the equipping of five process tubes with ball valves and auxiliary control equipment for charge-discharging of uranium during reactor operation was started in March. The results obtained in using this equipment on these five tubes will serve as a basis for possible larger scale application of the principle.

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 March, most of the significant factors affecting Reactor Section costs were of a beneficial nature, and included the record input production resulting from the improved operating efficiency and operation of KW Reactor, the relatively small amount of maintenance work resulting from slug failures and process tube leaks, and the absence of major maintenance programs. The primary factor adversely affecting Reactor Section costs was a significant rise in Power Sub-Section costs totalling approximately $146,000 as compared with February. The greatest portion of this increase, $102,000 resulted from a 35 per cent increase in steam generation over February when F Reactor was shut down most of the month. Chemical costs were increased a total of $35,000 as the combined result of decreased raw water quality and an increase in total process flow of 53 per cent, principally because of KW Reactor flow.

Total Reactor Section costs were increased significantly in March as the result of the initial inclusion of KW Reactor operating costs.

Preliminary estimates indicate that both plutonium irradiation and total irradiation unit costs will reach new record lows as the net result of the above factors.

E. Plant Development and Expansion

1. Project Status

The most significant Reactor Section project activity is reported below. Further details concerning projects 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 3/18/55.

[redacted]

E. Plant Development and Expansion

1. Project Status (Continued)

CA-431 (100-C Plant)
Completion of C Reactor replacement horizontal rods by about June 10, has been promised by the Western Gear Company. With that date in mind, tentative planning is in progress for a combined B-C Reactor outage at the time the B Reactor horizontal rod replacement work is in progress.

CA-512 (100-K Plant)
The start-up of KW Reactor, and the pre-start-up preparations at KE Reactor are described under "Activities." The Manufacturing Department has requested that the Reactor Projects Sub-Section consider a change in both design criteria and design of front face poison column water supply components to accommodate either normal or poison column tube charging. Work continues on correction of exceptions, with the work being accomplished by the Maintenance Sub-Section. The construction of an interim crib to be used in conjunction with the 107-K crib is in progress.

CG-558 (Reactor Plant Modification for Increased Production)
The revised project proposal was forwarded to the Atomic Energy Commission by the Financial Department on March 3. The proposal is currently under study, and approval is expected early in April. The remaining horizontal rod outages are scheduled to resume on April 18, at DR Reactor, followed at two week intervals by D, B, and H Reactors. As operating schedules permitted, preliminary project work continued at 100-B and D Areas.

CA-532 (Fiscal Year 1954 Water Tank Replacements)
This project was completed at 100 D and F Areas, with final inspection on March 31.

2. Plant Engineering

A number of engineering and development studies were active in the Section during March. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in document HW-36130. Several items of interest are reported below.

A program for determining the expected life of inhibited lubricating oils was initiated during March. Lubricating oil samples taken from process water pump units are ozidized continuously for 1000 hours under closely controlled conditions. Periodic tests during the oxidation process indicate the point

[redacted]

E. Plant Development and Expansion

2. Plant Engineering (Continued)

at which the inhibitor breaks down, and provide a reliable indication of the remaining service life of the oil.

Fabrication of component parts has been started for the installation of a five gpm laboratory size filter plant to be used in studying improvement in water processing methods. This equipment will provide a method of testing improvements in water preparation techniques or method in place of or prior to full water plant tests which have been the only testing methods available in the past.

A study is under way to determine the maximum permissible size for inter-area irradiated metal shipping buckets with the objective of reducing shipping costs. Fabrication of a test bucket of the new design has been authorized.

F. Significant Reports

1. Routine

Monthly operating reports issued for February were:

HW-35530-A	Reactor Section	J. H. Warren	3/7/55
HW-35623	Operations Sub-Section	J. H. Warren	3/1/55
HW-35652	Process Sub-Section	O. C. Schroeder	3/1/55
HW-35525	Projects and Personnel Development	F.A.R. Stainken	3/1/55
HW-35599	Radiation Monitoring Sub-Section	P. C. Jerman	3/3/55
-	Maintenance Sub-Section	E. E. Weyerts	3/3/55
HW-35612	Power Sub-Section	J. C. McLaughlin	3/3/55

Other routine reports issued during March included:

HW-35890	"Monthly Progress Report, Reactor Section Expansion, March, 1955"	J. P. Langan	3/23/55
-	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	F. A. R. Stainken	3/18/55
HW-35537	"Reactivity Balance and Associated Data - Period February, 1955"	R. E. McGrath	3/1/55

2. Non-Routine

HW-35764	"Final Report - Process Test MR-105-17, Water Quality Control - 100-F Area"	W. R. Conley R. W. Pitman	3/14/55
HW-34466	"Production Test 105-8-MR, Supplement A, Uranium Charging During Reactor Operation"	J. E. Robb R. D. Schilling	1/17/55

F. Significant Reports

2. Non-Routine (Continued)

HW-35817	"Additional Factors Involved in Raising Reactor Tube Outlet Temperatures"	A. K. Hardin	3/18/55
HW-35545	"Storage Bucket Requirements for the 100 Areas Through Fiscal Year 1957"	A. L. Bement	2/21/55

III. PERSONNEL

A. Organization

Effective March 1, W. K. MacCready was appointed Manager, Reactor Section vice J. H. Warren. Mr. Warren was appointed Superintendent, Reactor Production, Operations Sub-Section vice R. O. Mehann who was appointed Technical Specialist - Reactor in charge of 100-K Area reactor start-ups and reporting directly to Mr. MacCready.

B. Force Summary

	Beginning of Month	End of Month	Net Change
Section General	2	2	0
Operations	366	369	/ 3
Maintenance	605	608	/ 3
Projects & Personnel Development	40	42	/ 2
Power	487	487	0
Process	63	67	/ 4
Radiation Monitoring	79	82	/ 3
Section Total	1642	1657	/ 15

Changes during January included 16 transfers into the Section, three transfers out of the Section, six new hires, three terminations, no reactivations, and one deactivation.

C. Safety Experience

There were no Major or Sub-Major Injuries in the Reactor Section during March.

D. Radiation Experience

There were no Class II Radiation Incidents in the Reactor Section during March. One Class I Radiation Incident, No. 428, occurred at C Reactor on March 17, when a Maintenance Sub-Section employee received an uncontrolled exposure when

D. Radiation Experience

contaminated water splashed onto his coverall sleeve and skin as he removed a front pigtail from a process tube containing a slug failure. This incident is described in detail in Document HW-35991

E. Personnel Activities

At month end, 13 employees are receiving on-the-job training for engineering or supervisory assignments in the Section; six of these are on assignment under the rotational training program.

J. S. Corbett, Radiation Analyst, left March 26, on a two week trip to the Midwest and East to discuss possible improvements in protective clothing with several vendors.

J. C. McLaughlin, Power Sub-Section Superintendent, attended the American Power Conference in Chicago during the week of March 28.

E. W. Baker of the Process Sub-Section attended the Ninth Annual Western Metals Conference and Exposition at Los Angeles during the week of March 28.

On March 4, while on a technical recruiting trip to the Universities of Nevada, California, and California at Los Angeles, F. A. R. Stainken, Superintendent, Projects and Personnel Development Sub-Section, represented HAPO at a General Electric Company sponsored dinner and educational program for approximately 25 prospective graduates of the California Institute of Technology.

In March, the Operations Sub-Section began a series of weekly information meetings conducted by Unit Superintendents for Operating Supervisors and Chief Operators. Generally, these meetings include discussion of Company and Section policies, and operating procedures.

H. A. Kramer of the Maintenance Sub-Section on March 8, addressed a group at the Pasco Methodist Church on the subject of leadership.

An Education and Training Section program on Conference Leading was held in 100-B Area on March 15 and 16, for eight supervisors representing a cross-section of Reactor Section supervision.

Richland, Washington
April 7, 1955

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
MARCH, 1955

I RESPONSIBILITY

The Purex Sub-Section was established and key personnel for staffing the organization were transferred into the new Section. The B Plant Sub-Section was deleted from the Separations Section organization, and responsibilities for rehabilitation of B Plant were transferred to the Projects and Personnel Development Sub-Section, Contact Engineering Unit.

II ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	March		February	
	Normal	Acid Wash	Normal	Acid Wash
Charges started in Canyon Bldgs.	56	4	98	0
Charges completed in Conc. Bldgs.	56	4	100	
Special charges - Conc. Bldgs.	18		5	
Charges completed-Isolation Bldg.	213		199	
Average Waste Losses, %	4.30		3.97	
Special charges-Isolation Bldg.	23		12	
Material balance, %	103.9		107.9	

a. Bismuth Phosphate Operations (Continued)

	March		February	
	Normal	Acid Wash	Normal	Acid Wash
Yield through Process, %	99.6		103.9	
Average cooling time (days)	119		100	
Minimum cooling time (days)	64		67	

b. Redox Operations

	March	February
Equivalent charges started	133.9	109.2
Charges completed	127.8	95.6
Tons Uranium delivered to storage	245.4	181.6
Average Production Rate per operating day, Tons	8.6	8.0
Average Daily Operating Rate for the month, Tons	7.9	6.5
Average yield, %		
Uranium	98.8	96.5
Plutonium	100.2	101.7
Total Waste Loss, %		
Uranium	0.46	0.33
Plutonium	0.82	0.79
Average cooling time, days	82	92
Minimum cooling time, days	76	75
Percent down time	8.1	19.5

c. 231

	T	S	Z	Total
Batches started	86	150	0	236
Batches completed	85	150	0	235
Batches awaiting processing	2	7	0	9
Average yield, %	89.9	94.9		
Average Recycle, %	9.5	3.6		
Average Purity, %	96.3	96.2		

d. 234-5 Operations

	March	February
Batches completed through Task II	0	0
Runs completed through Task III	0	0
Reduction yield, RM	0	0
Waste Disposal, units	0	0

e. UO_3 Operations

	March	February	To Date
Uranium drummed, Tons	367.10	304.46	8992.87
Uranium shipped, Tons	342.87	283.01	8944.40
Average cooling time, days (Redox)	90	97	
Minimum cooling time, days (Redox)	81	80	
Waste loss, %	.02(est.)	.02(est.)	

f. TBP Operations

	March	February	To Date
Tons received from Metal REmoval	169.79	134.86	5111.67
Tons shipped to UO_3 Plant	165.05	129.95	4942.85
Average Production Rate per operating day, Tons	6.53	5.65	
Average Daily Operating Rate for the month, Tons	5.32	4.64	
Average yield, %	97.99	95.18	
Total Waste Loss, %	2.39	3.48	
Ratio Actual Waste Volume returned to Theoretical Volume	0.63	0.98	
Percent Down Time	15.05	17.86	

g. Power

	200 East	200 West
Raw water pumped, gpm	1 722	6 522
Filtered water pumped, gpm	603	1 043
Steam generated, lbs/hr	55 372	211 782
Maximum steam generated, lbs/hr	90 000	346 000
Total steam generated, M lbs.	41 197	157 566
Coal consumed, tons (est.)	2 360	9 418

h. Waste Storage

	Equivalent Tons U	
	March	February
Metal Waste reserve storage capacity-T Plant	289	364
1st Cycle reserve storage capacity-T Plant	681	416
Metal Waste reserve storage capacity-B Plant	685	866
1st Cycle reserve storage capacity-B Plant	74	74
Redox Waste reserve storage capacity	1114	1278

2. Activities

a. Redox Processing

New records were established during March for instantaneous feed rates and total monthly uranium production. A rate of 10 tons

a. Redox Processing (Continued)

uranium/day was maintained for 83 hours and a total of 245.6 tons of uranium were produced this month, exceeding the previous (December 1954) production record by 14%.

Three shutdowns of the extraction batteries were necessary this month, with the first occurring on March 16 for 24 hours due to failure of the 2A column feed pump. A second shutdown of approximately 36 hours occurred immediately after startup from the previous shutdown, due to poor decontamination of the product. A crash shutdown of less than three hours duration occurred on March 24 due to a power failure which affected column instrumentation. Except for the above shutdown periods, operating rates were maintained from 8 to 10 tons/day throughout the month. The 1A column let-down valve limited capacity of this column to 9 tons/day. When it was necessary to shutdown the 1A column for flushing on March 9, the 1S column was placed into service without curtailment of production. With the 1S column, rates up to 10 tons/day were established and maintained for 83 hours, however, inadequate instrumentation on 1S column prevented obtaining optimum operating conditions. Production was returned to the 1A column following the March 16 shutdown. Other causes for rate curtailment below that theoretically possible with present equipment included frequent regeneration and/or replacement of silver reactors, trouble with the centrifuge feed jet assembly (G-5 to H-2) which required replacement and partial restrictions in the D-8 to 241-S waste line necessitating periodic hot caustic flushes to keep clear.

It is anticipated that present production rates of 8.5 tons/day will be maintained until depletion of low MWD metal inventories early in April.

b. Metal Recovery

1) TBP Processing

The TBP Plant operated continuously this month except for a scheduled shutdown of 24 hours which extended into a 112 hour shutdown due to difficulties experienced in jumper make-up, jumper leaks, and let-down valve operation. Recurrent difficulties with the 001-TXR pump resulted in lower feed inventories for a short period which required cutting back canyon rates. However, recent reductions in waste losses due to intercycle stripper modifications and production rate increases achieved through improvements in equipment, satisfactorily offset the periods of difficulty, resulting in production for the month which exceeded the commitment by 10 tons.

2) UO_3 Processing

The UO_3 Plant operated continuously during the month except on March 11, 12 and 13 when the building was shut down due

2) UO_3 Processing (Continued)

to lack of feed. The TBP outage and difficulties experienced with high gamma UNH at Redox which occurred simultaneously caused this shut down. This inoperative period was devoted to maintenance repairs and building clean-up.

3) Waste Metal Removal

During the month, 104-C tank was declared empty and this completed the removal program in the CR farm. This farm was placed on standby and the operating crews moved to UR farm for start-up of this facility. The major removals for the month came from BXR and TXR farms with minor clean-up amounts from CR farm. While removal was maintained at a satisfactory rate to make TBP Plant commitments, extended difficulties experienced with the 001-TXR accumulator pump exemplified the problems of essentially two farm operation which should ease next month when UR farm is placed in service.

c. Isolation and Fabrication Processing

All material processed in the Isolation Building consisted of low MWD metal for off-plant shipment as nitrate. Sustained production rates at the Separations Facilities permitted the monthly commitment to be exceeded by approximately 28%. This was accomplished without difficulty, even though operations were confined to two cells after mid-month.

The continued curtailment of metal fabrication operations for replacement of Task III equipment permitted assignment of operating personnel to activities associated with the startup of the new facilities. These included water and acid flushes as well as dry runs in the purification equipment of Task I.

Testing of the reduction equipment in Task III included operation of the equipment with uranium as a substitute for plutonium. Several difficulties such as more power in diverter arms used for moving processing containers, cracking of refractories and sticking of slag to the button were experienced. Following correction of these conditions, preparation for operating the Task I and III on regular production were being made at month end.

During the period of Task I and Task III shake-down, work has been performed in the casting and machining operations toward preparing the equipment for fabrication of multiple casting and handling of three different models in the line. Techniques in preparing 2, 3 or 4 approximate shapes were used.

d. T Plant Processing

T Plant production was seriously affected during the month when an excessive iodine^{131} emission from the stack was encountered on March 17 and 18. The dissolvers were shut down and an intensive program was initiated to determine the cause. Subsequent processing at a reduced rate using special test material (300 MWD/T) resulted in some iodine emission. Processing of normal 200 MWD/T material which has aged 73 days is now planned in step-wise operation to determine steps to be taken to control the iodine^{131} emission. Silver reactors were changed and regenerated, however higher than normal emissions of iodine^{131} continued.

3. Special Operations

a. Waste Evaporators

A total of 353,375 gallons of T Plant first cycle and TBP wastes were processed in March. A volume reduction of 56.8 percent was maintained. The 242-B facility remained in standby.

b. Plutonium Recovery, Metal Fabrication

Recovery processing remains suspended during the month while operating efforts were concentrated on training of personnel in the new Recuplex facility.

4. Schedule Variance

Redox production of 245.6 tons of uranium established an all time monthly record while T Plant production was curtailed due to excessive iodine^{131} emission; however the Section commitment for separated plutonium 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. Nine carloads of UO_3 powder were shipped in March.

B. Equipment Experience

1. Operating Continuity

Redox down time totaled approximately 63 hours due to mechanical failure (2A column feed pump), column flushing and a power failure.

Downtime in TBP amounted to approximately 112 hours due to a scheduled shutdown and difficulties experienced in jumper installation.

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.

1. Operating Continuity (Continued)

Approximately 24 hours lost time occurred in T Plant, primarily due to dissolver troubles.

2. Inspection, Maintenance and Replacement

a. 2A Column Feed Pump - Redox

The 2A column feed pump failed on March 15 and was replaced with a regenerative turbine type pump.

b. Power Outage - Redox

An interruption to the electrical power serving the Silo operating panel instrumentation shut down operations for approximately three hours on March 24. Power was immediately restored and operations were resumed.

c. 60 Ton Crane - Redox

Extensive crane work, including decontamination work, was carried on during the month. Included in the work was replacement of the left cell wrench in a radiation field of 1.4 R at three feet, installation of "Quik connect" couplings on the spare festoon cables, and installation of ground indicator meters on the exciter circuit to indicate short circuits in these lines.

d. Silver Reactors

1) Redox

During the month the C-3 reactor was regenerated three times and the A-3 reactor was regenerated once. Since the iodine removal efficiency of the C-3 reactor was not satisfactory, this reactor was replaced at month end.

2) T Plant

During the month, due to the iodine^{131} emissivity problems, the 3-5R reactor was replaced on 3-7-55, regenerated on 3-9-55, and again replaced on 3-31-55. Following regeneration of the 4-5L reactor on 3-19-55, iodine removal performance was unsatisfactory and the reactor was replaced with the 3-5L reactor. Replacement of the 3-5L reactor is scheduled in April.

C. Improvement Experience

1. Process Tests and Revisions

a. Test of 1S Column Operation - Redox

On 3-9-55 the first cycle feed stream was diverted from the 1A to the 1S column to provide assurance as to the operability of the parallel 1S column and to provide an opportunity for water flushing of the 1A column. Due to lack of adequate instrumentation the 1S column operated with the interface in the raised, or designed, position and decontamination efficiency appeared to be somewhat lower.

A rate of 10 tons/day was maintained on the 1S column for approximately four days indicating a somewhat higher capacity for the 1S column than the 1A column. This rate differential has been ascribed to a lower capacity 1AW let-down valve. Testing of the 1S column was terminated on March 16. Completion of instrumentation and minor piping revisions are progressing on the 1S column so that it will be available as a fully equipped parallel first cycle extraction column.

b. Iodine Emission

1) Redox

When excessive iodine emissions were encountered during the month, steps were taken immediately to define and determine a solution to the problem. Additional sample lines to the individual off-gas dissolvers were installed and a sampling program was placed in effect to determine evolution peaks. Also, regeneration of the silver reactors was resorted to whenever evidence indicated that this might be beneficial. By month end definite improvement had been noted although the problem had not been resolved completely. Data correlation will be continued.

2) T Plant

The iodine^{131} problem in T Plant during March was much more severe than that encountered at Redox. The underlying cause(s) do not appear to be identical despite the similarity of the dissolving process. However, it became apparent that the decay age of the metal dissolved must not fall below 75 and possibly 90 days. During the month a program was initiated to determine in what phase of the process the iodine^{131} is evolved. Also, silver reactors were changed and the method of regeneration of the units was thoroughly reviewed to assure complete and adequate coating of the packing material. At month end, metal was being dissolved at a low rate under rigidly controlled conditions in an effort to resolve the iodine problem.

c. Waste Scavenging

There was no improvement in the operability of the waste scavenging program. The release of one BY storage tank from the B Plant

c. Waste Scavenging (Continued)

program for waste use, the cribbing of one tank of scavenged waste and reduced waste output as the result of in-building scavenged waste concentration did combine to minimize the immediate waste storage problem. However, the waste storage picture is still critical and facilities are needed for the in-tank scavenging of stored TBP wastes.

d. Pot Caking

While some caking appeared around agitator shafts for about a week no serious conditions were met all month. Two series of caking and reactivity tests were made. Sulfamic Acid (0.05 weight percent) plus Petro AA, a commercial anti-caking agent (0.01 weight percent) when added to pots gave no improvement. The same combination with 0.02 weight percent Petro AA resulted in serious foaming. These tests were discontinued.

2. Inventions and Discoveries

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

D. Events Influencing Costs

Although the runs processed by T Plant during March reflect a decrease of approximately 46% from the February production level, March's costs for the Separations Section are expected to increase by approximately ten percent. This increase in costs is the result of added essential material requirements associated with the record Redox production, the increased, over February, production achieved by TBP, the three day longer working month, and the addition of 117 employees to the Section roll.

E. Plant Development and Expansion

1. Project Status

a. Project CA-513-A - Purex

Construction at months end is 98.1 percent complete compared with a scheduled 100 percent completion. "Ready for Operation" date is still estimated to be October 1, 1955. Completion of construction exception items and operability tests is estimated to be July 1, 1955. Balancing of the canyon heating and ventilation system is scheduled to follow completion of operability tests. At months end Blaw Knox Company completed major responsibilities with the exception of sheet metal work on operation spare equipment, miscellaneous items necessary to return the mock-up shop to its original condition, and modifications to the two canyon

a. Project CA-513-A - Purex (Continued)

cranes. Financial status as of March 12, 1955 is 88.6 percent complete as compared to a scheduled 98.1 percent completion. The building cathodic protection system and communication was completed and accepted on March 8.

Approximately 50 changes and modifications requested in the later stages of construction checking are awaiting design approval or are being corrected by Minor Construction. Some of the major items are:

1) Changes in instrumentation to increase plant capacity to 1.5 times the designed rate.

2) Changes in canyon equipment to improve remotability.

3) General modifications to process samplers.

4) Relocate orifice plates on the cell side of the air tunnel ports. This arrangement will permit remote removal of the orifices to increase air flow through open cells.

5) Modify B samplers so that sampling may be performed by a new method which does not require the use of a bayonet.

6) Install rotameter after each metering pump so that flow of cold chemical addition streams to the process can be accurately determined.

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

Overall design is approximately 45 percent complete. The Lummus Company design package was received for approval by General Electric Company on March 25. General Electric portion of the design is 20 percent complete. Minor Construction is scheduled to proceed on the necessary tie-in changes in the near future.

c. Project CG-551 - 234-5 Expansion

Task III replacement was accepted with minor exceptions on March 18. Uranium stand-in runs are being processed through the equipment, and partitions between Task III and the remainder of the RMA line are being removed.

The Separations Technology Section personnel now occupy the new Final Inspection Facilities located in the northwest corner of the first floor.

d. Project CG-496 - Recuplex Installation

All portions of the Recuplex Facility, with the exception of one section of the solvent extraction hood, have been accepted by

d. Project CG-496 - Recuplex Installation (Continued)

Separations Technology Section with minor exceptions. A small crew of Minor Construction forces will be retained until April 8, to complete modification and startup items.

e. Project CG-549 - Task I Activation

Minor Construction completed their portion of the Task I Project on March 9. Plant forces have completed the work on exceptions and modifications of process hoods and equipment.

Failure of the refrigeration system heat exchangers to pass corrosion tests has made it necessary to use process water for cooling until the heat exchangers are delivered; delivery is expected sometime in May 1955.

Product shakedown of the equipment is scheduled for the week ending April 10, 1955.

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

The major revisions and additions to the 233-S, Final Concentration Building, should be completed by plant forces on April 1, with the exception of a few items to be completed after startup. The tie-in to the 202-S Building is tentatively scheduled for April 5, but will depend on results of the cold runs.

The progress on the 205-S Silica Gel Treatment facility has been slow, and the ready for use date is now May 1.

g. Project CG-613 - UO_3 Expansion Program

Department approvals of the project proposal for the construction and installation of six continuous calciners and accessory equipment have been obtained. The project proposal is ready for approval by the GE Financial Department.

A decision was made to install a prototype calciner in the 224-U pot room in order to expedite the activation of the production units upon completion of the project.

Detail design work for the expansion is scheduled for completion March 1, 1956.

h. Project CG-603 - 4X Program

Revision to Part I scope and Part II design criteria were submitted to and approved by the Design Council. The revised basis for rehabilitation of "B" Plant deletes items such as painting, spare parts, SWP lobby, laboratory equipment, transportation facilities, and shop facilities. Basic equipment requirements

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

for attaining proposed production levels for "B" Plant have not been altered. A revised project proposal which includes the Part I scope changes and the Part II design criteria has been prepared and is now in the process of being approved. Total project cost, based on the new revised scope, is now estimated at $5,300,000.

2. Manufacturing Engineering

a. Standards

The revisions to the labor standards for the Product Fabrication and Metal Recovery Sub-Section were completed. Similar endeavors in the T Plant are about 14% complete. A revised essential material standard for the 231 Building was developed and the steam standard for the 221-U Building was issued.

b. Work Simplification and Cost Reduction

1) T Plant Dispatcher

The investigation of the existing work load in this office was completed. Recommendations were made to install a PAX telephone unit and an Intrafax (ticker-tape) system for receipt of analytical results, to eliminate 30,500 ledger entries per month through redesign of forms and re-evaluation of record needs, and to re-arrange the office layout to effect motion economy. It is anticipated that five people will no longer be needed in this office upon adoption of these changes. First year net savings (after installation costs are deducted) of approximately $20,000 are probable.

2) Maintenance Records and Reports

A revised procedure was developed by the Industrial Engineering Unit for the estimation of work orders, procurement of material, and maintenance of cost records and routine reports. It was submitted to the Shops Unit, Power and Maintenance, for placing into effect in an effort to reduce the flow and amount of paper work involved.

3) Training

The spring semester Work Simplification program is 50% complete with 37 different jobs under study by the conferees for improvement.

c. Engineering Assistance

DECLASSIFIED

1) Cask Car Study

Final designs for the modifications to cask cars to lessen the

1) Cask Car Study (Continued)

contamination problem were completed and approved. Alterations, estimated at $2,684, were begun on one car to be used for test purposes. Completion of the modifications to this car is expected the latter part of April.

2) Canyon Cranes

A service engineer of the Whiting Company was consulted during the first week of March to aid in an evaluation of our crane alignment problem. At this time a complete set of new wheels, axels and bearings were installed on the U plant crane. The addition of this new gear plus the realignment features suggested by the service engineer has produced good performance characteristics from this crane. A complete report including data and other information forthcoming from the Whiting Company, is to be issued to cover suggested operational, maintenance and alignment procedures for all canyon cranes.

3) Noise Control

A study is underway to determine noise levels and intensities in various Separations buildings. Methods for correction or control to tolerate limits will be submitted in the form of a plant-wide report to be issued by the Plant Engineering Section.

4) Redox Ventilation

The mock-up cell ventilation tests were completed indicating that definite control of air flow is not accomplished below a flow rate of 200 ft/min. A report is being issued by the Engineering Department.

5) Off-Gas Units

Revised scope criteria is being prepared for re-design of the off-gas heating and absorbing units in T, B and Redox Plants. A remotely replaceable cartridge type heating unit and a canister type absorber with improved regeneration facilities are being specified.

6) Cover Block Bails

An investigation and study of the cause and correction of failure of tank farm cover block lifting bails is well underway. A test has been set up to evaluate a proposed method of strengthening bails by adding a socket anchored backing bar.

d. Property Management

As recommended by the Property Management Unit and the AEC, three buildings were disposed of by burning. These buildings, all of temporary construction were beyond the point of economic repair. Contamination on and around the buildings prevented their sale to an off-site contractor.

F. Reports Issued

1. Routine

Number	Subject	Author
HW-36056	Separations Section Redox Plant Sub-Section Monthly Report - March, 1955	R.T. Jessen
HW-36073	Separations Section Metal Recovery Plant Sub-Section Monthly Report - March, 1955	T. Prudich
HW-36059	Separations Section T Plant Sub-Section Monthly Report - March, 1955	C.T. Groswith
HW-36038	Separations Section Z Plant Sub-Section Monthly Report - March, 1955	W.N. Mobley
HW-36010	Separations Section Analytical Control Sub-Section Monthly Report - March, 1955	L.M. Knights
HW-36043	Separations Section Radiation Monitoring Sub-Section Monthly Report - March, 1955	A.R. Keene
Official Use Only	Separations Section Projects & Personnel Development Sub-Section Monthly Report - March, 1955	O.V. Smiset
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - March, 1955	C.P. Cabell
HW-36022	Separations Section Purex Sub-Section Monthly Report - March, 1955	V.R. Chapman
HW-35642	Essential Material Consumption for T Plant February, 1955	G.E. Cooper
HW-35643	Essential Materials Consumption for TBP Plant, February, 1955	G.E. Cooper
HW-35644	Essential Materials Consumption for Redox Plant, February, 1955	G.E. Cooper
HW-35645	Essential Materials ordered March 1 to March 31, 1955	G.E. Cooper
HW-35646	Essential Material Area Report to Cost and Purchasing, Feb. 1 to Feb. 28, 1955	G.E. Cooper
HW-35628	Separations Section Waste Status Summary, February, 1955	D.E. Peterson
None	Status of Projects, Informal Approval Requests, and Budget Items, March, 1955	R.M. Shervem
HW-35995	Separations Section Process Council Minutes March 8, 1955	W.G. Browne

2. Non-Routine

Number	Subject	Author
HW-35731-RD	Weekly Summary, Bismuth Phosphate Plant and Tank Farms for 1953	
HW-35732-RD	Weekly Summary, Bismuth Phosphate Plant and Tank Farms for 1954	
HW-35733-RD	Weekly Summary, Bismuth Phosphate Plant and Tank Farms for 1955	
HW-35830-RD	Bismuth Phosphate Process Control Unit, Monthly Reports, July 1952 through January 1953	
HW-35831-RD	Bismuth Phosphate Process Control Unit, Monthly Reports, January 1954 through December 1954	
HW-35875-RD	Bismuth Phosphate Process Control Unit, Sepcial Investigations, 1954 and 1955	
HW-35759	Radiation Incident, Class I, No. 431	D.R. Koberg
HW-36018	Radiation Incident, Class I, No. 433	W.G. Westover
HW-35864	Radiation Incident, Class I, No. 430	G.E. Backman
HW-35827	Radiation Incident, Class II, No. 92	D.R. Koberg
HW-35818	Elimination of Pulse Leakage During Column Outage - Purex	C.R. Anderson
HW-35833	Analytical Control Quality Report March 15, 1955	L.M. Knights b D.T. Crawley,
HW-35867	Determination of Sr^{90} in the Presence of Sr^{89} - March 21, 1955	H.R. Helmholz
Confidential Undocumented	Task I Operating Procedure	M.N. Raile
Confidential Undocumented	Task III Operating Procedure	C.L. Brown
HW-35607	Minimum PR Concentration-Task I Feed	E.G. Pierick
HW-35882-RD	Elimination of Plutonium Reductions	E.G. Pierick
HW-35724	Redox Process Discussion Meeting March 4, 1955	O.F. Beaulieu
HW-35466-RD	Labor Standard for the UO_3 Operations Unit	G.R. Ruzicka
HW-35541-RD	Labor Standard for the TBP Operations Unit	G.R. Ruzicka
HW-35526-RD	Essential Material Standard for the 231 Bldg.	R.H. Silletto
None	Analytical Service Standard for the Redox Plant	R.H. Silletto
None	Steam Standard for the 221-U Building	R.H. Silletto
HW-34550-RD	Labor Standard for the Redox Operations Unit	A.C. Morgentha V.P. Madsen
HW-34551-RD	Labor Standard for the Redox Plant Services	A.C. Morgentha V.P. Madsen

III PERSONNEL

A. Organization

Effective March 1, the Purex Sub-Section was established with the following personnel assigned to the organization:

A. Organization (Continued)

V. R. Chapman, Purex Plant Superintendent
F. A. Hollenbach, Superintendent, Purex Operations
J. M. Blackburn, Superintendent, Maintenance
C. R. Anderson, Head, Process Engineering

Effective March 1, B Plant organization was deleted from the Separations Section. T. Prudich, B Plant Superintendent was transferred to Metal Recovery Sub-Section as Superintendent, vice V. R. Chapman. Other personnel assigned to B Plant Sub-Section were transferred to Project and Personnel Development Sub-Section which assumed responsibility for rehabilitation of B Plant.

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	2	2	0
Redox Plant Sub-Section	232	233	+1
Metal Recovery Plant Sub-Section	282	304	+22
Z Plant Sub-Section	178	175	-3
T Plant Sub-Section	203	247	+44
Purex Sub-Section	-	137	+137
B Plant Sub-Section	39	0	-39
Power & Maintenance Sub-Section	332	326	-6
Projects & Personnel Development	131	62	-69
Analytical Control Sub-Section	162	185	+23
Radiation Monitoring Sub-Section	167	174	+7
Section Total	1728	1845	+117

C. Safety Experience

There were no major or sub-major injuries in the Separations Section in March. At the close of the month, both 200 Areas had operated 519 days without a lost time injury, an outstanding achievement since it involves almost 5,700,000 exposure man-hours.

D. Radiation Experience

Three Class I and one Class II radiation incidents occurred and included: (1) plutonium contamination via nitric acid burns to the forearm (20,000 d/m) of one process operator and to the finger tips (40,000 d/m) of a second process operator while removing filter blocks from a cleaning solution in cells 2 and 3 in 231-Z (No. 433); (2) uncontrolled exposure (up to 140 rads/hr) was experienced by a Sampler and two Radiation Monitors by walking too close to a 10-3 sampler jumper in the 221-T canyon (No. 430); (3) air contamination (up to 1.2×10^{-8} uc fp/cc) without benefit of respiratory protection to two Laboratory Assistants while operating a glove boxed sand blaster in 222-S (No. 431); (4)

D. Radiation Experience (Continued)

localized exposure above the permissible limit to the right hand (18 rads) and the right hip (1.5 rads) of a laboratory employee from a surgeon's glove, contaminated during slurping operations in 222-S (No. 92).

Daily emission of I^{131} from the T and S Plant stacks averaged 11.3 and 6.1 curies respectively. Regeneration of the A-3 and C-3 reactors in 202-S did not result in the expected lower I^{131} emission rates. Subsequent addition of mercuric nitrate succeeded in lowering emission rates by a factor of 2.. A maximum 24 hour emission from the 202-S stack of 19 curies was experienced. Regeneration of the 3-5R and the 4-5L reactors in 221-T was apparently ineffective. A maximum 24 hour emission from the 291-T stack of 90 curies was experienced. The emission of I^{131} from the 291-T stack was still not in control at month end.

Decontamination efforts on the Redox crane maintenance platform continued. Exposure rates were reduced from 300-500 mrads/hr to 30-150 mrads/hr.

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 Supervisor's Safety Training program and eighteen attended the sixth First Level Supervisors Information Meeting.

Seventy-four non-exempt people attended process training meetings; eighteen Instrument personnel are presently attending a nine week training course and twelve Radiation Monitoring personnel are receiving radiation and process equipment training.

Ninety two new employees attended orientation meetings. In addition training and programing assistance is being given to the Sub-Sections to supplement their individual training programs.

2. Personnel

Requisitions for 152 weekly personnel for the staffing of B Plant have been cancelled. Open requisitions are on file with Employment for 110 weekly employees.

During the month, one hundred seventeen non-exempt employees were added to the Separations Section rolls.

Obtaining stenographic-clerical help is still a problem; during the month, there were three terminations with only one addition. At present, there are eight open requisitions in the Section.

3. Visitations

Mr. E. G. Pierick, Head, Process Engineering, Z Plant Sub-Section, spent the week of February 28 through March 7 on a trip during which he visited the Dow Chemical Company, Rocky Flats, Colorado, and the University of California Scientific Laboratory, Los Alamos, New Mexico.

Mr. Robert E. Walser, General Electric TV installation engineer from Syracuse, supervised installation of the remote crane TV system during the month in accordance with contractural agreement. During his stay four electricians in the Maintenance Unit received training on the techniques of TV trouble shooting, adjustment, and maintenance.

Mr. A. Haines, Service Engineer from Whiting visited Hanford Works March 2 through March 8 to observe Whiting cranes.

April 5, 1955

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

March, 1955

ACHIEVEMENT

Operating Experience

Power Statistics (See last page for details)

Plant Contract

Probable time of March Peak . . .	5:30 - 6:00 p.m., March 25
TELEMETERED Peak demand for March	152,000 KW
Probable energy consumption for March	90,325 MWH
Billing demand for March	159,000 KW*
Actual BPA Metered Peak demand for February .	141,295 KW
Actual BPA Metered Energy Consumption for Feb.	63,970 MWH
Average Monthly Energy Consumption this FY through February	72,893 MWH

*The billing demand of 159,000 KW was the Contract demand figure previously reduced from 201,000 KW.

BPA System

The following momentary frequency fluctuations occurred during the month:

March 4, 1955; 11:49 a.m. to 59.67 cycles - Due to system loading
March 13, 1955; 2:40 a.m. to 59.62 cycles) Due to testing at
March 13, 1955; 4:12 a.m. to 59.66 cycles) McNary
March 21, 1955; 4:45 p.m. - 6:30 p.m. Several minor dips
March 24, 1955; 11:17 p.m. to 59.4 cycles - Due to trip out of Montana tie
March 27, 1955; 11:58 p.m. to 59.7 cycles - Due to system loading
March 30, 1955; 6:40 a.m. to 59.72 cycles - Due to system loading

No loss to production resulted.

HAPO System

During the performance of switching operations at the 251 substation, on March 28, power was inadvertently lost for approximately four minutes on one of the 13.8 KV lines supplying 200-E, the concrete batch plant, the 200-E-W and BY Telephone Exchanges, and North Areas. The cause was due to a switching error.

Equipment Experience

1. Prompted by the observation of a substation operator in 100-B-C, it has been determined that the 230 KV pipe bus supports as installed for the 105-C addition are marginal in stability. In normal high winds, the bus sections were observed to move each way an estimated 3" off center; the major displacement apparently accruing from the deflection of the insulator stack and the supporting pipe member. This condition is not considered to be too hazardous. The terminals of the bus are attached through flex couplings and should absorb the movement satisfactorily. This is the most probable point of failure. These fittings will be inspected periodically for signs of fatigue. If corrective action is indicated, it will be necessary to stiffen the supports in some manner. Design of future installations will be suitably revised.

2. In the course of checking the cause of erratic meter reading in the switchboards at 151-F, it was discovered that the hinge section of the control wiring on one of the 13.8 KV incoming line circuit breaker panels was in very poor condition. The wire was wartime vintage and several of the 30 conductors were on the verge of failing due to their inability to withstand the flexing when the door was opened and closed. During arranged conditions, the faulty wiring was replaced without production loss. Similar conditions have been corrected in 151-B and 151-D. Failure of these circuits would have caused loss of power to one of the 13.8 KV buses.

3. During one of the sub-freezing days in the early part of the month, lines in the vicinity of the 107 basins in 100-D, 100-F became sufficiently iced from the basin vapor as to require physical removal. The removal work was hindered by the SWP conditions and in 100-F power to the animal farm and fish hatchery could not be interrupted for long periods. Corrective measures are being studied. Considering the economic viewpoint and the unpredictableness of the wind and weather conditions, it is not planned to totally correct the situation.

4. Although unusually high winds prevailed for several periods during the month, there were no major system disturbances resulting from electrical plant deficiencies. Two more poles in the old Hanford-3000 Area 66 KV line broke off. The part on the ground only will be cleaned up at this time.

Events Influencing Costs

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

Materials carried on line trucks were given annual inventory this month.

The revision of the Power Contract demand for February and March from 201,000 KW to 159,000 KW resulted in a saving of approximately $124,000 in power billing for the two months.

Attendance for the month was 97.69%. 27.4% of the total absence was due to the absence of one man because of extended illness.

Plant Development and Expansion

Maintenance responsibility of the White Bluffs electrical distribution system, from the primary substation to the service entrance of the buildings, was assumed by this Section on March 15. Accrued costs will be billed to the AEC.

The writer has commended the Unit heads of the Section for their excellent performance in maintaining continuity of power, good relationships, and safe operation in 100-B and 100-D under the adverse conditions generated by Project CG-558. The major portion of the line work associated with site clearance around the 190 buildings has been completed by Minor Construction forces.

Planning associated with Project CG-558 and Project CA-586 (3rd 230-KV line) continued to require extensive attention.

In last month's report, it was estimated that the highest peak process power demand for any month during the balance of the fiscal year would be about 5% less than the Contract demand figure. Further investigation of the trend indicates that it will be more in the order of 10%. The lighter than anticipated loading at 100-K accounts for most of the differential. FY 56 Contract demand figures which were transmitted this week to BPA via AEC also reflected this differential plus an added margin of 2%. The unit cost of a KW month will also be affected to a lesser degree.

ORGANIZATION AND PERSONNEL

Force Summary

	March
Exempt Personnel	16
Dispatchers	5
Electricians	12
Lineman	22
Substation Operators	31
Secretary	1
Stenographer	1
Clerk	1
Storekeeper	1
Draftsman	1
	91

There were two hire-ins during the month; one lineman, one substation operator. Another lineman was removed from payroll during the month because of illness.

Safety Experience

Three minor injuries occurred.

During a lunch period, two men of the Line Maintenance Unit were testing their relative strength by forcing the others arm to the table. In the process, one of the men broke his right arm, requiring it to be placed in a cast for an expected duration of two months.

Radiation Experience

No incidents were reported.

Personnel Activities

E. G. Jones of the Transportation Section was guest speaker at the monthly informative meeting.

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ELECTRICAL UTILITY SECTION

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

	ENERGY - MW HRS.		MAXIMUM DEMAND-KW		LOAD FACTOR-%	
	Last Month	This Month	Last Month	This Month	Last Month	This Month
230 KV System						
A-2 Out (100-B)	22150	26530	45000	44200	73.2	80.7
A-4 Out (100-D)	14170	16010	24800	24700	85.0	87.1
A-5 Out (100-H)	8680	9230	16200	15500	79.7	80.0
A-6 Out (100-F)	3710	10185	14300	14800	38.6	92.5
A-7 Out (100-KW)	4320	16032	38000	47000	16.9	45.8
A-8 Out (200 Area)	5870	6290	10500	10500	83.2	80.5
A-9 Out (100-KE)	1584	1680	40500	13000	5.8	17.4
TOTAL OUT	60484	85957	189300**	169700**	47.5	68.1
MIDWAY IN	61541	87195	136000*	145600*	67.3	80.5
115 KV System						
BB3-S4 Out (300 Area)	2216	2504	4400*	4400*	74.9	76.5
66 KV System						
B9-S11 Out (100-K)	162	144	400*	400*	60.3	48.4
B7-S10 Out (W. Bluffs)	333	345	968*	900*	51.2	51.5
Hanford Out.	58	58	300**	300**	28.7	26.0
TOTAL OUT	553	547	1668**	1600**	49.3	46.0
HANFORD IN	548	536	1500*	1500*	54.3	48.0
Project Total						
230 KV Out	60484	85957	189300**	167900**	47.5	68.1
115 KV Out (300)	2216	2504	4400*	4400*	74.9	76.5
66 KV Out	553	547	1668**	1600**	49.3	46.0
TOTAL OUT	63253	89008	195368**	173900**	48.2	68.8
230 KV In	61541	87195	136000*	145600*	67.3	80.5
115 KV Out (300)	2216	2504	4400*	4400*	74.9	76.5
66 KV In	548	536	1500*	1500*	54.3	48.0
TOTAL IN	64305	90235	141900**	151500**	67.4	80.1

*Denotes Coincidental Demand
** Denotes Non-Coincidental Demand

Average Power Factor - 230 KV System 88.2

MANUFACTURING DEPARTMENT
PURCHASING AND STORES SECTION
MONTHLY REPORT MARCH, 1955

I Responsibility - No Change

II Achievement

Conversion of four more captions of General Supplies materials to the standard stock numbering system was accomplished. Only four additional captions remain to be converted to the new classes.

To keep abreast of the increased demand for material, emphasis has been given to increasing quantities ordered, reviewing all item controls on a scheduled basis and utilizing as much of Kaiser and Blaw-Knox material as possible.

The screening of purchase requisitions has also increased as 3,436 requisitions, consisting of 11,631 items, were processed during the month with 643 items being furnished from plant inventories. The number of items furnished could be increased considerably if Minor Construction would allow us to split items from their requisitions.

A change in filing procedures in the Receiving Unit permitted the discontinuance of maintaining purchase order registers. In addition all documents are screened prior to filing for extraneous papers which are discarded thus saving filing time.

Minor procedural difficulties are being worked out in the Ozalid Process now in operation in Receiving. To date it appears that the process will result in appreciable savings.

Effective March 28, 1955, receiving reports will no longer be issued to document receipts of coal. A procedure has been developed and agreed to by all interested Units to use the freight bill as the supporting document.

The work load of the Spare Parts Unit remained at a high level. Much of the activity was associated with receipts and establishment of additional items for new process facilities. However, the regular activities also contributed to the large volume of work processed. The total number of store orders filled amounted to 1,940. This amount is 404 more than during the month of February. A total of 212 Stock Adjustment Requests were received resulting in an additional 795 items being added to the Spare Parts and Spare Equipment accounts. The total item count for these two plus the Standby account now amount to 27,978.

The number of Operational Spares received from Kaiser Engineers and Blaw-Knox Company amounted to 8 and 105 respectively. The major portions of the items have now been received from Kaiser with about 50 or 60 percent from Blaw-Knox. The next 30 days should bring both of these programs nearly to a close.

II Achievement - (Cont.)

Fifteen additional Spare Parts catalogs covering 22 different classes of material were distributed. Nine of the fifteen covered Reactor Section material and the balance were for the Separation Section. Typing of these for both Reactor and Separations Section has been completed and we are currently working on those for Metal Preparation. As of this date Duplicating has a backlog of 14 catalogs for printing. Their inability to process these catalogs may prevent us from completing this program on schedule.

A survey was begun as of March 7, 1955 to determine the warehousing requirements for the Manufacturing Department and for other departments for whom Stores provide or would provide warehousing services. In this connection all buildings and grounds in each area were physically checked as of March 18, 1955. A report covering the results of findings together with final recommendations is in progress and is expected to be completed during April, 1955.

Approval was received from the AEC during the month to discontinue, effective April 1, 1955, the practice of marking certain items of Government property for identification. This approval was granted as a result of our request to them dated February 5, 1955. It has been estimated that this change of practice will result in an annual savings of $5,600.

An evaluation was made and completed during the month of the items carried in the General Supplies inventory under Caption 17- Welding Supplies. This evaluation resulted in a 25% reduction of the number of line items and in addition certain other refinements were made all of which has been calculated to save an estimated $5,000 annually.

The Area Stores, as such, are now closed, the material and supplies returned to Central Stores. Stainless steel yard at building 274-W, the laboratory stockroom at building 222-S and the radio supply room, building 3717, as well as the laboratory sample room in building 325 are in operation. Effective April 1, 1955 the personnel assigned to these operations will be transferred to the General Supplies Warehousing Unit.

Twice daily store order pick up and delivery of supplies to various buildings in the 200-E and 200-W Areas, was effected this month. This has improved the service to areas.

Detailed design drawings and specifications for the acid fractionator were received from Lummus Corporation on March 25 and March 28, 1955. These are now being reviewed by Engineering.

Status of Contracts

Essential Material

Sodium dichromate - two contracts written and sent to Wall-Western, Inc, and Irving M. Sabin Company, Inc. for signature.

Liquid aluminum sulphate - signed by General Chemical and now in process of signature by G. E.

1267295 Dry aluminum sulphate - Two contracts have been signed by Stauffer Chemical, and are now being signed by G. E.

II Achievement - (Cont.)

General Supplies

MRO-1 - for plantsite repair and maintenance of RCA Electron Microscope. Now fully executed and in force with RCA Service Co.

SO-2, Sup. 1 - for rental and servicing of IBM machines, including the new model 702, Electronic Data Processing Machine is now fully executed and in force. The Model 702 is expected to arrive during the first week in June, to be installed in Building 713 now under alteration for this purpose (Project CG-612).

SO-6 - for laundry and dry cleaning of firemen's, policemen's and security patrolmen's uniforms is now fully executed and in force with Ray-D-Ant Cleaners of Kennewick.

Suppliers of Aluminum dummies have been contacted to determine ways to reduce the cost for these items. The metal cost for the dummies amounts to 50 -70% of the total cost and the producers have indicated that a relaxation of specification, particularly regarding burrs, may reduce cost. This information has been relayed to the Reactor Section.

The satisfactory quality and service received by purchasing frozen meals for the field instead of the local lunches previously obtained, prompted an exploration of the possibility of placing an extended order which would assure delivery of meals when needed without requiring order placement every month or so. The field has concurred with this suggestion and has issued a requisition for approximately one year's supply. Bids are currently being obtained.

As a result of our proposal with the rail carriers to publish a reduced rate on Sodium Nitrate from Pacific Coast ports to the project, we were successful in getting the rate reduced nine cents per cwt., which based on our yearly consumption will effect a savings of approximately $5,400. Because of the emergency, the carriers considered our proposal at a special meeting and approved it for publication by Section 22 Quotation which was made effective to cover the first shipment.

The additional concentrators for Purex, previously built by Electric Boat Division of General Dynamics Corporation will be purchased on a competitive bid basis in accordance with instructions received from A.E.C. Engineering Department is being requested to furnish sufficient drawings inasmuch as those received earlier belonged to Electric Boat.

Action is being taken by Pennsylvania Salt Manufacturing Company of Washington, present holder of a contract for one half of our Caustic Soda requirements, to construct a large storage tank in the Pasco-Kennewick area. This will allow barge delivery to the storage tank and truck or rail delivery to the Project. It is not expected that immediate savings will result as the amortization of the installation must be accomplished by Pennsylvania Salt. However, the availability of stored caustic in the Tri-City area is a worthwhile safety factor to us. No Project funds are involved in this deal.

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II Achievement -(Cont.)

Cooperation from the field is permitting the purchase of Essential Material in amounts which will allow us to take advantage of price breaks in quantity and freight rate breaks in weight.

Definite progress is being made toward providing better control of project and critical orders and in supplying the status information on these orders to the field. Both ASC and Engineering Department have encouraged our efforts and are assisting.

Activity in practically all phases of the Section's functions remained at a high level or increased during the month as reflected in the following statistics. Worthy of special notice are issues of General Supplies which reached an all-time high of $352,000, and the number of requisitions received-3927 which also established an all-time high.

STATISTICS

Traffic Unit

Savings	January	February	March	Sept. 1, 1946 To Date
Rate Reductions	$ 3,555	$ 4,758	$ 5,882	$1,797,616
Freight Bill Audit	1,460	1,767	1,885	139,367
Loss, Damage & Overcharge Claims	582	560	64	143,542
Ticket Refund Claims	243	596	1,306	46,314
Household Goods Claims	73	-	-	17,715
Total	$ 5,913	$ 7,681	$ 9,137	$2,144,554

Work Volume			
Travel Requests	152	101	207
Reservations Made	400	313	660
Expense Accounts Checked	167	165	157
Shipments Traced	36	80	122
Quotations Furnished-Rates & Routes	569	540	629
Freight Bills Approved	727	682	900
Amount	$308,540	$282,289	$298,074
Carload Shipments	904	823	885

II Achievement - (Cont.)

Stores Sub-Section

	January	February	March
General Supplies			
Store Orders processed	29,073	32,475	34,355
Value of issues	$327,514	$324,132	$352,775
Line items in account	28,746	29,048	29,283
Back orders on hand	354	382	330
Out of stock items	224	241	203
Percent of line items out of stock	.8	.8	.7
Spare Parts			
Store orders processed	1,703	1,743	1,865
Value of issues	$148,296	$136,468	$130,288
Line items in account	26,095	26,735	27,265
Back orders on hand	350	396	394
Out of stock items	316	273	280
Percent of line items out of stock	1.2	1.0	1.0
Receiving			
Shipments received	7,651	6,251	8,447
Receiving Reports issued	5,537	5,106	7,604
Excess Material & Equipment			
Received	$252,428	$118,070	$ 92,736
Issued to Project	225,814	32,471	7,379
Shipped Off-Project	82,357	17,599	263,096
Revenue from scrap & surplus sales	$ 4,239	$136,899	$ 19,544
Requisitions screened	2,511	2,606	3,436
Items furnished	528	374	643

Purchasing Sub-Section

	January	February	March
Emergency Requisitions Received			
Employee & Pub. Relations		1	6
Engineering	5	24	38
Manufacturing	25	54	80
Medical	12	1	7
Minor Construction	38	118	168
Radiological Science	1	3	3
Stores	57	116	145
Total	138	317	447
Average per day	6.5	16.7	19.4

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II Achievement - (Cont.)

Purchasing Sub-Section (Cont.)

	January	February	March
Total Requisitions*			
On hand start of month	873	816	914
Received	2,485	2,604	3,315
Placed	2,542	2,506	3,182
On hand end of month	816	914	1,047

*Do not include those assigned to A.E.C.

Number of Purchase Orders Placed			
General Supplies Unit	1,726	1,577	1,832
Process Equipment Unit	483	392	591
Essential Material Unit	28	24	34
Local Purchase	53	36	55
Total	2,290	2,029	2,512
Value of Purchase Orders Placed			
General Supplies Unit	$524,807	$555,419	$608,554
Process Equipment Unit	951,415	334,282	951,663
Essential Material Unit	704,458	488,798	1,059,440
Local Purchase	453	298	392
Total	$2,181,133	$1,378,797	$2,620,049
Purchase Order Alterations			
Number	162	182	209
Gross Value	$113,340	$ 96,234	$ 70,768
Expediting			
Orders on hand start of month	2,246	2,214	2,455
Orders received	2,213	2,027	2,817
Orders completed	2,245	1,786	2,687
Orders on hand end of month	2,214	2,455	2,577

III Organization and Personnel

Organization

Effective with the close of business March 31, 1955 the Area Stores Unit of the Stores Sub-Section was discontinued with personnel and remaining area responsibilities transferred to the General Supplies Warehousing Unit.

Effective with the close of business March 31, 1955 the Procurement Status Unit of the Purchasing Sub-Section was discontinued with personnel and duties merged with the Purchasing Liaison Unit.

Force Summary	2-28-55	3-31-55	Change
Exempt	54	55	+1
Non-Exempt	200	206	+6
Total	254	261	+7

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Achievements

From data contained in "Stores Inventory and Excess Personal Property" report issued by the Division of Finance, Atomic Energy Commission, the following excerpts were taken. These show that General Electric Co., which controls the vast majority of Hanford inventories, enjoyed a very favorable position in almost all phases of inventory management when compared with total A.E.C. operation for the six month period ended December 31, 1954.

Current Use Stores (exclusive of special process spares, returnable containers, stores work in process and scrap) amounted to the following as of December 31, 1954:

Operations Office	Months' Investment	Value (In Thousands)
Washington	3.2	$ 22
Grand Junction	3.3	298
Hanford	3.7	5,471
Savannah River	3.7	4,664
Oak Ridge	4.2	18,709
Schenectady	5.5	334
Idaho	5.8	586
Chicago	6.4	1,132
San Francisco	6.4	1,388
New York	7.2	603
Santa Fe	7.2	15,916
	4.8	$49,123

Inventories held by General Electric Company for production at December 31, 1954 compared with the total for all production contractors shows:

Inventories (In thousands)	G. E. Value	G. E. Mo. Inv.	A. E. C. Value	A. E. C. Mo. Inv.
Current use	$ 5,471		$ 32,401	
Standby	84		541	
Excess	449		2,923	
Total Dec. 31, 1954	$ 6,004	3.7	$ 35,865	4.4
Total June 30, 1954	6,677	3.5	35,328	3.8
Change	$ (673)	.2	$ 537	.6

Activity in Excess Personal Property for Hanford compared with the total for all operations offices during the June-December 1954 period is shown below.

	Hanford	A. E. C.
On hand June 30, 1954 (In thousands)	$ 3,865	$ 35,413
On hand December 31, 1954 (In thousands)	$ 1,000	$ 33,618
Percent of decrease	74.0%	5.1%
Percent of recovery from sales to the public	19.4%*	21.7%
Percent available for disposal which was disposed of	77.9%	54.6%

*Increased from 5% realized for the first six months of 1954.

VII Organization and Personnel (Cont.)

Safety Experience

The normal monthly safety and security meetings were held throughout the Section.

Personnel Activities

Two representatives from Phillips Petroleum Co. of Arco, Idaho visited the Central Stores Operation to learn about our inventory control procedures.

A system of comparative analysis has been developed to give Receiving Unit employees factual information regarding their performance. This data has proved beneficial in improving output.

Time studies of the Spare Parts Unit's assignment and detailed job functions have been made during the month. The accumulated data will be used primarily for two purposes: 1st, as a yardstick in measuring employees performance, and 2nd, to uncover activities that appear to be redundant or require excessive amounts of time to complete.

Meetings were held at the Sub-Section and Unit levels in the Purchasing Sub-Section for information and discussion purposes.

Arrangements were completed with the School of Nuclear Engineering to have a course in Blueprint Reading made available to Purchasing and Stores personnel. This commences March 29, and we expect about 15 persons to attend.

[redacted]

TRANSPORTATION SECTION
MONTHLY REPORT
MARCH 1955

Transportation Section personnel forces decreased from 492 to 491 by four new hires two transfers in, one reactivation - personal illness, two terminations, and six transfers out.

Fiscal year to date costs through February are under the budgetary provisions by $71,060 or 2.568%. FY 1955 expenditures are $12,840 or 0.474% less than those for the same period in FY 1954.

The following indicates comparative costs by major service functions:

Function	FY 1955 1st 8 mos.	FY 1954 1st 8 mos.	% of Change From FY 1954
Railroad	$514,232	$486,869	+ 5.62 %
Plant Bus	890,994	923,996	- 3.57 %
Heavy Equipment Maintenance	374,984	369,070	+ 1.60 %
Light Equipment Maintenance	440,304	499,822	-11.91 %
Road Maintenance	78,575	92,905	-15.42 %

Review of the 1956 and preparation of 1957 Automotive and Heavy Mobile Equipment Budgets for operating departments and the Atomic Energy Commission has been completed. A summary of the budget follows:

FY 1956	Total Amount	Replacements	Additions
Additions and Replacements	$ 935,900	$ 801,300	$ 134,600
Equipment Upgrade	126,400	126,400	—
Total	$1,062,300	$ 927,700	$ 134,600
FY 1957			
Additions and Replacements	$ 973,900	$ 906,700	$ 67,200

Completed the preparation of the following budgetary data for FY 1956 and FY 1957: Overhead costs for each organizational unit, landlord costs for the 600 Area and the Consolidated Transportation Facility, statistics and unit cost information on the Richland Bus System, reviewed and revised personnel requirements as affected by the non-reactivation of the B Plant, and furnished informational assistance on liquidations.

Received the final status report covering the annual physical inventory of Fuel and Lubricants (0450-950 through 956). Physical quantities exceeded the book value by $93. Variance to disbursements since the previous physical inventory averaged .03%. Several meetings were held with custodial personnel and representatives of the Inventory Accounting Unit to investigate the overages and underages and develop recommendations. Fuel disbursements for the year exceeded 2,000,000 gallons and sales totaled approximately $300,000.

Liquidation rates for bus service were reduced in February on the average of 6% per month for area employees. Actual costs were over liquidated by $35,200 at the end of January. Economies from the operation and maintenance of the 53-passenger buses were greater than had been predicted.

[redacted]

Developed percentile allocations by buildings for the various categories of landlord expenditures for the Consolidated Transportation Facility. Furnished percentages to the Manufacturing Cost Unit for distributing the costs of each building to tenants.

Co-operated with the Internal Audit Unit in the audit of the several Transportation material inventories as to documents utilized and controls, stock records maintained, and general procedures.

The inadequacy of the heating system at the 1171 Building continues to receive attention. The Commission has contended that the extraordinary expenses are properly maintenance costs. The premises for this contention were thoroughly explored and refuted in answering correspondence.

Extensive roof damage to the 1171 Building occurred during the high wind period of March 21-24. It has been determined that a portion of the roof will have to be replaced resulting in a cost of at least $6000. Discussions are in progress relative to the future design, also who is to stand the cost of these repairs, and other aspects of the problem.

Hanford Operations Office has requested that preparations be made to initiate the HOO Reserve Pool. This involves grading, marking, and fencing of the Reserve Pool Lot. Construction contractors have been instructed to start delivering equipment designated for this pool as it is progressively released from construction work. The Transportation Section at this time is only to physically receive the equipment from Construction. Hanford Operations Office is still awaiting information from Washington relative to the organization and setting up of the Reserve Pool. W. J. Morrell advised on March 28 that no funds would be available for four months to perform overhaul work on the 180 pieces of Commission equipment which is presently scheduled for the Pool. Some overhaul maintenance may be required on the equipment assigned to Minor Construction work from funds allocated to this type work. The procedure for performing such type work is not fully developed although it will probably be in the form of Minor Construction actually making the paper transfer of equipment to the Pool. Work order would then be issued to Transportation to perform the necessary repairs.

The Commission's policy in regard to commitment of funds for equipment not included in construction projects at the fiscal year-end has been changed. Previously the policy of the Atomic Energy Commission was to accept as a commitment amount the total of all documents processed through the Contract Cost Units. In turn funds were obligated to equal the estimated costs of items to be procured. In the future a commitment must consist of the following:

a) Purchase orders placed with a vendor by June 20.

b) A directive received from HOO-AEC.

c) Work orders issued for fabrication with a definite estimate. Work orders for installation of equipment may be included as commitments if reference is made to a specific purchase order number.

A high level of activity continues in equipment control with efforts directed to supplying the Plant needs wherever possible with units made available by completion of the construction program either by additions or upgrade. A significant item was arrangements whereby the balance of the 1947 International pickup fleet will be exchanged for later model and like make pickups. This has the advantage of reducing the quantity of parts required in Stores inventory.

Transportation Section

Negotiations are in progress to obtain an 1953 model, 1500 h.p. diesel-electric locomotive available from another AEC site. This unit would replace a 500 h.p. 1942 war model locomotive which will require $6000 to $7000 of repairs in FY 1956. The one large locomotive will greatly facilitate railroad operations by eliminating the need for two locomotives now required to handle the large commercial tonnage from Richland to the Areas. It will also make available a 1000 h.p. locomotive for process work, which will facilitate this service.

The requisition for new pickup trucks was written so as to include ten units with special generators for use with two-way radios. This will eliminate buying special radio equipment later and the practice will result in an estimated savings of $100 per unit.

The change out of the Richland, 700-300 Shuttle, and Evacuation bus fleets has been completed. This program was accomplished through an upgrading procedure whereby later model White buses were acquired from Construction to replace K-7 International buses.

Received the special report by the Operations Research Study Group on transporting Plant personnel. This report indicated that the established bus system is operating about as economically as can be expected under the present basic philosophy. Management has concluded that the adverse effect on employee morale would prohibit the adoption of major changes in working hours which would have permitted a savings from reduced bus operating costs. Other aspects of the report are being studied to attain improvements. Continuing efforts are being made to reduce the number of sedans and pickups which are being driven to and from the outer areas.

Commercial rail traffic during March decreased 12.8% over February due to the shorter reporting month and some reduction in construction and miscellaneous materials. The following recapitulation indicates the distribution of commercial cars handled:

Carload Movements -	Loads In	Empties In	Loads Out	Empties Out
General Electric Company	782	11	8	858
AEC - Kaiser (cement)	2	0	0	3
Blaw-Knox	4	0	0	5
J. P. Head Company	1	0	0	1
Kaiser Engineers	20	0	0	20
L. W. Vail	1	0	0	1
U. S. Army	12	0	0	13
	822	11	8	901

Railroad process service during March decreased 16.7% over February due to production difficulties.

Completed the movement of vessels from the 272-East Shop to the Purex Facility which had been in progress since November 9.

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

The reconditioning of the number one engine on locomotive 39-3719 is proceeding satisfactorily following the receipt of parts. Flat car 10A 3618 is being rebuilt and is approximately 75% complete.

Transportation Section

A quantity of special lubricating oil for locomotives has been obtained for testing purposes since the advent of sticking valves and unusual deposits on engine parts. Initial results have been completely satisfactory. The deposits have disappeared and no excessive sludging or dilution has been encountered. No report has been received on the oil samples which are being analyzed by the Shell laboratories.

The Plant Bus System transported approximately 8% fewer passengers in March than in February due to the shorter reporting month. The following statistics indicate the magnitude of service rendered:

Passenger Volume	149,279
Revenue - Bus Fares	$ 7,463.94
Earnings - Transit Advertising (February)	$ 94.75
Bus Trips	6,560
Bus Miles - Passenger Carrying	180,342
Passenger Miles	4,763,838

Completed an extensive study of temperature and ventilation on the Plant bus fleet. Correction of inadequacies should result in better relations with passengers.

A thorough examination of the area shuttle bus system led to a number of revisions which will improve the general efficiency and suitability to passengers. Favorable comments are being received and complaints have lessened. Plans have been formulated for group meetings with area employees to better acquaint them with the methods and problems of bus operation to promote understanding. These meetings will be supplemented by a series of articles in the GE News.

The problem of sticking injectors in diesel buses is still receiving attention; however, it has been alleviated by increasing the frequency on oil changes from 4000 miles to 2000 miles. Results are not yet available on the analysis of oil samples by the Shell laboratories.

The Richland Bus System transported approximately 8% fewer passengers in March than in February due to the shorter reporting period and the normal seasonal decline. The following statistics indicate the volume of service rendered:

Total Passengers Including Transfers	12,028
Revenue - Bus Fares	$ 692.28
Earnings - Transit Advertising (February)	$ 4.31
Bus Trips	984
Bus Miles - Passenger Carrying	5,215
Passenger Miles	30,258

Alterations were made to the spring system on the buses assigned to the Richland Bus System to improve the riding qualities of this equipment.

Off-Plant Chauffeured automobile trips (Company business and/or official visitors) totaled 166 which were rendered to the following locations:

Benton City, Washington	13
Grandview, Washington	1
Hinkle, Oregon	9
Kennewick, Washington	27
Mabton, Washington	2

Pasco, Washington	64
Pendleton, Oregon	17
Prosser, Washington	4
Richland "Y", Washington	2
Sunnyside, Washington	9
Walla Walla, Washington	1
West Richland, Washington	3
Yakima, Washington	14

The following tabulation indicates in gallons the volume of fuel distribution between February 10 and March 28.

	Gasoline	Diesel Fuel	50 Cetane	Kerosene	White Gas
Stock at Start of Month	44,500	21,772	4,450	4,691	293
Received During Month	139,950	18,100	33,000	4,870	0
Disbursed During Month	119,110	22,387	32,750	6,284	38
Stock at End of Month	65,340	17,485	4,700	3,277	255

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

Motor Overhauls	50
Class A Inspections and Repairs	89
Class B Inspections and Lubrications	1074
Weekly Inspections - Fuel Trucks and Off Plant Vehicles	26
Semimonthly Inspections - Buses	171
Monthly Inspections - Railroad Rolling Stock	7
Annual Inspection - Railroad Rolling Stock	1
Visualiner Inspections	98
Routine Maintenance Repairs and Service Calls	1822
Accident Repairs and Paint Jobs	34
Tire Repairs	585
Wash Jobs	442
	4,399

Forty-six 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 February and the utilization of each type:

Code	Type	No. of Units	Total Mileage
1A	Sedans	340	525,228
1B	Buses	141	214,164
1C	Pickup Trucks	431	233,900
1D	Panel,Carryall,Sta.Wagon	171	146,968
1G	Jeeps	3	775
1H	Power Wagons	50	22,093
68 Series	Trucks	225	90,099
		1,361	1,233,227

Procured and placed in service a new paint heater which eliminates the need for paint reducers and permits a more uniform application thereby resulting in improved quality and appearance.

Permanent lubricating equipment for the 100-K Area Garage has been installed and temporary equipment returned.

Completed the seasonal reconditioning of pull tractors and spray units in readiness for the spring weed control program in the manufacturing areas.

Maintenance of Plant railroad trackage during March required 6,737 man-hours.

Applied bituminous material to 1,000 sq. yd. of parking areas in the 200-West Area and one mile of surfaced roadway in the 100-H Area to control contamination requiring 280 man-hours.

Maintenance of Plant roads and the production of road aggregate materials during March required 1,398 man-hours.

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

	MC 3	MC 5
Stock at Start of Month	63.64	23.89
Received During Month	0	0
Used During Month	13	0
Stock at End of Month	50.64	23.89

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

	3/4" to 0 Pre-mix Tons	½" 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	668	2,118	1,038	3,930
Made During Month	0	0	3,077	0	485
Used During Month	188	35	130	0	8
Stock at End of Month	220	633	5,065	1,038	4,407

ENGINEERING DEPARTMENT

MARCH 1955

PILE TECHNOLOGY SECTION

Pre-startup evaluation of all critical components was completed and the KW pile was placed in operation on March 11.

The capacity of the K Pile Ball 3X system has just been measured in the fully loaded, dry, xenon-free, fringe-enriched KE Pile. During the test, the following conditions were obtained when the pile was exactly critical; thus, the safety system capacities shown are actually measured limits with no safety factor included.

Pile Loading Condition

1. 88 "C" columns in 5th LU from reflecter (due to more dense loading at pile sides, this loading probably corresponds more closely to 100 evenly-spaced "C" columns)	1. 37 central steel ball columns plus 14 fringe boron-steel ball columns.
2. 72 "C" columns evenly spaced in 5th LU from reflecter.	2. 51 steel ball columns
3. 32 "C" columns evenly spaced in 5th LU from reflecter.	3. 45 steel ball columns loaded - the 6 fringe ball columns empty.
4. No enrichment - case of fully loaded natural uranium dry pile.	4. 43 steel ball columns (equivalent to the 41 VSR's plus 2 steel ball columns)

Three ruptures have occurred in hot press canned slugs. Two of these were side failures of solid slugs and the third was a cleavage failure of a cored piece. The relatively low exposure of about 600 MWD/T at which the failures occurred would indicate that this canning method is unsatisfactory.

Four ruptures have occurred in unbonded uranium slugs at exposures between 150 and 320 MWD/T. The three which have been inspected were side failures similar in appearance to J slug failures which have occurred at DR Pile. This test indicates that slugs produced by this method are unsatisfactory.

A rupture has apparently occurred in a cored slug at about 1100 MWD/T in the C Pile. Neither of the two central tubes has failed, which may indicate that the performance of the cored slugs will not be as desirable as anticipated.

Low power level operation of KW Pile with low graphite temperatures caused concern with respect to physical distortion of the graphite and a dangerous stored energy condition. Application of available data on physical property changes in irradiated graphite indicates that no serious problem exists.

Results from the alternate pile atmosphere study show that nitrogen may be used for a pile atmosphere without causing excessive corrosion of the process tubes. The importance of preventing water leaks was emphasized by high corrosion rates in that part of the test which was accidentally in contact with liquid water.

Stuck charges at H Pile and their subsequent discharge led to a preliminary investigation of the graphite conditions in channel 1586-H. Examination of the channel indicated cracked tube blocks and a separation of 4-1/2 inches between the tube block and trunnion block at 14-1/2 feet from front Van Stone flange.

Dinget slugs produced by hammer forging at Simonds and rolling at Fernald are ready for pile irradiation. The first press forging operation at Heppenstall, Pittsburgh, Pennsylvania, was observed on March 22 and 23. The dingets were press forged to a size to fit the extrusion presses at Adrian, Michigan. The schedule at Heppenstall provides for further forging of this material to meet a scheduled charging date of the first press forged and rolled uranium in the HAPO piles in May 1955.

Various aluminum alloys are being tested to find one suitable for jacketing fuel elements to be exposed in high temperature piles. The 1% Ni-2S aluminum alloy appears to be the most satisfactory. This alloy has shown a very low corrosion rate in deionized water at 350 C with no tendency toward intergranular corrosion. Some alloys containing copper and silicon also appear promising.

The four 0.40-inch diameter by 1.50-inch long matrix type capsules that were irradiated to 5000 MWD/T have been examined at HAPO. Visual examination showed no changes in the external appearance of the capsules or the matrix material due to irradiation. The ease with which the samples were decanned indicates that this material is dimensionally stable and no distortion of the samples had occurred. In fact, the samples that were exposed to 5000 MWD/T decanned easier than those which had been exposed to 1000 MWD/T.

SEPARATIONS TECHNOLOGY SECTION

The preparation of the Purex Technical Manual was completed and readied for issuance early in April. Two test lots of continuously produced UO_3, each containing approximately 4000 pounds were shipped to K-25 for testing in the pilot plant. Average reactivities were 1.13 and 1.30, respectively. A study of the technical feasibility of recovering U-233 in the Redox plant is in progress. It appears that about 50 tons/mo. of thorium could be processed (with no thorium recovery) with few changes in plant and equipment.

1207309

The consolidation of the Instrument Machine Shop and the Electronic Construction Shop with the Technical Shops is proceeding as scheduled. The physical combining of the machine shops will take place April 4 with the Electronic Shop scheduled to move May 1.

DESIGN SECTION

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

	Percent of Total Effort
Design Development Programs	28
1952 Hanford Expansion Program	19
Reactor Plant Modification for Increased Production	15
4X Program	14
Other Projects and Design Orders	24

The 1952 Hanford Expansion Program design work remained at a high level during March with principal effort devoted to instrument problems associated with KW reactor start-up and design field liaison in support of operability tests for KE reactor.

Total design for Project CG-558, Reactor Plant Modification for Increased Production, advanced on schedule to 71% complete. Scope design is complete and detailed design 65% complete.

Design of the 1706-KER Facility advanced to 94% complete. Design is complete with the exception of instrument and electrical drawings.

4X Program design moved forward on schedule with progress as follows:

	Design Scope	Detailed Design
CG-599 - 4X Program - 100 Area	97%	80%
CG-603 - 4X Program - Bismuth Phosphate Plant	100	90
CG-613 - 4X Program - Metal Conversion Plant	98	21
CG-614 - 4X Program - 300 Area	100	63

General Electric design for CG-598, Purex Acid Fractionator, proceeded on a priority basis during the month following receipt of the vendor design for the fractionator. Detailed design for the 202-A Building modifications, acid fractionator building addition, and associated outside facilities is 30% complete.

Preliminary scope was completed for the changes to the Purex Plant to attain an expansion up to a capacity of 2.75 times instantaneous design rate. This report provided the basis for a request to the AEC for authorization of design and procurement funds for increasing the capacity of the Purex Plant. On March 31, 1955, the AEC authorized engineering and procurement to achieve this potential capacity.

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	100%	100%*
CA-512	100-K Area Facilities (Excluding 1706-KER which has not been scheduled)	100	99.9
CA-513-A	Purex Facilities, Part "A"	100	98.6
CA-514	300 Area Expansion	74**	74**
CG-535	Redox Capacity Increase, Phase II	99	97
CG-539	Additional Waste Storage Facilities - Redox	87	87
CA-546	Fuel Element Pilot Plant	100***	54
CG-558	Reactor Plant Modifications	8	5
CA-603	Hanford 4X - Bismuth Phosphate Plants	12	16

* Project was complete, and is being closed out with exceptions April 1, 1955.
** Based on Revision #3 to the Project Proposal, approved by AEC on March 31, 1955.
*** Based on original scope.

The machinists in Minor Construction shops caused a work stoppage by walkout at noon on March 16. This walkout occurred when the J. A. Jones Company refused demands of the machinists' business agent for an additional superintendent, foreman, tool crib attendant, and apprentice machinist. Following extensive negotiations, and the assignment of the additional apprentice, the machinists returned to work on the morning of March 23.

Minor Construction forces attained a record on March 29, 1955, of 2,000,000 manhours without a lost-time injury.

The 1706-KE Building was essentially complete, and current work consists of equipment installation, instrument testing and repairs, painting, and acceptance testing. Delivery of fittings for the 1706-KER loops has continued to be a limiting factor in the start-up of 105-KE. Of the critical fittings required, about 55% have been received.

Preparations were completed for transfer of remaining Purex work from the construction contractor to Minor Construction.

ORGANIZATION & PERSONNEL

Total on Roll, March 1, 1955	1,431
Accessions	32
Separations	36
Total on Roll, March 31, 1955	1,427

A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

ENGINEERING ADMINISTRATION SECTION

MARCH 1955

The greatly increased circulation of the Library's "What's New" resulted in a marked increase in magazine and book circulation. Periodical routing hit a new high of 8,200, 10% above the previous high of April 1954. Efforts are being made to streamline the handling of the periodical circulation. Names of personnel in adjacent offices or buildings are being combined into a single route list (to reduce the number of times a journal crosses the circulation desk and has to be posted to the Kardex) and the use of individually printed gummed name and address labels is being considered.

During the month the local AEC approved the 1955 membership list (previously approved by the Subscriptions Committee in Schenectady) and the majority of the membership dues which were outstanding have now been paid.

The greatest number of documents ever issued through the Classified Files were processed during March. One OFFICIAL USE ONLY manual had 597 copies. Considerable overtime was required at the issue desks to handle this peak load.

The annual inventory of Research and Development reports required by the AEC was completed and summarized the first part of March. The summary report was submitted to the GE Security Office, March 17, in time for the April 1 deadline. Results were:

(1) 21,260 copies or 5,091 titles were inventoried. This includes 84 copies of HW- originated Weapons Data reports.

(2) 35 copies were unaccounted for, 30 of which were reported missing in the 1953 inventory. One unaccounted for copy has since been located, thus reducing the total to 34.

Work by Statistics personnel in analyzing results of the plant-wide attitude survey is well underway. The statistical work for the managers' and employees' reports should be completed by May 15, 1955.

During the month the following major contract activities were handled:

1. Modification No. 5 to Special Agreement No. G-12 and Modification No. 9 to Special Agreement G-5 between General Electric and National Carbon Company covering final close-out of these agreements were returned completely executed by National Carbon Company March 11, 1955. Conformed copies have been distributed.

2. Proposed Special Agreement No. G-49 between General Electric and the University of California at Los Angeles covering the loan of a seam welder has been inactivated since it has been found that the

welder does not belong to the University but rather belongs to the U. S. Government.

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 received completely executed from the appraiser March 4, 1955. Conformed copies have been distributed.

4. Modification No. 5 to Special Agreement No. G-22 between General Electric and Future Farmers of America, Inc., providing for extension of time of the contract and for the transfer of title of sheep was approved by the Commission March 3, 1955, and by Future Farmers March 23, 1955.

5. Special Agreement No. G-58 between General Electric and Stromberg-Carlson Company providing for instruction of General Electric telephone maintenance technicians was returned fully executed by the Contractor March 2, 1955. Conformed copies have been distributed.

6. Modification No. 4 to Consultant Agreement No. 113 between General Electric and Dr. S. T. Cantril (Consultant in the field of industrial medicine) providing for an extension of time has been executed by General Electric, approved by the Commission and on March 30, 1955, was executed by the Consultant.

7. Modification No. 4 to Consultant Agreement No. 115 between General Electric and Dr. P. E. Kendall (consulting cardiologist) providing for an extension of time has been executed by General Electric, approved by the Commission and was finally executed by the consultant on March 31, 1955.

R. J. Schier

R. J. SCHIER, MANAGER
ENGINEERING ADMINISTRATION SECTION

[redacted]

PILE TECHNOLOGY SECTION

MONTHLY REPORT

March 1955

VISITORS & TRIPS

W. M. Cashen and A. N. Holden, KAPL, spent March 1-4 at HAPO discussing KAPL assistance to HAPO.

K. Copenhagen, W. Decker, W. J. Ramsey and B. Rubin, UCRL, Livermore, visited HAPO, March 21-22, regarding Hanford assistance to the Whitney Project.

D. H. Cornell, KAPL, visited HAPO March 15-16 regarding KAPL-120 modification.

P. C. Daly, Westinghouse, Pittsburgh, visited HAPO March 16-18 regarding Westinghouse loop proposal.

John M. Davis, North American Aviation, Downey, Calif. visited HAPO, March 14-15, to survey existing design construction and operation of remote metallurgical equipment handling.

R. B. Oliver, ORNL, came to HAPO on March 30 to study various methods and types of equipment used for non-destructive testing.

R. S. Pratt, Bridgeport Brass, Adrian, Mich. came to HAPO on March 31 to discuss fuel element technology.

T. M. Snyder and A. D. Tevebaugh, KAPL, visited HAPO, March 2-4, regarding KAPL assistance and instrumentation.

D. M. Wilsey, KAPL, visited HAPO March 2-8 regarding KAPL-120 modification.

J. A. Ayres visited KAPL, ALCOA and ANL to consult on corrosion problems, March 21-26.

J. A. Berberet and W. E. Fry, spent March 30-31 at GE-ANP, Evendale, discussing present and future Hanford irradiations for off-site laboratories.

Pile Technology Section

S. H. Bush and M. J. Sanderson visited Allegheny-Ludlum, KAPL, Nuclear Metals, Metals & Controls, Wallingford Steel, Breckenridge Company, National Lead, Carborundum Company and Trent Tube Company regarding production of Zircaloy tubing, March 7-17.

J. J. Cadwell spent March 16-23 at GEL consulting with the Atomic Power Study Group on fuel elements.

J. L. Carter, Jr. attended the American Physical Society Meeting, Baltimore, Maryland, March 17-19.

V. R. Cooper visited Ames Laboratory, Ames, Iowa, March 28-29, to discuss programs for assistance to Hanford relating to metallurgy. He also spent March 30-31 at Mallinckrodt Chemical, St. Louis, attending a MDAC meeting.

R. L. Dickeman visited GE-ANP, Evendale, March 30 through April 1, to discuss ANP reactor program.

J. J. Gard and E. C. Wood attended an AEC information meeting at ANL, March 23-25.

O. H. Greager spent March 30-31 at Mallinckrodt Chemical, St. Louis, attending a meeting of the Metallurgy Development Advisory Committee and inspecting their Feed Materials Production facilities.

C. Groot and N. D. Groves attended the NACE Conference at Chicago, March 7-10.

H. A. Johnson visited Heppenstall Co., Pittsburgh, and Mallinckrodt Chemical, St. Louis, regarding dingot and ingot fabrication; he also visited Aluminum Co. of America, Radio Corp. of America, Standard Pressed Steel Corp. and Lodge & Shipley Company for consultation on uniskan process, March 21-25.

W. T. Kattner visited National Lead, Fernald, Ohio, regarding drilled slug program, and attended a committee meeting on uranium quality and fabrication at Mallinckrodt Chemical, St. Louis, March 3-13.

D. C. Kaulitz visited Johns Hartford Company, New York City, to inspect neutron spectrometer, and visited the Marshall Products Company, Columbus, Ohio, to discuss elevated temperature tensile equipment and special vacuum furnace, March 1-7.

G. A. Last attended a seminar on ferromagnetisms at GEL, March 29.

M. Lewis spent March 1-4 at the University of California, Berkeley, recruiting technical personnel.

R. J. Lobsinger visited Phillips Petroleum Company, Idaho Falls, March 10-11, to discuss water technology and observe loop installations.

Pile Technology Section

R. E. Nightingale attended the National American Physical Society meeting in Baltimore, Maryland, March 17-19.

R. S. Paul spent March 7-9 recruiting technical personnel at the Willamette University, Linfield College and University of Oregon, Portland, Oregon.

J. W. Riches attended committee meetings for uranium quality and fabrication at National Lead, Fernald, Ohio, and Mallinckrodt Chemical, St. Louis, March 7-11.

J. M. Skarpelos visited KAPL to discuss high temperature water technology and attended a carbon steel committee meeting at Westinghouse Atomic Products Division, Pittsburgh, March 28-31.

G. E. Wade visited Phillips Petroleum, Idaho Falls, March 10-11, to study high pressure loops at the MTR.

W. P. Wallace consulted on zirconium alloy development and fabrication at Carborundum Company, ANL, Superior Tube Company, Bridgeport Brass; and discussed zirconium tubes at ALCOA, Wallingford Steel Company, Allegheny-Ludlum Steel, National Lead & Titanium-Zirconium Division, and Trent Tube Company, March 14-25.

C. D. Wilson visited Superior Tube Company, Norristown, Pa. and Bridgeport Brass, Adrian, Mich., to discuss zirconium tube fabrication; ALCOA, New Kensington, Pa. regarding corrosion and fabrication problems; and Babcock & Wilcox, Akron, Ohio, regarding high temperature loop fabrication, March 21-28.

E. C. Wood spent March 7-8 at the University of Arizona, Tucson, recruiting technical personnel, and March 21-22 at KAPL discussing non-destructive testing methods.

D. C. Worlton visited Aircraft Nuclear Propulsion Center, Lockland, Ohio, and National Lead Company, Fernald, Ohio, March 28-29, to discuss non-destructive testing methods.

ORGANIZATION & PERSONNEL

Personnel totals are as follow:

	February 28	March 31
Administrative	2	2
Pile Engineering	94	95
Pile Materials	58	59
Fuel Technology	108	110
Physics Research	38	39
Metallurgy Research	69	69
Contact Engineering	4	4
Total	373	378

Pile Engineering: R. V. Bowersock, Tech Grad, permanently assigned on March 28; J. R. Spink, F. W. Van Wormer and R. L. Gruver transferred from non-exempt to exempt rolls on March 1.

Pile Materials: M. B. Trott, Secretary C, transferred from Office Auxiliaries Sub-Section on March 21.

Fuel Technology: D. O. Hunter, Tech Grad, permanently assigned on March 21; B. F. Pippenger, Engineering Assistant, transferred from Metal Preparation Section on March 21; M. D. Jones, Accountability Clerk D, transferred to Separations Technology Section on March 7; K. F. Powell and J. D. Ross, Engineering Assistants, reported for work on March 3 and 10, respectively; and A. T. Taylor, Engineer II, terminated on March 11.

Physics Research: H. E. Handler, Engineer I, reported for work on March 23.

Metallurgy Research: R. L. Hales transferred from non-exempt to exempt rolls on March 1.

PILE ENGINEERING SUB-SECTION

PROCESS TECHNOLOGY

Power Level Limitations

The maximum operating power level during March, 1955 was limited by 95 C outlet water temperatures at DR Pile, 100 C at C and H Piles and 105 C at B Pile. The outlet water temperature limit at F Pile was increased from 100 C to 105 C on March 24. At KW Pile the power level was limited to that power where extensive damage is not expected to occur should a pigtail fail.

Process Specification Changes

The following process specifications were approved:

11.00 - Allowable Heat Generation in a Process Tube - Installation of coarse-mesh cone screens has permitted a reduction in the safety factor applied to allow for undetected cone screen plugging at C and K Reactors. The result of this is that instability temperature limits have been increased about 2 degrees C.

The limitation on the proximity of the Panellit high trip to header pressure was reduced from 50 to 30 psi for tubes loaded with other than uranium or uranium alloy fuel elements.

26.00 - Slug Rupture Limits - Because of improved slug quality the exact limitation of tube power as a function of exposure has been eliminated. The specification is now written to allow slow increases in tube power and to prevent the occurrence of a large number of ruptures in a short period of time as experience is gained in the performance of fuel elements.

Ruptured Slugs

During the month three failures occurred in normal production metal. These were: (1) a compound cap failure of a Group 9 metal slug at DR Pile; (2) a side failure of a "K Lot" Piece (Fernald cast, unpickled, beta heat treated in rod form in a carbonate salt bath, lead-dip canned) at C Pile; and (3) a side failure of an "N Lot" Piece (Mallinckrodt cast, pickled, heat treated in slug form in a chloride salt bath, lead-dip canned) at D Pile.

Two failures occurred in production test metal at C Pile. One of these was a uranium cleavage failure of a cored, normal uranium slug. This piece, which was cold canned and had an extruded point closure, failed at an exposure of 259 MWD/T. The other failure occurred in a cored, normal uranium lead-dip canned piece at an exposure of 1129 MWD/T. This piece was stuck, and has not yet been removed from the tubing.

Irradiation of A-Lot and B-Lot Metal - 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 surface, rod transformed, lead dip canned slugs were being irradiated at H Pile until three failures occurred in each group. Three

A Lot failures and one B Lot failure have occurred. All B Lot metal was discharged when it was discovered that two tubes at 1072 MWD/T and 1126 MWD/T were stuck because of slug warpage. From the best information available at this time one can expect a maximum B Lot slug warpage of 80 mils with exposures in this range.

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

This test authorizes the irradiation to failure of 4 tubes of cored uranium lead-dip canned 4" slugs and 4 tubes of 4" control slugs at high and low tube powers. Four tubes were charged at C Pile and 4 tubes at F Pile. A rupture occurred in a cored slug at C Pile on 3-23 after an exposure of 1129 MWD/T. The four tubes at F Pile have reached 780-820 MWD/T without incident.

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 40 supplementary tubes at F Pile. Two ruptures will be incurred in C Pile. All slugs at F will be discharged at normal goal exposures of 675-775 MWD/T. The C Pile tubes have operated for six months without incident and have reached exposures of 750-840 MWD/T. Those loaded at F have operated for 5 months without incident. Tubes have been discharged after exposures of 180 MWD/T, 369 MWD/T and 584 MWD/T with no abnormalities yet detected.

Unbonded Slugs - PT 105-578-A

Four tubes each of "C" process canned solid slugs, cored slugs, nickel plated solid slugs and control slugs were loaded in C Pile. Ruptures have occurred as follows:

Solid Slugs	161 and 221 MWD/T	2 ruptures
Cored Slugs	206 MWD/T	1 rupture
Nickel Plated Slugs	326 MWD/T	1 rupture

Only the control slugs remain loaded and they have reached an exposure of 460-500 MWD/T.

Hot-Press Canned Slugs - PT 105-577-A

This test authorizes the irradiation of solid slugs with fusion and diffusion welds, cored slugs with fusion welds and control slugs. Fifteen tubes were charged, four of which will go to rupture. To date the following ruptures have occurred:

Solid - Diffusion Weld	556 MWD/T	1 rupture
Solid - Fusion Weld	603 MWD/T	1 rupture
Cored	686 MWD/T	1 rupture

The exposure of the control slugs which are the only slugs remaining is 850-900 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 to be irradiated to 200, 400 and 675 MWD/T for metallurgical examination. A fourth tube containing 4 unbonded, cored, enriched slugs centered in

18 unbonded cored pieces and solid aluminum dummies was charged on January 19 and ruptured on March 16 at an exposure of 259 MWD/T. Post irradiation examination of the tube exposed to 200 MWD/T showed the slugs to be in good condition. A second tube was discharged at 352 MWD/T.

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

The metal under these tests came from rods which were rolled from ingots that differed slightly from the ingots for standard production metal. Pu and post-irradiation measurements will be obtained. No ruptures are anticipated. Present exposure levels are 450-500 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

Three tubes each of standard lead-dip slugs, unbonded point pressure-closure slugs and, mechanically bonded point-closure slugs will be irradiated under this test. The slugs are loaded at C Pile. A rupture occurred in a mechanically bonded slug on 2-27 at an exposure of 301 MWD/T at which time all mechanically bonded slugs were discharged.

Extruded Cored Slugs - Evaluate Process Development - PT 105-588-A

Three control tubes from each month's supply of cored slugs received at HAPO during the development period of cored slug production will be irradiated to 900 MWD/T and given a metallurgical examination. When available, equal numbers of extruded and drilled slugs will be loaded in the same tube. One tube of extruded slugs was loaded at C Pile on 11-7-54 and has reached an exposure of 550 MWD/T. At D Pile three tubes were loaded on 3-7-55 and 6 tubes on 3-30-55. All tubes at D contain mixed charges. Three tubes with a goal exposure of 1100 MWD/T will be loaded at C Pile.

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

This test authorizes the irradiation of 4 tubes of extruded cored slugs and 4 tubes of standard production metal until two ruptures occur in each type of slug.

Uranium-Silicon Alloy - PT 105-586-A

Silicon alloy slugs from ingots (1 tube), from Dingots (4 tubes) and cored (3 tubes) will be irradiated until 2 ruptures occur in the Dingot metal and to 900 MWD/T for the cored slugs. Standard production metal (4 tubes - 2 ruptures) will serve as control. One tube of preliminary ingot metal was charged in B Pile in December and has reached an exposure of 450 MWD/T.

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

This test authorized the irradiation of 7 tubes of I and E slugs at C Pile. All tubes were discharged in February at an exposure of 135 MWD/T because of high temperature of the water flowing through the cores. It is intended to resume this test using larger diameter cores.

Irradiation of Dingot Slugs - PT 105-596-A

This test authorizes the irradiation of 9 tubes charged alternately with slugs fabricated from Dingots and control slugs in order to determine the performance of Dingot slugs. The control slugs are from K Lot (rod transformed) and L Lot metal (slug transformed). Two tubes will be discharged at 300 MWD/T and two at 600 MWD/T for examination and measurements. The remaining tubes will have a goal exposure of 900 MWD/T or higher.

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, the details of which are covered in HW-33170. One hundred fifty-six tubes are loaded in C Pile and 61 tubes in H Pile. Goal exposure is 200 MWD/tube. Eighteen tubes in H will be irradiated to 2 ruptures. To date 207 J-Q columns containing about 6.9 tons of irradiated thorium and 6.5 Kg of U-233 have been discharged. No ruptures have occurred during the past month and no graphite heating problems have been encountered.

PILE PHYSICS

Ball 3X System Recommendations

An analysis of the KW Pile Ball 3X effectiveness data was published as HW-35783, "Evaluation of K Pile Vertical Control Systems," C.L. Miller; supplementary extrapolations and calculations were included to indicate the strength of the entire Ball 3X system as functions of boron ball concentration and of enrichment conditions. On the basis of this analysis, recommendations were forwarded to the Design Section in HW-35797 that boron-steel balls be procured for the K Pile Ball 3X systems.

The later measurements in the KE Pile given below were somewhat more encouraging than the KW extrapolations had indicated; however, the steel ball system still did not provide the desired protection in the fully-enriched pile. The absolute values for allowable enrichment predicted by the theoretical calculations also summarized in HW-35783 were surprisingly close to the values obtained later in the KE tests.

Control System Evaluations - KE Pile Startup

The capacity of the K Pile Ball 3X system has just been measured in the fully loaded, dry, xenon-free, fringe-enriched K Pile. During the test, described in detail in Supplement B of the KE Startup Procedures, HW-35709, the following conditions were obtained when the pile was exactly critical; thus, the safety system capacities shown are actually measured limits with no safety factor included.

Pile Loading Condition	Vertical Control System Configuration
1. 88 "C" columns in 5th LU from reflector (due to more dense loading at pile sides, this loading probably corresponds more closely to 100 evenly-spaced "C" columns)	1. 37 central steel ball columns plus 14 fringe boron-steel ball columns
2. 72 "C" columns evenly spaced in 5th LU from reflector.	2. 51 steel ball columns
3. 32 "C" columns evenly spaced in 5th LU from reflector.	3. 45 steel ball columns loaded - the 6 fringe ball columns empty.
4. No enrichment - case of fully-loaded natural uranium dry pile.	4. 43 steel ball columns (equivalent to the 41 VSR's plus 2 steel ball columns

A further test is planned to check empirically the shape of the curve of single ball column effectiveness vs. boron-steel concentration with a steel ball, boron-steel ball mixture.

KE Pile Reactivity Status

Critical was achieved in the dry cylindrical loading with 413 tubes loaded, indicating the KE Pile to have a cold clean reactivity about 30 inhours greater than that of the KW Pile; test pile graphite measurements had also indicated that the KE Pile should be slightly more reactive than KW. The observed critical radial buckling was approximately 72 microbucks, the observed radial augmentation distance approximately 65 cm., and the measured ih/microbuck ratio was 23.4. These data all agree closely with KW startup results.

Recycled Uranium Reactivity Measurement - KE Startup Experiments

The reactivity effect of replacing the nine central natural uranium columns in the dry critical loading with nine columns of "re-cycled" metal was no greater than the precision of the measurements; the experimental precision should have shown up differences greater than 5 to 10 inhours for a complete pile loading. The "re-cycled" metal consists of a mixture of natural uranium and of Hanford-depleted uranium rejuvenated at the Oak Ridge diffusion plant.

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

The twelve high-exposure columns desired for Hot Semi-Works separation were discharged from the H Pile on March 15 at an exposure level of approximately 1100 MWD/t.

KE Operational Graphite Coefficient Test - PT 105-600-A

This production test, designed to measure the graphite coefficient in the KE Pile as a function of plutonium buildup, is currently being circulated for signatures.

Thorium Studies - Yield Predictions

The study to present up-to-date information on U-233 buildup and associated side reactions in a form for use in production forecasting and accounting is nearly complete. A document is currently in rough draft form which predicts the quantities as a function of exposure, specific power conditions, and cooling time of the following nuclides: Thorium 232, 233, and 234; Proto-actinium 233 and 234; and Uranium 233, 234, and 235. Calculations were made by IBM methods for exposures up to 4000 MWD/AT.

Shield Deterioration Observations - H Pile

Visual observation of the side shield at H Pile during the removal of the D test facility and of the P-13 test facility from the A test hole during the month indicated most of the masonite to be in good structural condition although there was evidence of shrinkage, especially in the inner cycle. Some samples of masonite obtained from the innermost masonite cycle of the D test hole appeared fairly weak and brittle as would be expected in this higher temperature region. It is encouraging to note that the masonite surrounding the high temperature recirculating facility in the A test hole appeared comparable in condition to the masonite surrounding the D test hole facility.

KW Pile Shield Attenuation

A review of the HMSS startup surveys at the KW Pile and discussions with individual radiation monitoring inspectors indicate no serious shield defects. The readings on the charging elevator during operation at the existing level indicate less than 5 mr of gamma activity and essentially no neutron activity.

PHYSICS DEVELOPMENT

Prototype Physical Constants Test Reactor

The fabrication of the remaining significant mechanical components for this reactor, i.e., the moving face and flux leveling systems and the boral shield, are underway. Electrical conduit installation in Building 305-B is largely complete and the control room installation has been initiated as has the layup of the graphite portion of the reactor.

The Aluminum-U-235 alloy fuel elements have been fabricated by Carbide and Carbon Chemical Company personnel at ORNL; these elements include (1) 4.1 kilograms of U-235 in the form of alloy annular slugs for use primarily in the reactor faces to "level" the longitudinal flux and (2) 2.2 kilograms in the form of solid alloy slugs for use in the shutter-type control rods. A portion of the fuel has arrived on site. Development work at Metals and Controls Corporation has yielded promising lead-U-235 matrix elements through the impact extrusion technique; however, the

annular elements produced thus far are very brittle and the ingredient proportions are being modified in an attempt to obtain better mechanical characteristics.

In the discussion of the nuclear safety of this reactor before the Advisory Committee on Reactor Safeguards on December 7, by Physics Research personnel, the following points were raised by the committee:

1. Is the rate of reactor assembly well controlled?
2. Will linear expansion in the control rod assembly during an excursion accelerate the excursion?
3. Will the collapsing of the lead-U-235 matrix annular slugs during an excursion be inhibited by "surface tension" effects?

Items 1 and 2 have been adequately handled in the design of the reactor. The rates of reactor assembly are fixed through fixed speed motors driving the face assembly; speed is reduced as the face closes through the equivalent-safety wise-of discrete power steps which ensure that face motivation is switched from one drive mechanism to another at the proper time or the assembly is halted. The control rod assembly is constructed such that elevated temperatures result in linear expansion which tends to reduce the excess pile reactivity. The "free fall" time of the U-235 matrix annular slugs when molten is not definitely known; they have been assumed to have essentially the viscosity and surface tension of molten lead. An attempt is being made to design a realistic measurement of the collapsing time of these elements; however, it is difficult to supply adequate power to melt the elements in times less than a few hundred milliseconds. Although this point is being investigated further, we do not consider the collapsing action of the lead-U-235 matrix element to be essential to safe operation of the reactor and plan to initiate operations concurrently with the investigation.

Slug Rupture Detection

The initial gamma spectrometer unit, of those to be provided under projects CG-578 and 579, has been received from Radiation Counter Laboratories and functionally tested in the laboratory. The basic system appears adequate if some components are altered; this alteration is quite simple. Stability checks are continuing.

Tests to determine the effectiveness of ion exchange resins in the slug rupture detection application have been prepared for C and H Piles; the H Pile test is delayed while the gamma monitor turret assembly is repaired and the C Pile test until KE startup activities are completed.

Reactor Safety Nuclear Instrumentation

The instrumentation at KW pile continues to function erratically. It appears that much of the poor performance of the Beckman and high level period trip systems can be corrected through concerted system maintenance. A serious problem in the arcing of the BX and BXA relays which open on a Beckman trip remains to be properly corrected. The specified settings for the safety circuit trip on the Beckman channel recorders has been modified to require the trip to be set within three major divisions of the instantaneous indication on the recorder until the initial rate of power rise is determined on this system; the specification then permits a fixed

trip at 90 per cent of full scale with range changes of a factor of [illegible] a mid-scale deflection is obtained.

The sub-critical neutron multiplication detector has been modified to permit easier operation and will be re-installed at DR Pile next month.

Lattice Neutron Economy

Preliminary analysis of the data describing neutron distributions through a K Pile lattice cell - obtained during KW startup - yield an initial cold, clean conversion ratio of 0.885 for the wet pile. This represents an increase of about six per cent in the conversion ratio as a result of reducing the lattice spacing from 8.375 to 7.5 inches.

Test pile results describing the purity of graphite in the Hanford piles have never been in close agreement with the results of diffusion length measurements made on the "as stacked" pile, i.e., including process tubes and voids. The limitations of both methods are being reviewed in detail in an attempt to assign the source of the discrepancy. It is possible that "neutron refrigeration" occurs in diffusion length measurements to the extent that good agreement would not be expected; this point will be investigated experimentally. Document HW-35467, "Diffusion Length of Thermal Neutrons in Graphite," A.W. Thiele and D.C. Pound, was issued during the month.

Neutron traverses have been made in large diameter slugs and hollow slugs with dry cores to evaluate the disadvantage factors and resonance escape probability in support of fuel element development programs.

KE Pile Startup

Physics Development personnel spent the major portion of the month participating in the technical activities associated with the activation of KE Pile. The instrumentation system provided for sub-critical, low level post-critical, and neutron distribution monitoring has functioned satisfactorily.

Reactor Safety - Tube Outlet Water Temperature Monitoring

The twelve thermal resistance elements have been relocated at H Pile to simulate a nominal one tube in a block of twenty-five monitoring frequency as per Development Test 105-595-A, "Test of a Cell System Temperature Monitor". The resistance bulbs are basically of the K Pile type with brazes isolated from the coolant with various protective coating materials to provide additional information for Design Section. The functional specifications for a system to be installed at the older areas have been developed cooperatively with Design and Manufacturing and are being circulated for approval.

Reactor Safety Project

The Atomic Energy Commission has directed that the scheduled Hanford in-pile tests of the North American Aviation safety fuse be carried to completion and that the $30,000 estimated as required be made available from monies already allocated Hanford programs. A detailed review of the proposed irradiations is being carried

forward by Special Irradiations personnel and NAA will be informed of required modifications to the test assemblies at the completion of the review.

Tests of the fuse assembly scheduled by NAA to be performed at Arco in the Materials Test Reactor have not yet been initiated; these include a determination of radiation damage effects on (1) enriched $B^{10}F_3$, i.e., dissociation and recombination reactions, and (2) the U-235 alloy-solder plug assembly, and a measurement of the response time of a fuse element in a flux increasing exponentially with time.

Test Pile - Routine Tests

The reactivity of uranium containing diffusion cascade product has remained very uniform during the month. The U-235 content of the UF_6 from Paducah is apparently in the range of 0.710 ± 0.002 per cent which, on the basis of blending one part recycle with three parts virgin uranium, will result Hanford specifications being met - see HW-35650, "Justification - Recommended Isotopic Composition of Uranium Metal," O.H. Greager. There were 49 National Lead billet egg lots (all containing recycle material) and 24 Mallinckrodt lots (virgin uranium) tested during the month with the following results:

TDS Range	Number of Lots Falling in TDS Range	
	NYO	MCW
6-9	7	0
10-15	41	24
16-20	1	0

Test Pile - Special Tests

Numerous samples of boron steel and/or steel balls were identified as to fractional content of boron steel at the request of Reactor Section to make boron steel balls available for the 3X system at the K Piles.

The strength of the shim rods in the Test pile was determined to be 0.24 per cent $\triangle K$.

HEAT TRANSFER

Cooling-by-Boiling Studies

A test was performed at 1250 psi and 400 kw tube power with a 1/4" annulus. The net result was to show that qualities greater than 20 per cent can be reached. However, the true maximum permissible quality could not be determined due to scale formation on the heater tube, bowing of the heater tube, and other equipment problems.

Other tests were run with tube powers from 10 to 100 kw to determine whether superheated steam could be obtained in a process tube assembly. A 1/4" annulus, exit pressures from 100 to 250 psi and inlet temperatures from 50 F to 300 F were utilized. In these tests it proved impossible to reach the superheated condition.

This was due to two factors: (1) the large annulus and low flow rate presumably combined to give low fluid velocities and poor heat transfer and (2) the stainless steel process tubes usually bowed before the tests could be completed. Qualities approaching 100 per cent have been obtained in the past when 0.08" annuli have been used, but annuli of this size were not available for these tests. The tube bowing is believed to be due to temperature gradients around the periphery of the tube which in turn are believed to be due to separation of the steam and water.

The process tube bowing described in the above paragraph has also been encountered to some extent for higher powers, pressures and flow rates. Enough evidence has now been obtained to indicate that vertical rather than horizontal tube assemblies may be required in order to make cooling-by-boiling practical. With vertical tubes the steam-water separation should not occur and gradients around the periphery of the tube would not exist. The validity of these postulations is being examined in detail. Regardless of the outcome it is certain that much valuable information and experience have been obtained from these tests.

Due to the need for the use of the mock-up equipment on tests of a different nature, it is planned that cooling-by-boiling testing will be largely suspended until about August.

Cooling-by-Boiling Equipment Development

Progress on the installation of the equipment required to modify the mock-up to withstand pressures of 2000 psi is progressing satisfactorily. Present indications are that the equipment will be ready for shake-down tests early in June.

A heater tube has been developed which is cheap and which eliminates the need for internal pressurization during tests at high pressures. It consists essentially of a thin-walled aluminum tube drawn over a train of core pieces each coated on the exterior with a ceramic insulator. Valuable assistance from Fuels Technology personnel was received on this work.

An inexpensive material suitable for insulating the heater tube from the process tube has been shown to be satisfactory. Since this material will withstand high temperature steam and is not brittle, it greatly reduces one of the biggest practical problems which has been encountered.

1706-KE Single Pass Boiling Facilities

A preliminary review was made of the equipment proposed by the Pile Materials Sub-Section for use in the subject facility. From the standpoint of tube flow and pile safety, the equipment appeared quite satisfactory. Some changes were recommended in order that the boiling conditions be more readily controllable.

Steam Power Loss at the Old Piles

The results of experimental tests to determine the effects of steam power loss were reported in HW-35529, "Experimental Study of Steam Power Failure in High Temperature Operation at D Pile," K.G. Toyoda. The tests show that outlet temperatures of at least 120 C may be tolerated without tube or slug melting following steam loss, if the pile is scrammed.

Program to Raise Outlet Water Temperature

Studies of the problems involved in raising the pile bulk outlet water temperatures to 100 C are continuing in cooperation with the Pile Coolant Studies Unit and Reactor Operation Engineering Unit. It is probable that a production test to authorize operation of D Pile at 100 C can be prepared by June.

Charge-Discharge Production Test

An analysis has been made of the pile safety aspects of the use of the charge-discharge equipment which is to be installed on C Pile by Reactor Operation Engineering Unit. No sacrifice of pile safety can be foreseen insofar as tube flow is concerned.

Hydraulics Laboratory Studies

It was determined experimentally that the flow through a K Pile tube loaded with C metal plus four lead cadmium slugs would be about 6 per cent less than that in a normal tube. This lower flow will lead to a different Δt than might have been expected.

Tests were performed on the proposed CG-558 inlet assembly to demonstrate acceptability and the results were reported in HW-35760, "Pressure Drop-Flow Characteristics of Project CG-558 Inlet Assembly," H.H. Greenfield. It is interesting to note that, under normal 558 flow conditions, a critical flow condition occurs in the outlet parker fitting. A prime consequence of this is that tube flow rates will be constant for any rear header pressure from 0 to about 35 psig.

K Pile Pigtail Limit

An analysis was made of the probable consequence of rupture of an inlet pigtail at K Pile during operation. It was concluded that, in the event of a complete failure, sufficient water would flow through the tube from rear to front to prevent slug melting if the equilibrium tube power was under 500 kw. K Pile is presently limited to this level.

K Pile Incident

An analysis has been made of the temperatures encountered by the slugs and tube of tube 4669 early in January. It has been concluded that the results of visual examination of the slugs and tube can be explained reasonably on the basis of heat transfer calculations. In addition, it has been concluded that the things learned as a result of the incident will not have a large effect on previous postulations of the consequences of loss of coolant.

ANP Fuel Element Test

Calculations have been made to determine the graphite temperatures adjacent to the test hole containing the element under various test conditions. These were reported as HW-35894, "Heat Transfer Aspects of Proposed ANP Experiment," S.R. Fields and HW-35895, "Additional Heat Transfer Information for the Proposed ANP Experiment," S.R. Fields.

Helium Replacement

A formal report which summarizes the replacement of the pile helium atmosphere with CO_2 was issued as HW-34012, "Final Report on PT 105-168-P, Replacement of Pile Helium Atmosphere with CO_2," S.S. Jones.

EQUIPMENT DEVELOPMENT

Charging and Discharging Studies

A K-monel segmental discharge spline fabricated by the Superior Tube Company was tested during the month. Four discharges were successfully accomplished but it was found that on each successive run the spline became more difficult to insert under the slugs. Because of this tendency of the metal spline to hold its inflated shape, the fabric type spline appears to be better and a modified one has been ordered which has a spring steel insert to correct its shortcomings reported last month.

Assistance was provided to Operations and Maintenance on the development of a pneumatic charging machine which has now been placed in service at 105 F. The new machine is entirely air operated without electrical connections, has no external valve linkages and is designed to be as safe and jam-proof as possible.

An extensive analysis was prepared during the month of the complete history, development work, economics, and problems associated with charge-discharge during operation. A document is being prepared which presents the results of this study.

Horizontal Rod Studies

Development work concerned with horizontal control rods is now at a minimum. The first complete pile has now been converted to the new rods, and all known major problems have been solved.

Additional tests are being performed on the ribbed sphincter seals for C Pile to obtain further data for the final report.

Vertical Rod Studies

Development work on vertical safety rods was held to a minimum this month by inclement weather conditions at the test site. Some modifications were made to the K Pile 3X tie-in switch, and a new cushioning mechanism for the air accelerated rod was designed.

Supplementary Control

Tests were completed on the single tube heated mock-up to determine the rate of heat transfer from slugs to graphite using a K Pile process tube. Results indicate that with the slugs at the melting point of aluminum, about 0.7 KW/ft. is transferred from slugs to graphite.

The work on poison splines was concentrated during the month on the improvement of the nozzle seal. A 2S aluminum tubing has been received and full length splines are being fabricated.

Process Tube Assembly and Piping

The investigation of a double Venturi assembly for boiling instrumentation has now been deferred pending completion of Heat Transfer's boiling study mock-up. Tests reported last month had to be abandoned because of pump surging in the mock-up being used.

Principal emphasis during the month was again centered on the K Pile pigtail problem. In cooperation with Design Section, a group of pigtails of various configurations has been established and these will be procured by them for evaluation. Our efforts have been directed toward the refinement of the rubber "grommets" for use on the stainless connectors, and the preparation of equipment to do the testing.

Efforts to qualify maintenance welders for ASME Code work on the high-pressure-temperature thermal loop have now been abandoned. Several Minor Construction welders have recently become qualified for this work, and the fabrication of the facility has been turned over to them.

Physical Constants Testing Reactor

Difficulties encountered in laying the movable face rails and rack sections, the shortage of craft personnel, and the necessity of leveling sections of the reactor pad by grinding, delayed layup of the moderator. These difficulties have been overcome and moderator stacking is well underway at month's end. The movable face base and drive mechanism has been installed. Drawings for the movable face frames, the flux leveling rings and tubes, the boral shield, the synchro readout panels, and the driver tube assemblies have been revised and are ready for final issue and fabrication.

Other Engineering Development Work

Several of the major problems associated with the operation of the graphite core-borer were solved during the month. Other modifications are in process.

The development of equipment for use with zirconium tubing continued during the month. One section of tube was slit using a carbide tipped cutting tool, and other samples have been successfully Van Stoned.

SPECIAL IRRADIATIONS

Sufficient information has been obtained from GE-ANP to permit the preparation of a final draft of specifications for their facility. A report on the 305 Pile tests with a prototype fuel element has been issued. Technical studies to date show that this facility can be accommodated in C Pile with some reservations being made on the power generation in the element. Since it has been decided that the facility will be provided with annular water cooling to avoid over-heating of the graphite, additional 305 tests will be required to firm up power generation in the element.

Additional funds have been received from KAPL to complete the modification of the high pressure, high temperature recirculating loop. Minor Construction has started shop fabrication and installation. The present scheduled date for the insertion of test specimens is August 15, 1955. The in-pile tube of the old loop was successfully removed Tuesday, March 15. The radiation intensity of the tube was determined to be approximately 10,000 r/hr at one foot in air. The "D" test hole facility has been removed from H Pile to provide adequate space for the modification of the loop.

Following the settling of financial arrangements, work in the support of NAA safety fuse experimentation (NAA 109) has been resumed. Cored fuel elements required for these experiments are being prepared and will be shipped to NAA upon completion of their fabrication.

Over 200 cobalt samples (ORNL 183) are being recanned in the technical shops. Difficulties are being experienced in getting satisfactory welds. Concurrence of the customer is being obtained to recan a portion of these in new aluminum containers.

The experimental assemblies for studying the in-pile reaction between pile gas impurities and potential process tube and slug jacket materials (HAPO 105) are now operating in F Pile. Heat generation in the stainless steel gamma type heaters provides temperatures higher than that desired. Due to this difficulty the assemblies will be discharged during April. Additional assemblies are being prepared for charging in May.

Experimental equipment is still being prepared to support studies to determine damage to graphite samples maintained under conditions identical to those in-pile but with the absence of pile radiations (HAPO 158).

Radiation of neptunium samples in the Snout I facility at H Pile as a portion of the experiment to determine the cross section of neptunium-240 (HAPO 143) continues. Preliminary data have been obtained but difficulties with experimental equipment have interfered with any satisfactory determinations of the cross section.

Thermocouple assemblies are being fabricated to measure exit core and annular water temperatures in a process channel irradiation of cored slugs (HAPO 159). Data will be used in support of cored slug development.

An experiment is being performed to determine the effect of gamma irradiation on the electrical resistivity of asphalt mastic pipe coating. These data are required in support of use of this material in construction of new tank farms.

Equipment is being designed and fabricated to perform calibrations of the low and high period trip instrumentation in the K Piles.

Numerous revisions in the experimental facility in the K Piles have been made in support of KW Pile startup. Facilities were also monitored carefully and at this date are operating satisfactorily. New shield plugs employing boron and aluminum will be installed in KE Pile before startup. The radiation data has indicated that the shield plugs initially installed would exhibit extensive induced activity upon exposure to irradiation. Numerous inspections of the experimental facilities at KE Pile are being carried out.

Discharge equipment for the two Snout facilities at KW Pile is being designed. This equipment will consist of discharge casks plus provisions for disposing of radioactive components used in irradiation experiments.

Project CG-556 pertaining to the test hole water pipe supply at C Pile has been completed.

Six vertical height traverses were run during the month, three in C Pile and three in D Pile.

Process channel 1586 H was borescoped on March 19. Extensive damage to the tube block was observed in the region where the process tube previously occupying this channel was stuck. In particular, a five-inch gap of the tube block was observed in the center of the pile.

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 COOLANT STUDIES

Production Tests

A charge of slugs especially prepared to study the effects of aluminum grain size on corrosion rates was charged into tube 2276-C on March 15, under PT-105-549-E. The outlet temperature of this tube has been as high as 107 C since the test started.

Nine 63-S, 72-S, process tubes have been installed in three reactors under PT-105-543-E. Two of these tubes are installed in 100-D reactor, four at 100-F reactor, and three at 100-H reactor.

Components of the equipment to be used in determining the radiation effects on 2-S aluminum corrosion under PT 105-551-E are being tested in the Flow Laboratory. The Groves Flex-flo valves which will be used for controlling the flow to the reactor process tubes are being tested in the Heat Transfer Flow Laboratory.

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 seven months.

The last of the corrosion data on J-N loadings exposed under PT 105-562-A has been compiled. No apparent difference between the corrosion of J slugs and natural U slugs could be found.

An analysis of slug side failure rates for the last two years was made. No correlation could be found between the side failure rates and either pile power level or exposure concentrations. The rates have fluctuated frequently at the various piles, but never have become high enough to cause any concern.

Specifications

A draft of a revision of water treatment specification No. 4:00, pH Adjustment, is being circulated for comment. It is proposed to revise the specification in accordance with the results of PT-105-526-E to require a process water pH of 7.3. It is expected that this will result in a 25 to 50 per cent reduction of pile corrosion rates or a 5 to 10 per cent increase in production.

Corrosion Monitoring

Twenty-one process tubes were examined during the month. Of sixteen tubes removed during the extended outage at F Pile at least nine had light to heavy external corrosion. In the examination of the other tubes indications of cocked slugs were found in one tube from D reactor and one tube from C reactor; otherwise, the tubes examined exhibited no unusual corrosion.

Correlation of pile process tube examination data collected from September, 1953, to January, 1955, indicates a relationship between cocked heavy metal slugs and

ruptures. Evidence of cocked or misaligned slugs appears in process tube as patches of heavy scaly film deposits and local areas of heavier corrosive attack accompanied by a reduction in hardness of the aluminum. The reduction in hardness is attributed to localized heating caused by the cocked slugs. In the examination of process tubes removed for reasons other than the occurrence of ruptured slugs, thirty-one per cent of the tubes bore evidence of slug cocking. Sixty-seven per cent of the tubes removed because of ruptured slugs contained film patterns which were indicative of cocked slugs.

An examination of tube 4885-KW, removed on 3/5/55, revealed that the front Van Stone flange had been extruded into the front gunbarrel causing the tube to leak. Metallurgical examination of this tube revealed pits 5 mils deep on the outside of the tube about 9 feet from the front Van Stone flange.

The inspection of boiler #3 in the 185-KE Building and boiler #2 in the 185-KW building revealed that the boilers were in good condition.

Laboratory Corrosion Tests

The internally-heated mock-up has operated successfully for over one month. The data indicate the surface temperatures of the corrosion samples may be about 60 C higher than the water temperatures. This fits very well with the theory of in-pile corrosion presented in the latest corrosion correlation. The test will be terminated in another 30 days.

Samples of eleven different seal coats applied to K type thermohms were exposed to flowing hot pile process water (120 and 150 C) in the 105-D Flow Laboratory. Five different organic protective coatings, Amercoat 74, Amercoat 1577, Phenoline 301-303, green Unichrome, and clear Unichrome, failed by swelling, blistering, and discoloring in both 120 C and 150 C process water at the end of 140 hours of exposure. A very thin coating of silicone varnish applied over an aluminized coat failed by powdering after 48 hours of exposure to 120 and 150 C water. Tin-indium solder applied to a thermohm to cover the silver solder braze was severely corroded after exposure to 120 C process water for 140 hours. Samples

Maximum distortion rates observed for TS-GBF graphite in water cooled test facilities at Hanford are about 0.5 per cent for the first 1000 MD/AT and 0.3 per cent for subsequent exposure up to 4000 MD/AT. Very high exposures in the MTR show that saturation in the expansion of transverse samples occurs at about 2.5 per cent expansion. Because the tube blocks in KW Pile are under cut 3.2 per cent, the distortion experienced at KW cannot fill this undercut, and as a result will not be observed as a distortion of the graphite stack. The AGOT-TS graphite utilized in fringe tube blocks may expand somewhat more than the TS-GBF graphite but the differences are not large.

Graphite temperatures have increased sufficiently to eliminate any danger of a stored energy surge. The stored energy which was built up during the low temperature operation, has essentially been released so that no danger exists.

PT 105-535-E, Alternate Pile Atmosphere Study

The aluminum and iron foils which were exposed under this production test to water-saturated nitrogen gas and in contact with pile graphite samples were discharged from H Pile. The foils from the annulus tube facility showed very high weight losses because liquid water was accidently admitted to the inner tube containing the graphite and foils. Electrolytic couples between the graphite and aluminum caused high corrosion rates which resulted in the complete disintegration of the 2 mil foils and as much as 50 per cent weight loss on the 5 mil foils. The 1 mil iron foils were completely oxidized. The samples from the other two channels were not exposed to liquid water. During the six month period of the test these demonstrated an average of 2 per cent weight loss in the presence of nitrogen saturated with water vapor and almost undetectable corrosion in the presence of nitrogen plus 10 per cent carbon monoxide saturated with water vapor. The low weight losses in the presence of carbon monoxide are attributed to protection offered by a polymerized carbon suboxide deposit which was observed on all the foils. It is concluded that no excessive attack of metal will take place in a pile using a nitrogen atmosphere for a transient poison as long as excessive amounts of water are not allowed in the pile.

Thermal Annealing of Damaged Graphite

A series of ten annealing runs has been completed on a single graphite sample with 556 MD/CT cold test hole exposure. Successively higher annealing temperatures were used starting with 100 C and ending with 750 C. At each temperature, the rate of annealing was determined by observing the rate at which the C_o X-ray peak shifted with time. Nitrogen gas was used as an inert atmosphere at the higher temperatures. During the annealing the C_o spacing decreased from 6.97 to 6.79 Å.

Analysis of these runs according to the theory of Vand gives the distribution of activation energies from 28 to 87 kcal/dislocation. There are broad peaks in this distribution curve at 35 kcal and 84 kcal. These correspond to annealing rates conveniently measurable at about 150 C and 750 C respectively.

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

Fabrication of the heater assembly parts for the Series V and VI exposures is complete. Canning of the samples, wiring, and final assembly remain to be

accomplished. Arrangements have been made with Special Irradiations Unit for construction of an improved type temperature control system for use with these exposures. The control instrumentation previously used was found to have deteriorated beyond the point where repairs were economically feasible.

A new target date for the Series V irradiation has been set at July 1, 1955, in tube 3461-B.

High Temperature Irradiation Facility

Drafting of the revised prints of the controlled temperature facility for the Materials Testing Reactor is expected to be complete by April 1. Completion of the prints will permit construction of a single-section mockup of the assembly for testing of thermal characteristics.

The vendor for the instrumentation to be used in the facility has scheduled shipment of all components prior to May 6.

DT 105-538-E, Controlled Temperature, Low Exposure Irradiations of Graphite

The C_o determinations on the three exposures, two 80 C runs and one 30 C run, have been completed. This test was intended to explain a form of radiation damage mechanism using the C_o displacement data; however, variation of the initial C_o values among the virgin samples is greater than the displacement caused by the low exposure radiation. The samples were valuable for determining physical distortion rates at 80 C; these results have been previously reported.

RECIRCULATION TECHNOLOGY

Recirculation Studies

The H Loop was operated at reduced pH (4.8 - 5.0) and at 200 C for several days. Results from supporting tests in ELMO-3 showed that this pH is not compatible with the stainless system, especially at the welds; the loop pH has since been returned to normal. There appears to be no ready method of compromising diverging pH requirements of aluminum in stainless steel systems. Further work is being done in ELMO-2, using a cation resin for pH reduction. Modifications to ELMO-4 loop were completed. Two rupture tests have been conducted, one a standard Hanford slug and one a zirconium clad, magnesium matrix slug. In the former case, flow stoppage occurred in about fifteen minutes at 280 C; in the latter case flow stoppage occurred as soon as the loop was brought up to 280 C.

Construction of the carbon steel loop continues to be thwarted by lack of ASME qualified welders. Fabrication of two off-site loops progressed satisfactorily. The high pressure conductivity cell was successfully tested at 4000 psi. Further investigation of the conductivity measurement program is being made through vendor contacts.

1706-KER Facility

Construction of 1706-KER proceeded; the structural portion of the building is nearly completed, and installation of 105-KE piping is underway. Start-up

procedures were prepared in cooperation with Instrument Design personnel. Studies of boiling capabilities of the loops show that the feasibility with 150 psi pumps is marginal, and installation of 450 psi pumps is recommended for the boiling loops. Calculations of the loop surface area were made to aid in evaluating the corrosion and crud problems which might be encountered.

Semi-Works Operation

Construction of the 1706-KE Water Studies Semi-Works is nearly completed, and final acceptance tests are underway. The 105-D Flow Laboratory was shut down and the five operators have been assigned to 1706 for training. Preparation of the Operation Manual has been completed.

Studies were continued on the single pass boiling system. Current plans call for mock-up of the system in 1706 prior to installation on the pile, to determine operating characteristics at reduced flows.

Process Water pH Evaluation

Additional slug weighing data from the F-Pile test confirm corrosion rate reductions in the range 25 to 50 per cent as pH is reduced from 7.65 to 7.3. Tests of raw water at pH 7.0 indicate appreciably higher rates than those observed in process water at the same pH. The out-of-pile tests at D Flow Laboratory at pH 6.6 and 6.2 confirmed previous trends. Steel corrosion data demonstrated the importance of dichromate in inhibiting corrosion at pH 6.6.

PILE GRAPHITE STUDIES

H Area Distortion

During the shutdown of March 16, difficulty in discharging the charges and process tubes of 1586-H, 3180, 4182-H, and 3988-H was encountered by Operations. Forces up to 5000 pounds were used in discharging the slugs from 1586-H, while forces up to 7000 pounds failed to discharge the tube from this channel. The tube was eventually split and partially discharged using a force of 5000 pounds.

Removal of graphite samples from H Pile with the core borer had been scheduled for 2171-H and 3674-H for this outage. To conserve downtime, it was decided to remove samples from 1586-H instead. Several cores were obtained from the channel, however, none were complete. In attempting to obtain central cores, it was observed that the core borer could not be inserted into the pile beyond 16-3/4 feet.

Microscopic examination of the graphite powder collected from the coreboring indicated small amounts of hydrated aluminum oxide similar in nature to that found in F Pile in March, 1952.

After a review of vertical height distortion indicated negligible curvature, bore diameter traverses of the channel were taken and the channel was borescoped.

The bore diameter traverse indicated nominal diameters up to 12 feet from the front Van Stone flange. Between 12 feet and 14 feet the horizontal diameter gradually increased while the vertical diameter remained essentially constant.

At 14-1/2 feet, the horizontal diameter increased to instrument full scale (1.80 inches) and calibrating head lodged in the channel.

Borescoping of the channel indicated several longitudinal cracks in the graphite tube blocks. At 14-1/2 feet, a separation of the tube blocks was observed. The end of a trunnion block was clearly visible along with fragments of graphite lodged between the tube block and the trunnion block. At 16-3/4 feet, the end of the process tube was observed. The exact length of this section of the process tube was not determined due to the shorting of electric leads in the borescope.

It is anticipated that additional examination of this channel, the rear face thermal blocks, and other channels will be accomplished during the next outage. Details of this preliminary examination are reported in HW-35993, "Graphite Condition of Channel 1586-H," D.B. Lovett, 3/30/55.

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

D Pile operated most of the month at 500 C and 60 per cent helium. Vertical height traverses taken March 9 on tubes 4453, 4674, and 4494 show little change in distortion trends. Six and one-half core samples were cut from the first two tube blocks of channel 1169 on March 23. Evaluation of samples properties has not yet been made.

It has repeatedly been necessary to extend the length of time during which high helium concentrations may be used after startup for reactivity transient control. This necessity is attributable to an unusually high mortality rate of control rod thimbles at D, reducing the average number of usable rods to seven. Increasing the helium use is regarded as making this production test a little more rigorous but has not yet produced any obviously bad effects.

PT 105-548-E, High Temperature Burnout Test at C Pile

At the shutdown of March 3, channels 1960-C and 2785-C were discharged, tube 2773-C was removed and perforated gun barrels were installed, and a vertical height traverse was taken on tube 4674. On March 9-10, a reactivity test was made by adding 20 per cent CO_2 to the gas at equilibrium power. Actually the CO_2 concentration reached 67 per cent and maximum temperature achieved was 685 C in channel 2773 when general graphite temperature was approximately 550 C. The unexpectedly high temperature in 2773 is not considered typical of higher temperature operation since rod movement during this test caused a concentration of highest tube powers around 2773. Nevertheless, it was decided to postpone charging of the J-Q diamond load for 2773 until after the first high temperature operating period of the test, to be certain that the temperature in 2773 is not excessive.

Samples were loaded in 1960, 2773, 2785, and the D test hole on March 14, and the production test was officially begun. Unfortunately, C Pile has not been able to operate for any appreciable period of time since, so high temperatures have not yet been reached.

KW Pile Graphite Temperature

Operation of KW Pile at relatively constant power level since startup this month shows an unusual temperature distribution in the graphite stack. Temperatures in

most fringe regions are considerably higher than in the central zone, which is cooler than expected for present power level and gas composition. Analysis of the distribution indicated that the overboring pattern of the tube blocks has a very great effect on temperature with the present gas composition of 50 to 65 per cent CO_2. Maximum indicated temperature is presently approximately 6-1/2 feet from the front edge of the stack. This location is at the middle of the second tube block, which is overbored 0.130 inch on the radius. Temperature here is approximately twice that of the corresponding central temperature, where tube block overbore is 0.030 inch. The 0.060 inch zones are also hotter than the center. At the extreme front and rear of the pile, in the 0.220 inch zone, the temperatures are appreciable.

Indicated tube block temperatures are not much lower than in nearby filler blocks. Removable stringer thermocouples generally agree quite well with other couples. Most chromel-alumel and iron-constantan thermcouples agree. Central zone thermocouples at K are much nearer control rods than in other piles, but it is still too early to ascertain the effect of rod movement on temperature.

Distortion Trends

At C Pile continued central contraction is shown by a vertical height traverse this month on 4674-C. Lovest elevation is -0.10 inch (0.20 below layup elevation). Traverses made for the first time on tubes 4659 and 4688 show central deflections of 0.00 and -0.05 respectively. Temperature in these regions is high enough to corroborate this.

PT 105-512-E, Pile Graphite Sampling

During the past month the graphite core borer was successfully used to remove graphite samples from B, C, D and H Piles. Three cores were removed from the central region of channel 2785-C which had operated at a higher temperature as a result of PT 105-536-E. Surface area measurements of these cores indicate an oxidation of about 0.1 per cent. Only partial cores were obtained from channel 1586-H on March 18, probably because of fractured graphite tube blocks. On March 22, seven cores were cut from 0868-B and two cores from 3972-B. Six cores were removed from channel 1169-D on March 23, including one cut vertically up in the channel at the nine foot four inch position and another at the same position cut vertically down. Following X-ray analysis of the cores, annealing and other destructive tests will be performed.

Determination of Oxygen in the Pile Gas

At the present time adequate instrumentation is not available at each pile for the determination of oxygen in the pile atmosphere. A Beckman oxygen analyzer, Model G-2-318 installed several months ago at C Pile has not operated satisfactorily. The Chemical Instrumentation Unit has modified an apparatus to operate in the presence of the various components of the pile gas. The apparatus which continuously monitors oxygen content depends on the "depolorizing" effect of oxygen on a silver electrode in a silver-cadmium cell. The apparatus has been proven in the laboratory and will be transferred to C Pile for further development. A Beckman, Model G-2-241, oxygen analyzer is also being evaluated and parts have been ordered to change the range of this instrument to 0 - 0.2 per cent.

PT 105-532-E, Monitoring of Pile Graphite Burnout

Routine burnout samples were removed from both B and C Piles. Samples in channel 3461-B charged on 9/21/54 were discharged on 3/23/55 after 149 effective operating days. Oxidation rates were lower than previously obtained due to low temperature operating at B Pile. Rates of 0.18 per cent/1000 days and 0.38 per cent/1000 days for large and small samples respectively were observed. These rates are about 1/3 of the nominal rates for operation at 500 C maximum graphite temperature. Samples in channel 1960-C charged on 10/27/54 were discharged on 3/3/55 after 88.9 effective operating days. Oxidation rates for these samples were somewhat lower than previously obtained due to the high concentration of helium in the pile gas atmosphere (75 per cent).

FUEL TECHNOLOGY SUB-SECTION

FUEL ELEMENT DEVELOPMENT

Extrusion of Cored Slugs

Comparative inspection reports from NLO indicate that an improved yield for concentricity and hole dimensions was obtained through the use of a self-centering billet in the extrusion operation. Refinements in press alignment and a new liner should provide additional improvement in the concentricity of the I. D. to the O. D. of the tube.

Direct Cast Fuel Elements

Uranium-silicon alloy was cast into zircaloy-2 cans which had been preheated to 900 C. Bonding between the uranium and can was complete but fracture of the bond occurred during cooling. It is indicated that the current cans are too stiff to follow the contraction of the uranium during cooling. Zircaloy cans given various annealing treatments to decrease their stiffness will be used to test this theory.

Metallographic Laboratory Facilities

Metallographic and testing facilities in the Pilot Plant were placed in operation during the month. The metallograph was assembled and supplies were ordered to provide a complete self-service metallographic laboratory.

Ingot Quality Studies

The slugs from ingot Quality Study 9c have been received, canned, and shipped to the 100 Areas for irradiation. The Mallinckrodt portion of the test consisted of 5600 eight-inch slugs from ingots cast from pickled derbies, and the National Lead portion of the test consists of 6900 eight-inch slugs from ingots cast from unpickled derbies. Specific metallurgical tests and sample slugs to compare the physical properties of the samples from the two groups were not made for this test because the sample slugs from the unpickled portion were inadvertently canned.

The preirradiation testing and evaluation of the slugs from the ingot quality studies 7, 8 and 9 have been completed. Summaries of the preirradiation data and conclusions are reported in HW-33642.

Evaluation of Dingot Uranium Fabricated by Forging and Rolling

The slugs that were produced from dingots fabricated to rods by a duplex process (hammer forging followed by rolling) at the Simonds Saw and Steel Company and the FMPC have been canned for Production Test 313-51MT (HW-34511). The slugs have been tested, measured, and are ready for pile irradiation. A report, HW-37598, has been issued covering the metallurgical evaluation of the slugs, and a subsequent report covering the canning phase of the production test is being written.

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Arrangements have been made to forge dingots at the Heppenstall Company plant at Pittsburgh, Pennsylvania. There will be 50 dingots (~300# each or 7 tons total) forged during March and April, and 30 dingots (~1000# each or 15 tons total) forged a month starting in April. The resulting products will be rolled at the FMPC for subsequent irradiation at HAPO. The first forging operation at Heppenstall was observed March 22 and 23, and the preceding schedule was established. It is expected that the first of this material will be canned and charged at HAPO during May, 1955.

Observations on the Intergranular Network in Uranium

The present state of information on the intergranular network (reticulate structure) in alpha uranium can be expressed as follows:

a. It is postulated that a hydrogen concentration in excess of 2 ppm and a cooling rate in excess of 70 C per second is necessary for the formation of the intergranular network.

b. The intergranular network is found in uranium water quenched from the temperature 600 - 750 C.

c. The intergranular network is not found in uranium air cooled from the temperature 600 - 750 C.

d. Tensile specimens for salt bath treated uranium having a pronounced reticulate structure have shown about 30 percent lowered tensile strength at room temperature than specimens of induction heat treated material (no reticulate structure) of similar grain size. These results are from two pairs of samples only. Similarly heat treated samples from different rods are now being prepared for verification of results.

It is pertinent to note that when beta quenched uranium containing the intergranular network is alpha annealed at 640 C for 15 minutes and then water quenched, the intergranular network is formed at the grain boundaries of the recrystallized grains.

Quenching Production Uranium in Brine

On February 14, 1955 the circulating water quench tanks used for slug heat treating at HAPO were replaced with a non-circulating water quench tank to prevent the loss of uranium which flakes off as oxide during quenching.

In the new quench tank the operating conditions are quite variable. At the start of a heat treating run, slugs are quenched in 10 C water; as the heat treating run proceeds, the quench water temperature increases to 35 - 60 C and the salt concentration of the quench water (salt carryover) from the salt bath heat treatment increases at the rate of approximately 0.25 percent per hour. At the time this large variation in quenching condition was noted, the slug heat treating operation was to be stopped in a short period of time.

Therefore, no specifications to reduce the variation in operating conditions were placed on the operation.

Surface Hydrogen Analysis Techniques

A rapid procedure is being developed to determine whether the hydrogen in FMPC treated uranium conforms to HAPO specification (< 2 ppm total with < 6 ppm in 25 mil periphery). A vacuum extraction apparatus using induction heating has been constructed and placed in operating condition by members of the Analytical Control Unit, Process Sub-Section, Manufacturing Department. In this apparatus the surface of a slug is heated to 600 C in 4 minutes 15 seconds and held at that temperature for two minutes and 15 seconds. The volume of gas evolved in the total six minute and 30 second time interval will be correlated with bonding layer porosity and possible total hydrogen concentration. When the correlation is made it is planned that a similar apparatus will be set up at FMPC to ascertain whether the uranium slugs manufactured there meet HAPO specifications.

Banding in As-Rolled Uranium

Since the first quarter of 1953, when HAPO began receiving FMPC rolled rods, banding* has been observed in as-rolled uranium. The frequency of occurrence of the banded structure in as-rolled uranium at HAPO is currently approximately 20 percent, while at du Pont (also a receipient of FMPC rolled uranium) banding was observed in 20-30 percent of the production uranium during the third quarter of 1954.(1)

A document, HW-33714, Banding in As-Rolled Uranium, has been issued concerning this subject. The following recommendations were made to the National Lead Company at FMPC:

a. that the cause of banding in FMPC rolled rods be determined by experimental work by the National Lead Company

b. that the National Lead Company take steps to eliminate the banded structure from as-rolled uranium.

* Banding is a segregated structure of roughly parallel areas of large and small grains aligned in the direction of working. In as-rolled uranium, banding cannot be removed by annealing above the recrystallization temperature and is therefore not associated with cold working during rolling.

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(1) Verbal communication between W. T. Kattner and T. C. Evans of the Savannah River Plant.

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National Lead Company metallurgists have expressed the belief that banding is the result of uneven temperature control (localized overheating) in the homogenizing salt bath between breakdown and finish rolling, and have taken steps to eliminate the overheating effects.

Delay Quenching of Uranium

A proposal has been made and subsequently approved to irradiate under production test 313-53MT (HW-35590, PT 313-53MT, Effect of Heat Treatment Modifications Upon In-Pile Stability) not less than a total of 50 tons of slugs given a delay quench after salt bath beta heat treating. The toal slug tonnage will be split into three groups and heat treated in slug form. One group will have a 35 second delay quench, the second a 50 second delay, and the third an 80 second delay. The following heat treatment specifications, aside from the delay time, will apply to all three groups of slugs:

1. Salt Bath - Houghton Liquid Heat 980 (trichloride eutectic salt mixture).
2. Time in Agitated Salt Bath - approximately 9 minutes.
3. Temperature of Bath - 705 ± 5 C.
4. Quench Bath Temperature - 50 - 60 C.
5. Quench Bath Composition - 5 - 10 percent salt solution (trichloride eutectic salt mixture).

The heat treatment and delay quenching of the production test uranium will be accomplished during the first two weeks in April, 1955.

Quality Control of Uranium

On November 17, 1954 a quality control procedure for uranium slugs processed at HAPO was initiated. In a meeting with Manufacturing to discuss this subject it was agreed that the Process Sub-Section would assume responsibility for monitoring and presentation of the data showing trends in bath operations.

Uniskan

Tests were conducted to determine the axial thrust, radial roll force, and torque required for uniskan operation on Hanford can diameters. It was found that a maximum axial force of 3,000 pounds and a radial roll force of up to 2,000 pounds might be experienced. A torque of 1900 inch pounds at 80 rpm was noted. These tests were made using 347 stainless steel sleeves and cold rolled steel cups. Improved results have been obtained with respect to surface quality and general performance of the uniskan operation with the roll frame employing the tilted roll design. Materials that have been satisfactorily processed include 347 stainless steel, 446 stainless steel, mild steel, cold rolled steel, and zircaloy-2. A few nickel samples have been worked with moderate success on initial trials. Uniskanning was applied to reduce the wall thickness of zircaloy-2 cans at an

intermediate step in the current Bridgeport Brass Company's schedule for drawing zircaloy shells. The can wall was taken from 35 mils to 18 mils in one step. Resulting cans appeared to be of higher quality than those cans processed in a multiple step sequence by Bridgeport Brass Company. Additional cans will be processed as they are available from Bridgeport.

Zircaloy-2 Process Tubing

A low yield has been experienced in the initial efforts to fabricate zirconium-zircaloy-2 process tubing at Superior Tube Company by the KAPL process, namely, extrusion followed by tube reducing at room temperature. A review of the tool design was made and a test was conducted to determine what factors in the present process might be altered to give improved results. It was found that a uniform reduction was not being made when the extruded blanks were tube reduced to process tube size. At the rib sections, a reduction in thickness of about 41 percent was made while the remainder of the blank walls was reduced 53 percent. It is being recommended to Superior Tube Company that the extrusion die and tube reducing mandrel be re-ground so that a more uniform reduction may be made.

To further study refinements in this process, samples of as-extruded zircaloy-2 tubing material have been given several annealing treatments followed by reductions in the rolling mill. Hardness and tensile data were collected and a report of the results is being prepared. A cursory examination of the data obtained indicates that: (1) different annealing cycles have only a moderate effect on the properties of cold worked material; (2) hardness measurements are not a sensitive means of determining the condition of the material: and (3) there is a slight indication that zircaloy-2 may be cold worked with greater ease and with less risk of material failure at lower working speeds than now normally used. The test also indicates that fabrication of zircaloy-2 process tubing should not be unduly difficult for reduction of wall thickness up to 55 percent which is ample for the current KAPL process.

Process Fittings on Zircaloy-2

In cooperation with Pile Engineering some tests were initiated to determine if the flanging of zircaloy-2 process tubes for tube fittings is feasible. Flanging tests were made on tubing samples that had been given various anneals at temperatures between 700-800 C for times from 15 minutes to an hour. Both vacuum and dry argon were employed. Preliminary 900 Van Stone flanging tests were unsuccessful for any of the heat treated material.* Flanges were successfully rolled; however, the best results were achieved when the tubing was heat treated at 800 C for 1/2 hour and 700 C for 2 hours.

* KAPL, with a more extensive annealing schedule, was able to accomplish 90° Van Stone flanges.

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FUEL ASSEMBLY DEVELOPMENT

Weld Defects in Lead-Dip Canned Slugs

The reject rate for Al-Si "spikes" continued at a level of about six percent with fluctuations ranging from one percent to as high as ten percent. Based on a correlation between the lead content of the canning bath and the prevalence of Al-Si "spike" rejects a proposal has been forwarded to Manufacturing suggesting that a canning line be operated for comparative purposes in which low impurity levels are maintained for a period of about three months. It is anticipated that this program will be in effect the early part of April.

Six canned slugs with Al-Si "spikes" were evaluated with six standard slugs in the 105-D flow laboratory at a water temperature of 125 C for a period of six weeks. Subsequent analysis of these pieces in the corrosion laboratory indicated the can wall and cap adjacent to the weld bead to be subjected to the greatest corrosive attack. (These areas were shown to be anodic by the Aluminon test.) The weld bead including the "spikes" (cathodic areas) were subjected to comparatively less attack.

Correlation of Slug Production Reject Data and Uranium Lot Types

A survey was made of production data covering the period from November 20, 1954, to February 20, 1955, to characterize the nature of associations which might exist between uranium lot types and slug reject data. There was no apparent correlation between bad weld rejects and lot types. The average poor bond rejection rate for rod-treated slugs was substantially less than that for uranium heat treated in slug form. Prior to February 1955, outgassing of the rod-treated cores was necessary to maintain canning yields. Subsequent bond data reflect reduction in gas content to the extent that questionable advantage is gained by continued outgassing of rod heat treated material; therefore, Fuel Technology concurs with Manufacturing on a recommendation to discontinue the outgassing procedure.

Fabrication of Dip Canned Cored Slugs with Welded End Plugs

Approximately 6000 cored slugs were sealed by welding during March with a yield of 90 percent. Loose plug fit which leads to heavy surface oxidation through extended welding cycles is presently the largest single factor contributing to weld rejects. About 4100 canned cored slugs were sent to storage this month. Canning yield for March was 77 percent, up four percent over February and about comparable to solid slug canning yields. Overall yield from welding to storage was 69 percent this month, which represents an increase of three percent over February's overall yield.

Cored Slugs with Aluminum End Plugs

A technique for sealing the end of hollow slug cores with aluminum end plugs for dip canning has been developed to the point that pile charging appears

desirable. Over 200 slugs with both 3/8" and 1/4" thick end plugs were successfully canned with no instances of bath metal entering the interior of the cores. A supplement to Production Test 313-47-MT is being prepared for the fabrication of about 3000 slugs by this method. These drilled cores are on site, having been originally ordered for this purpose; the counterbores will be machined in the next few weeks.

Muffle furnace tests are in progress to determine if diffusion between the aluminum end plugs and the core will promote separation of the cap from the assembly. This is, however, a very qualitative test in that pile conditions are not simulated and the temperature of the test destroys the jacket-core bond. No other damage to the assemblies has been noted for exposures up to 236 hours at 400 and 500 C. Up to 1/8" of the plug sides were consumed by the diffusion reaction at 500 C in this time.

Cored Slugs with Crimpled Uranium End Plugs

Development of the crimped uranium plug method for sealing hollow cores for dip canning was completed. Equipment for limited production trial has been prepared and the dimensional tolerances and processing limits determined for both virgin and recovered cores. Three thousand drilled slug cores and 8000 end plugs have been ordered from Fernald for production test fabrication and irradiation.

Hot Press Canning of "C" Alloy Slug Cores

Canning of aluminum dummy slugs, undertaken to evaluate the timing of processing steps and to introduce the formation of the Tru-line slug end contours, was completed and production of "C" alloy slugs resumed. Canning yields are improving; large gains in yield came principally from, 1), use of a delay period of several seconds between the time the slug assembly is placed in the die and the time axial pressure is applied and, 2), the use of controlled air circulation for drying components with low temperature air.

Iron Contamination of Unbonded and Hot Pressed "C" Alloy Slugs

Anodic areas subject to pitting attack were found on all recently produced unbonded and hot pressed "C" alloy slugs. These areas were found in the weld bead and on the side wall near the weld. They are caused by the presence of iron particles left embedded in the surface at the time steel wool is used to prepare the assemblies for welding. This surface condition must have been characteristic of all similar slugs since mid-1953 - including production test slugs - when the steel wool technique was initiated (during preparation of the DR-10 load). The iron contamination was discovered during a series of evaluations to optimize the cleaning of hot pressed Tru-line slugs, production of which was started this month. As the iron contamination can be readily removed by a five-minute acid dip, Manufacturing will clean approximately 8000 "C" and "J" slugs and 200 "Q" slugs now in storage, most of which will have to be returned from the 100 Areas.

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Fabrication of Double "C" Alloy Slug Assemblies

Welding together of two "C" alloy slugs was chosen as the most promising method of immediately providing a longer fuel element that could be expected to be more resistant to chattering in the process tubes at high water flow rates.

The Fillerarc welding technique for joining two canned light alloy slugs to form one integral unit was developed for unbonded slugs. Modification of the welding cycle to adapt it for bonded slugs is in progress. Joined, well-aligned assemblies with the weld deposit flush with or recessed below the side wall have been consistently produced. Early application to production-canned "C" alloy slugs is anticipated.

Hot Press Canning Process

A summary of the hot-press canned, nickel plated, diffusion bonded fuel elements that failed during irradiation at C pile is presented in the following table:

Failure Date	Exposure MWD/T	Fuel Element Type	Failure Classification	Position (number one slug downstream, 32 per tube)
1/18/55	558	Solid core, diffusion welded closure	Jacket failure	Number 5 (3374 C)
1/23/55	603	Solid core, fusion weld superimposed on diffusion closure	Jacket failure	Number 10 (3283 C)
2/27/55	625	Cored, fusion weld superimposed on diffusion closure	Core failure	Number 16 (1382 C)

Post-irradiation examination of the ruptured and non-ruptured pieces has disclosed the following information:

1. Intergranular corrosion penetrating two-thirds of the depth of the aluminum can wall has been noted on the first hot-press rupture.

2. What appears to be groove pitting and ledging attack was common on many of the hot-pressed fuel elements - both solid and cored, but was not noted on the lead dip control material examined to date.

3. The corrosion rates of hot-pressed fuel elements are similar to production material (one to two grams per month).

4. Examination of the uranium core in the first rupture showed no anomalous structure or cracking.

5. An attempt was made to remove the cap from the first ruptured piece; however, the cap was too strongly bonded and could not be separated from the core. This indicates that bond deterioration did not play a part in initiating the failure of the fuel element.

6. Several non-ruptured cored pieces have "worm tracks" (denoting an impending core failure), indicative that the failure mechanism originated in the core.

Corrosion tests are being run to establish the cause and mechanism of the intergranular attack and groove pitting. The cored fuel elements which show "worm tracks" will be sectioned in an attempt to establish the failure mechanism.

About 100 solid and 15 hollow (I and E) fuel elements have been canned in a continuing evaluation of the two piece hot working punch. The experiments show that:

(1) component surface preparation is not as critical as for the single motion cap weld method.

(2) cap-depth welds with no thinning of the can wall are consistently obtained when caustic or scrub cleaning methods are used.

(3) no change in the hot-press cycle is required to complete the hot-working operation.

Work is continuing to establish minimum component surface preparation conditions.

The effect of pressure upon the hot-press closure was investigated with simulated hot-press welds. Weld strength increased with pressures up to 8 tsi, but did not increase with additional pressure. Average tensile strength of welds pressed at 4 tsi was about 6000 psi; above 8 tsi it was approximately 9000 psi. The higher pressure apparently is more effective in breaking up surface oxides and exposing clean aluminum. There was no apparent correlation between time of deformation and weld strength. In all cases the tensile strengths were in excess of the aluminum yield strength.

Twenty-five aluminum cans with a four mil porcelain-enamel coating fused to the inside surface were recived from Battelle for bonded insulated fuel element canning studies. Light sizing reductions and hot-pressing at 625 C did not damage the enamel coat. Some tendency for the ceramic to bond to nickel plated uranium was noted, but the ceramic did not bond to bare uranium. Additional tests with plated uranium are planned.

Cold Closure Process

Approximately 500 four-inch cored slugs have been machined locally for the proposed supplement to PT 43-MT (cold closure). Each slug was marked to show the cruciform pattern orientation prior to transformation heat treatment in a chloride salt bath. Vacuum outgassing is scheduled for these production pieces

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to further reduce hydrogen content.

A 400-ton press to be used in cold closure work has been modified to give the operator a choice of 2 platen speeds and 2 pressures. A turnstile for handling eight-inch cold closure dies on the 400 ton press has been fabricated.

Zirconium Jacketed Fuel Elements

Uranium has been canned in zircaloy-2 by dip canning to produce fuel elements suitable for high temperature water cooled reactors. Fifteen fuel elements were prepared, two of which had 1 mil nickel plate on the uranium. The nickel plated pieces were canned by processing through the lead dip cycle. Only about five percent of the can was wet by the Al-Si. The remaining 13 fuel elements were prepared from uranium coated with 1 mil of iron and 0.1 mil of nickel. Canning involved a 1 minute dip of the zircaloy can in molten zinc chloride at 400 C followed by Al-Si canning at 610 C. Three slugs were capped. Most of these elements appear to be well bonded. Poor bonds on two of the pieces were found to be associated with the absence of iron electroplate at these spots. Metallographic examination is continuing and eleven of the fuel elements will be thermally cycled.

Fuel Element Pilot Plant

Minor Construction forces continued to move equipment from the 3730 Building into the Pilot Plant. A revised project proposal was prepared covering, as major items, the moves of 3706, 328, 3732, and 304 Building equipment into the pilot plant, the provision of office space on the mezzanine floor, and the deferment of the semiworks equipment. The revised project is currently being circulated for approval signatures.

FUEL EVALUATION

Lead-Dip Canned Uranium

Irradiation experience with standard production B-lot lead-dip canned slugs (fabricated from five-inch diameter ingots and beta heat treated as rods in a carbonate salt bath) indicates a potential for satisfactory in-pile performance up to 800 - 1000 MWD/T at 600 to 700 KW/tube power, with slug warping, rather than failure being the limitation. See "warp in B-lot Slugs" below.

A total of about 1250 tubes of B-lot material has been irradiated to $\geq$600 MWD/T in B, D, DR, F, and H reactors, including about 700 to 1000 tubes to $\geq$800 MWD/T. Over 5000 tubes of lead-dip canned slugs are presently charged in 105-B, D, DR, F, and H. Lead-dip slugs from seven-inch diameter ingots (K, L, M, N, P, and Q lots) are generally at $<$600 MWD/T exposure. Exposures for significant quantities of the various types include 220 tubes of K-lot slugs (transformed as rods in carbonate salt) at 500 - 600 MWD/T and about 300 tubes of L and N lot slugs (transformed as slugs in chloride salt) at 400 to 500 MWD/T.

Failures include a single "25-M type" cap at 810 MWD/T, four side failures at 150 to 280 MWD/T and a side failure in a recovered (Z-lot) slug at 670 MWD/T.

Warp Measurements

(1) B-Lot Slugs

Recent warp measurements compiled on rod heat-treated slugs from PT-7-M and 24-M indicated that at increasing exposures above 800 MWD/T warp of these fuel elements would cause an increasing incidence of stuck charges in pile process tubes. Actually, out of 250 tubes of eight-inch slugs charged in these PT's, six stuck charges were experienced at exposures between 600 - 800 MWD/T. These data caused concern over the irradiation of PT 539-E where 140 tubes of rod heat-treated slugs were operating at concentrations of 1000 - 1100 MWD/T. Thus, twelve tubes were scheduled for discharge on March 6 at 105-H to determine the extent of warp on the high exposure B-lot slugs. Three of these charges were reluctant to discharge in that higher-than-normal forces with the charging machine were required to move the slugs.

Warp measurements in two tubes of slugs from this discharge (one of which discharged slowly) showed a maximum warp of 82 mils with 11 percent of the slugs examined warping between 60 and 82 mils. The slug which warped 82 mils had considerable mechanical damage.

At the next discharge, an additional seventeen tubes were scheduled for discharge with the stipulation that if one stuck, the complete test would be pushed. Of the seventeen, tube 2191-H would not push with the charging machine but was flushed with 350 pounds of water pressure. Subsequent discharge of the remaining PT 539-E B-lots showed two more charges, tubes 1586-H and 3180-H, to be stuck.

An additional 22 tubes of B-lot material charged as normal production slugs and at or near goal exposure were also discharged during this outage. Two of these charges, tubes 3988-H and 4182-H at 850 MWD/T, stuck in their tubes requiring 7000 pounds force to discharge. Visual examination of these and the PT 539-E stuck charges showed the heavily warped pieces which caused the charges to stick were the fourth to the eighth slugs from the front of the tube. Further warp measurements on these pieces will be made.

(2) Triple-Dip vs. Lead-Dip

Additional data compiled to determine the effect of pile exposure in fuel element warp show that rod transformed fuel elements warp most in positions in the front half of the tube. Of three tubes of material measured at 775 MWD/T, nine slugs warped in excess of 40 mils, eight of these were in upstream positions with a maximum of 78 mils occurring in the seventh piece from the front in tube 2181-F. This relationship also was observed on the B-lot pieces described above which were warped to the extent of causing stuck charges.

Warp of triple-dip material, however, follows an opposite trend in that the maximum warped slugs, of between 30 and 46 mils, occurred in downstream positions.

(3) Bonded and Unbonded Slugs

Warp measurements on slugs from tube 3865-C at 165 MWD/T which contained a mixed charge of unbonded solid, lead-dip, unbonded cored, and unbonded nickel-plated slugs show that the unbonded slugs ("C" process canned), both solid and cored, warped up to 20 mils more than the bonded lead-dip control slugs.

The solid unbonded slugs warped up to 43 mils, the cored unbonded slugs warped a maximum of 34 mils, and the lead-dip canned pieces warped as high as 23 mils. The highest warped lead-dip pieces were in the upstream section of the charge and follows the data gathered previously which is described above. The unbonded pieces, however, warped the most in downstream position of high slug temperatures and warped upstream about the same amount as the bonded pieces. The data suggest that the lack of bond may cause an asymetrical temperature distribution in the slug which intensifies the degree of warp, or that the heating of the core during dip-canning anneals out cold work or other stresses introduced by cold straightening of rods which, if present, would contribute to warp.

Fracture Tests

The breaking characteristics of three tubes of triple-dipped slug transformed irradiated uranium and three tubes of lead-dipped rod transformed irradiated uranium were compared at exposures between 700 and 800 MWD/T. Each tube of rod transformed material was paired with an adjacent tube of triple-dipped material, each pair being charged and discharged together.

The data from breaking these six tubes of slugs showed:

a. An average of four slugs per tube of the rod transformed material broke with effectively no force, whereas an average of eleven slugs per tube of the triple-dippped material broke with no force.

b. Most of the slugs that broke with negligible force were in the quarter of the tube upstream from center (positions nine through sixteen from the front face). The extreme positions at which breaking with negligible force occurred were the fifth and twenty-second slug from the front.

c. The rod transformed slugs, with very few exceptions, broke either with a force equivalent to that required to break unirradiated uranium (ten to twelve tons) or with negligible force. The force required to break the triple-dipped material, however, declined from a value of ten to twelve tons for the slugs at the ends of the tube through intermediate breaking forces of five or six tons to zero breaking forces for the slugs in the quarter of the tube upstream from center.

There will be further tests to substantiate the above trends.

Fuel Technology Sub-Section

Woodsplitter Testing

Tests have been completed which show that the 10 C seasonal variation in the temperature of the cooling water used on woodsplitter samples does not have an appreciable effect upon the splitting resistance of the uranium. Statistical analysis of the data shows an increase of about 20 percent in the number of cycles to failure as the coolant temperature increases from 8 C to 50 C.

Several methods of insulating a slug for woodsplitter testing have been attempted but, to date, an adherent durable insulation has not been produced.

Data relating the quality of regular production slugs as determined by pickle inspection, MIZ-2 (crack and inclusion detector) classification, and woodsplitter cycles to failure, were studied. A significant number of the slugs acceptable for canning by pickle inspection standards were no better than rejects, as determined by cycles to failure in the woodsplitter, while a good correlation was obtained between woodsplitter results and MIZ-2 quality. It is felt that these results further point out the desirability of exploiting the MIZ-2 instrument for routine slugs inspection.

Charge-During-Operation Tests

Seven tubes of uranium slugs have been charged during reactor operation at full-power, and irradiated up to 700 MWD/T without incident or apparent serious mechanical damage to the slugs.(1) Since this operation is to be continued on a test basis, it was desired to assess damage to the slug-jacket bond that might result. Tests were carried out using the prototype machine and mock-up facility in 108-D building, at water flows of 100 percent of normal maximum expected at 105-C (40 gpm) and 150 - 200 percent of this value. Slug damage is being assessed by destructive and non-destructive tests. A very preliminary conclusion, based on visual examination and ultrasonic testing of the bond integrity, is that no unusual damage resulted from charging at the normal flow rate.

105-C Metal Examination Facility

All basin I and II equipment stations are in place, with some control wiring and final adjustments uncompleted. Installation of the balance in the slug weigher will be made by the manufacturer's representative late in March.

Remaining equipment included in the original equipment project has been fabricated, and is ready for installation in basins III and IV.

Design is complete for dejacketed slug examination equipment. Underwater portions of the ultrasonic test equipment are being fabricated. The de-jacketer underwater assembly will be fabricated off-site.

(1) HW-34465, Interim Report, Production Test 105-B MR, Uranium Charging During Reactor Operation, J. E. Robb, January 13, 1955.

Fuel Technology Sub-Section

Woodsplitter Expansion

Project IR-184

Installation of equipment for the expansion of the TOCCO induction heater to provide three work stations is about 60 percent complete. Delivery of two new work coils will delay startup of the new stations until about May 1, 1955.

High Temperature Loop

Drawings have been received "for comment" showing the proposed design of a recirculating loop to permit woodsplitter tests at temperatures up to 200 C. A rough estimate of the cost is slightly under $20,000. A more detailed estimate is being made based on off-site fabrication of the entire unit.

TESTING METHODS

Al-Si Penetration Test

The completed Model 2 instrument and a new probe assembly has been installed in the slug canning line for continuous operation, testing material canned on a 45-second cycle. Some instrument difficulties were experienced in the initial operation, but the primary difficulty experienced was with the conveyor breakdown at the end of the month. This is being repaired as rapidly as possible.

The Model 1 instrument is now completely re-built and is ready for use as a standby. Until the time when the Al-Si penetration tester is used regularly in production, it is planned to use the Model 1 also to investigate the incidence of defects in aluminum cans as soon as a used lathe is converted to a can manipulator.

Drawings of the completed Model 2 instrument have been finished and made available to Manufacturing Department.

Ultrasonic Bond Test

A second production run, in which the sensitivity of the bond test instrument was further reduced from last month's 8.2 percent reject rate, resulted in a 3.55 percent rate on 789 pieces. There were 28 rejects, one of which was also a frost test reject. Autoradiographs of the 28 rejects showed that the frost test should have rejected at least 5 for single voids greater than one square centimeter in area. At the conclusion of this test a further reduction in sensitivity was made which is expected to give about a 1.4 percent reject rate; and a new production run has been started to determine whether any frost test rejects will be missed.

Uranium Quality Test

Several production scale tests of L, K, and N lot material have been made with the Model 2, uranium quality tester. L-lot material was tested in the

as-rolled condition and the others in the heat treated condition. From 750 to 1000 pieces of each type were tested to obtain a frequency distribution of the quality indications obtained with the instrument. The distribution curves peak at the same value for all types of material, thus indicating that the range of quality within each type is enough greater than the variations in electrical properties between types that the same standard may be used for all slugs. The distribution curves appear to be the usual bell-shaped curves, but differences in spread were observable between the different kinds of material. These tests are continuing in an effort to choose an economical operating point for the reject circuits.

Training Sessions

A series of discussion and laboratory demonstration sessions were held with Manufacturing personnel in an effort to acquaint them with the operating principles and maintenance data on four new non-destructive testing instruments. Primary purpose of these sessions was to familiarize instrument maintenance personnel with the instruments before their routine use in the production process.

COATINGS AND CORROSION

Corrosion Studies

High temperature corrosion studies on aluminum alloys are continuing. The alloy consisting of 1% nickel in 2S aluminum has shown extremely low corrosion rates in deionized water at 350 C. After 32 days, the corrosion rate was approximately 5 mils/month. The corrosion was uniform, except that a blister formed at one end after five days of operation. This blister could have been caused by inhomogeneity of the sample. New samples of metal more carefully prepared will be exposed. Unless some unforeseen effect results from irradiation, this material appears very suitable for pile operation at high temperatures. It is planned to obtain samples and make actual fuel elements with this material; these fuel elements will be exposed at 250-350 C both in and out of pile. The results will be useful for comparison of this material with zirconium, stainless steel, or other materials now being considered as jacketing materials for high temperature piles.

Corrosion rate studies have shown that magnesium and magnesium-silicon alloy corrode rapidly in deionized water at temperatures $\geq$250 C. At these temperatures both magnesium and magnesium-silicon corrode about four times as fast as uranium.

Additional studies to determine why zirconium cans disintegrate following rupture have shown that zirconium in water or steam does not react with hydrogen at low temperatures (170 C), even at pressures of hydrogen up to 1600 psi. This study was performed in a closed system (autoclave); the sample was covered with water and hydrogen was added prior to heating in quantities such that the desired pressure-temperature relationship was obtained.

Other alloys of aluminum have also been tested. The alloys which are s[illegible] promising are: A-132 (0.8% Cu, 12% Si, 2.5% Ni, and 1.2% Mg); and 112 (7% Cu, 1.7% Zn).

Type-of-attack tests on Alcoa cans which have been heat-treated for various times were started. In some cases, pitting attack at the grain boundaries was noticed.

Anodizing

The production test on anodized films has been completed. The results demonstrate that protection is provided by anodizing the fuel elements. The control pieces which had not been anodized showed damage from abrasion during handling and charging. The anodized pieces showed no evidence of such damage and the corrosion was extremely uniform. Plans have been made to expose some anodized pieces in the pile at 110-120 C

An economic evaluation of the anodizing process has been made and will be issued as document HW-35740.

Impervious Electroplates

Preliminary experiments indicate that the porosity of nickel electroplate may be partially overcome by an undercoat of tin. Tests in boiling water showed a marked improvement in the corrosion-resistance of nickel plates deposited upon a 0.2-mil coating of tin, when heat-treated at about 230 C.

Electroplating Thermohms

A method for nickel plating K Pile thermohms was developed. The plate obtained was adherent and should provide adequate corrosion resistance. This method was not used because procurement of a better replacement element will be sufficiently rapid to meet the production requirements.

Evaluation of Fuel Elements

The corrosion-protection afforded uranium in 120-170 C water by thin coatings of electroplated nickel, nickel foil, and nickel from nickel carbonyl plating has been investigated, using as-coated slugs and slugs with hot pressed, partially stripped aluminum jackets.

An as-electroplated KAPL slug having a one-mil coat of nickel has been in 170 C deionized water for 100 hours without evidence of corrosion. Previous as-plated slugs have withstood 100 C water only half as long.

Two slugs with one-mil nickel coats from nickel carbonyl were hot pressed and all the aluminum jacketing, except the end caps, was chemically stripped. These slugs also show no effects from 100 hour exposure to 170 C deionized water.

Eight hot-pressed slugs with roughly 25-100 mm^2 of aluminum jacketing removed to expose nickel coatings one to two mils thick have been subjected to static, deionized 170 C water and 120 C flowing process water for 1-2 months without failure.

PHYSICS RESEARCH SUB-SECTION

Lattice Physics

The measurements on the reactivity change produced by a 1/2" axial core in the slugs of a 7" lattice were completed this month. The results are shown in the table below:

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

	Wet Lattice	Dry Lattice
Solid Slugs	78.5	79.6
Cored Slugs	74.3	83.9
Difference	-4.2	+4.3

In this lattice, the increase in reactivity in going from the wet to dry condition, is augmented by 8.5 μb as a result of the 1/2" core in the slugs. Coring of the slugs thus leads to a less safe pile in this case.

If this data is extrapolated to the cases of the three present Hanford lattices, however, and if the axial core is assumed to be 3/8" in diameter instead of 1/2", then the change in the wet to dry difference is much smaller, being about 1 or 2 μb or 25 to 50 inhours. One concludes then, that the use of cored slugs in present piles does not significantly affect their safety.

Survey measurements of the buckling of J-Q lattices are being made to explore possible methods of U-233 production in Hanford piles. Two lattices have been completed and the results are given below:

Buckling (in μb = 10^{-6} cm^{-2}) of J-Q Lattices

Spacing	Wet	Dry
8-3/8"	70 ± 10	140 ± 10
6-3/16"	205 ± 15	255 ± 15

The result for the 8-3/8" lattice shows that this type of loading is extremely unsatisfactory on account of the large jump in reactivity produced by loss of cooling water.

Reactor Physics

The first experiment planned for the PCTR is a measurement of the temperature coefficient of reactivity for HAPO lattices loaded with synthetic slugs having U-235 and Pu-239 concentrations corresponding to 0, 1000, 2000, and 4000 MWD/T exposures. During the past month an analysis has been made to determine uncertainties in buckling of the test lattice which will be inherent in the experiment because the knowledge of the U-235 and Pu-239 concentrations in the synthetic slugs is uncertain. The results show that the percentage error in the buckling measured is always larger than the percentage error in the concentration of the U-235 or Pu-240. In the worst case the

percentage error in the buckling is 4.5 times the error in the U-235 concentration. It has become clear from this study that one of the greatest uncertainties in this experiment is likely to arise from the analysis of the concentrations of fissionable isotopes in the synthetic slugs.

A report, HW-35786, "Reactivity Dynamics of a Thermal Reactor" was issued by R. E. Heineman during the month.

Fuel for the TTR has been authorized and specifications have been put out for bids. The mechanical and control components are being moved from the laboratory to the reactor building, and instrumentation is being checked out. Scheduling of actual assembly and major electrical work will depend on progress in PCTR work and availability of service organization manpower.

Nuclear Physics

An experiment to measure the neutron absorption cross section of Np-239 is being conducted as a joint effort by the Physics Research and Chemistry Research Sub-Sections. Samples of Np-239 are irradiated at H-Pile to produce Np-240. The Physics group has the responsibility of determining the amount of Np-239 and Np-240 in the irradiated sample. The Np-240 assay is accomplished using a calibrated scintillation counter in conjunction with a pulse analyzer which records the 1.0 and 1.5 mev gamma rays from Np-240. The Np-239 assay is done by counting an aliquot of the irradiated sample in a 100% geometry beta counter.

During the past month it has been possible to detect that Np-240 is produced during the irradiation. A 1.5 mev gamma ray has been seen which has the expected Np-240 half life of 7 minutes. A preliminary estimate of the Np-239 neutron absorption cross section for producing this activity gives an answer considerably lower than the 80 ± 20 barn value which has been obtained from an independent experiment at Oak Ridge.

A complication has arisen in actually stating the cross section of Np-239. In addition to the 7-minute activity mentioned in the previous experiment, a second activity with a much longer half life has been observed for gamma rays having an energy in the order of 1 mev. There is evidence from other laboratories that two states of Np-240 may exist, a 7-minute state and a 1-hour activity. It now appears that both of these activities may have been produced in the Np-239 irradiation. If such is the case, an attempt will be made to define cross sections for production of each of these isomeric states.

Work has commenced on the design of an experiment to measure $\frac{d\eta}{dE}$, the variation with energy of the number of fast neutrons produced per fission in U-235. As visualized, the experiment would utilize the crystal spectrometer as the source of monoenergetic slow neutrons which cause fissions in a thick U-235 disk. Fast neutrons would be detected with a Hornyak button. So far a theoretical correction has been developed to account for neutron scattering in the U-235 disk. A remaining problem in the design of the experiment is the development of a technique for accounting for the variation in fast neutron detection efficiency as a function of the slow neutron energy.

Physics Research Sub-Section

Physics Problems Connected with Plant Operations

Calculations were made to determine the safety of several tanks and other equipment in the Redox Plant.

A document was issued outlining the bases to be used in writing process specifications for contact maintenance of unreflected process vessels in the Purex, Redox and Recuplex Plants.

Irradiation Effects

Long-term elevated-temperature exposures of uranium test specimens have been planned, employing the facilities at the Material Testing Reactor. Four Zircaloy-2 capsules containing uranium tensile specimens surrounded by NaK were charged in the reactor during February. These are scheduled for discharge March 28 with an estimated exposure of 4×10^{20} nvt (~1600 MWD/T). Five additional tensile specimen assemblies were successfully canned and autoclaved during the month. Four of these were shipped to the Materials Testing Reactor to be charged in the same reflector position as the previous four capsules in order to duplicate the exposure and temperature conditions. They will be exposed for one reactor cycle or approximately 2×10^{20} nvt (~800 MWD/T).

Computation of the concentration of individual fission products in uranium after irradiation is continuing. The calculations for the initial set of conditions selected are complete, and a report is being written. The report describes the methods of calculation and the results, and discusses various aspects of the design of fuel elements for high temperature, high exposure application which may be critically affected by fission product mobility.

Metallurgical Techniques

Weighed and precharacterized metallographic specimens of annealed ingot uranium and of Zircaloy-2, immersed in NaK and contained in a Zircaloy-2 capsule, have been heated for two weeks at temperatures of 600, 700, and 800 C, respectively. After a three-week period at temperature, these specimens will be examined for evidence of attack by NaK and changes in microstructure.

A beta heat treated uranium specimen has been cathodically vacuum etched in a new etching unit which utilizes a Zircaloy-2 to glass seal. Optical examination of the etched specimen reveals a definite lineage and sub-grain structure in direct agreement with previous electron microscope studies on beta heat treated uranium.

Optical and electron microscope investigations on the possible presence of an intergranular phase or contaminant believed to be present near the external surfaces of uranium that has been salt bath, beta heat treated and water quenched are continuing. A wafer specimen polished mechanically on a tangential surface has been cathodically vacuum etched, replicated, and examined. Grain boundaries were observed to etch uniquely as compared to normal uranium. Electron microscope studies on this specimen have just begun.

Evaluation of a new type Zircaloy-2 capsule for in-pile diffusion studies has shown it to be satisfactory. The capsule consists of a thick walled Zircaloy-2 cup having a 0.9-inch outside diameter and a 0.5-inch inside diameter which permits insertion of insulator disks, diffusion disks, and temperature monitors. An ironing operation reduces the original slip fit to a press fit which has good heat transfer properties. A ram, which insures an axial load on the specimens during irradiation, is screwed into the end of the capsule after the ironing operation and welded. Two U-Al diffusion couples and six temperature monitors have been sealed into one of the new capsules. The desired in-pile temperature at the two diffusion interfaces should be 200 C (392 F). Since the temperature of the diffusion couple is determined by the flux and since the flux in the MTR required to yield a prescribed temperature

in the diffusion specimen cannot be guaranteed, the in-pile temperature of the couples will be approximate. The integrated flux, however, will be available after the run has been completed. Two additional U-Al couples are now being prepared for irradiation at 250 C (482 F). Laboratory diffusion studies are continuing as a basis for interpretation of the in-pile studies. A cathodically vacuum etched U-Al couple is now being annealed in vacuo at 200 C (392 F).

A uranium wafer that has had 580 MWD/T exposure is being used to establish etching procedures for the cathodic etcher. This sample has been etched at 2,000 volts, 10 milliamps, 75-80 microns argon pressure for 5, 10, 15, and 20-minute etching times. Satisfactory photomicrographs were obtained for 5 and 10-minute etches, but the macrophotographs were not satisfactory. The 15 and 20-minute etches produced good macrophotographs as well as good photomicrographs. The longer the etching time, the more relief produced. The structure of the AlSi and aluminum has not been revealed, although the bonds between the two materials and uranium show up well.

Fuel Elements

Unbonded slugs, canned by the room temperature point closure technique, are being irradiated to determine their rupture resistance and to check the hypothesis that an unbonded fuel element should give improved performance under Hanford conditions. Two solid slugs were irradiated successfully 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 were irradiated without incident in K Pile to 490 MWD/T at a specific power of 38 kw/ft. In addition, four solid unbonded slugs are currently operating normally in K 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 uranium slugs and four unbonded cored enriched slugs in C Pile incurred a failure at a tube exposure of about 280 MWD/T. The ruptured slug was a natural uranium slug third from the downstream end of the active loading. The uranium of the slug had split longitudinally, but considerably more corrosion of the uranium was evident than is normally present in split failure. Determination of the cause of failure awaits post-irradiation examination in the Radiometallurgy facility. The four enriched slugs and eight of the natural slugs have been viewed in the basin. None of these slugs showed evidence of preferential corrosion at the closure or non-uniform heat transfer.

Two mechanically-bonded, point-closed slugs irradiated to 800 MWD/T in D Pile have been examined in the Radiometallurgy facility. Comparison of pre-irradiation and post-irradiation measurements of these two pieces indicates a diameter increase of 0.005 to 0.010 inch, and no length change occurred on one piece and a 0.010 to 0.015-inch diameter increase and a 0.060-inch length decrease occurred on the second piece. No indication of warp or bumping was observed on either piece. On the basis of these limited data it does not appear that a serious dimensional instability problem is associated with the canning technique. A general pitting attack was observed on these pieces. This pitting has been observed on normal AlSi canned material and does not appear to be associated with the point closure canning technique. No evidence of aluminum-uranium interaction or diffusion between the cap and slug end was observed on either of the pieces examined.

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Metallurgy Research Sub-Section

Fuel Materials

The four 0.40-inch diameter by 1.50-inch long matrix type capsules that were irradiated to 5000 MWD/T have been examined at HAPO. Visual examination showed no changes in the external appearance of the capsules or the matrix material due to irradiation. The ease with which the samples were decanned indicates that this material is dimensionally stable and no distortion of the samples had occurred. In fact, the samples that were exposed to 5000 MWD/T decanned easier than those which had been exposed to 1000 MWD/T. The samples were decanned by removing the ends of the samples and driving the fuel elements out of the cans with light blows from a hammer. Samples containing the magnesium-silicon alloy matrix decanned slightly easier than those which contained a pure magnesium matrix. Bend tests on the samples showed them to be very uniform with little or no change from the results obtained with the 1000 MWD/T samples. The maximum loads at failure ranged from 1080 to 1200 pounds, while the deflections ranged from 0.0082 to 0.0085 inch over a one inch gage length. The samples which contained a magnesium-silicon alloy matrix broke into two pieces while the samples with a pure magnesium matrix did not.

A method of preparing uniform-sized particles of uranium is essential to the economical manufacture of the type of reactor fuel element in which particles of fissionable material are close packed in a supporting matrix. To achieve this end, an effort is being made to devise a process of slip casting uranium powder or uranium hydride powder as uniform-sized spheres. Preliminary experiments have been carried out in which a suspension of uranium hydride in paraffin oil was dropped onto a bed of powdered magnesium. The resulting damp compacts were heated in a vacuum chamber to distill off the paraffin oil, followed by thermal decomposition of the uranium hydride. The spheres of uranium resulting from decomposition of the hydride were non-pyrophoric, about 1.5 mm diameter, and sintered to a relatively fragile compact. When heated for about one hour to about 900 C, the uranium spheres shrunk in size to about 1 mm diameter, becoming hard in the process. Microscopic examination of the spheres showed about 40 percent porosity. It is expected that many more solid particles can be obtained by varying the technique, which is applicable to continuous processing.

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Metallurgy Research Sub-Section

Zirconium Metallurgy

A report is being prepared on the reaction rate of zirconium and Zircaloy-2 in dry air. Tests at 500, 600, and 700 C (930, 1110, and 1290 F) are complete; testing at 300 and 400 C (570 and 750 F) is being continued. Weight gains after 1000 hours at 400 C check very closely with those predicted by extrapolation of data obtained at higher temperatures. Exposure time at 300 C is not yet sufficient to produce significant weight changes.

Two modified annulus process tubes, 3469-F and 3474-F, were charged with zirconium and Zircaloy-2 gas reaction specimens March 3, 1955 (PT-105-524-SI). Gamma heating is the primary source that is used to bring the specimens to the desired exposure temperature. With the F Pile operating at 850 megawatts the test assemblies are operating near 600 C (1112 F) instead of a desired maximum temperature near 450 C (842 F), which would give some latitude for control of temperature with resistance heaters. This high temperature operation offers a good opportunity to measure the effect of pile irradiation on the growth of zirconium alloys exposed in both moist and dry air, but the scaling may be too excessive to allow accurate weight gain measurements. New tube charges redesigned to operate at lower temperatures are scheduled for loading during the April 21 shutdown.

A series of Zircaloy-2 hydrogen alloys in the range of 20 ppm to 550 ppm hydrogen have been notch-bend tested, and the expected lowering of fracture strain without a corresponding increase in fracture stress was observed. Also observed was a shift to higher temperatures of the transition from brittle to ductile fracture as hydrogen content was increased. Prebending annealed Zircaloy-2 specimens at a high temperature, followed by bending to fracture at room temperature, has revealed a strain aging phenomenon.

Work was continued on the examination of a production test (PT-105-509-SI) of zirconium tensile samples and metallographic wafers which had been exposed to 780 MWD/AT. Tensile tests were completed on samples which had been fully annealed or had 20 percent and 50 percent cold work prior to irradiation. The results showed a slight increase in the tensile properties over those from the two previous exposures of 190 and 500 MWD/AT. Hardness tests, which were completed on all the wafers, showed an increase in hardness of up to five percent over the previous exposures.

Metallurgy Research Sub-Section

Uranium Reduction Studies

The reduction of uranium oxides to metallic uranium by electrolysis of CaF_2 solutions of UO_3 at temperatures above the melting point of uranium has been attempted. The electrolysis of a solution of UO_3 in crude CaF_2 which contains Al, Mg, Na, Fe, and Si as major contaminants yielded a product identified as USi_2. A similar experiment using pure CaF_2 yielded a product identified as alpha uranium with traces of iron and silicon contaminants. The current efficiency of the electrolysis process is low, around six percent, and voltage requirements are high, about 65 to 70 volts per cell. The dissipation of from 700 to 1000 watts of energy is required to keep the bath molten by electrolysis. To date no single consolidated pool of metal has been formed, but isolated pellets up to 1/8" diameter have been produced.

Bomb reductions of the double salts calcium uranium(IV) fluoride and sodium uranium(IV) fluoride, prepared by precipitation from uranyl nitrate solutions, have resulted in high button yields; however, the 0.3 to 0.7 percent iron impurity in the salts is coalesced with the uranium. If this co-precipitated iron cannot be washed from the double salts, it will be impossible to prepare pure uranium by bomb reduction of the double salts prepared using ferrous ion as reductant. Electrolysis of these double salts from LiCl-KCl eutectic has been demonstrated. Thirty percent respectively of the compounds $UCaF_6$ and $UNaF_5$ were dissolved in the low melting eutectic. Platinum cathodes and graphite anodes were employed. Electrolysis was conducted at a current density of one ampere per square centimeter in each of the fused baths. Current efficiency for reduction of $UCaF_6$ was 35 percent compared to 59 percent for $UNaF_5$. An analysis of the metal indicated a decontamination of iron had been achieved. Iron impurity in the uranium prepared from $UCaF_6$, containing 3400 ppm iron, was 250 ppm while the $UNaF_5$ showed an iron decontamination from 3900 to 134 ppm in the metal. In each run approximately 30 percent of the uranium was depleted from the fused bath. As the uranium is further depleted and iron concentrations increase with respect to the uranium, the decontamination of iron may be less favorable.

Radiometallurgy Examination

The examination of the eight-inch ruptured unbonded "C" process canned slug (PT-105-578-A) from tube 2686-C was continued. Microscopic examination of jacket cross-sections in the immediate vicinity of the hole revealed two areas of pronounced intergranular corrosion of the outside surface of the jacket and an area adjacent to the hole which had a typical cast "J" metal structure. The chemical composition of this sample has not as yet been determined. A section of jacket taken approximately 180° from the hole (bottom of the slug) had a normal aluminum structure and showed no evidence of intergranular corrosion. Longitudinal sectioning of the uranium core defined a zone containing voids and small cracks as being similar in shape to the longitudinal section of half an egg and extending for two inches from the cap end. Sectioning also revealed severe cracking along the slug axis, extending two inches from the cap end to the base end. Cathodic etching of a transverse wafer from the "egg-shaped" zone revealed a structure consisting of large columnar grains radiating from a point located near the center of the void filled area. There was no discontinuity in grain structure across the zone boundary. However, microscopic examination did reveal a very large number of very small voids outside of the "egg-shaped" zone. Diameter measurements were made of the core two inches from the cap end, and it was found that the diameter was 40 to 60 mils greater than the specified pre-irradiation diameter in spite of the appreciable corrosion attack undergone by the uranium.

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In addition to the rupture, an unruptured piece from tube 2786-C has been received for examination. This slug was discharged January 12, 1955, after an exposure of 185 MWD/T. Visual examination of the outside of this slug indicated that it was in good condition. A transverse section was taken four inches from the cap end. Electrocleaning failed to bring out the macrostructure but did reveal a narrow circular band about 1/2-inch in diameter and a network of fine cracks in the center similar to, but not as extensive as those observed in the ruptured piece.

An eight-inch ruptured slug canned by the hot press technique and irradiated under PT 105-577-A was received by Radiometallurgy for examination. It was discharged from tube 3374-C on January 19, 1955, after an exposure of 556 MWD/T. The jacket of this slug was split longitudinally along the top (opposite the rib marks) starting approximately two inches from the cap end and extending for a distance of 5-1/2 inches. The jacket was swollen over a large area surrounding the split by the formation of uranium oxide. The swelling extended completely around the slug but narrowed down to a band approximately 2-1/2 inches wide between the rib marks. There was no swelling observed at either the base or cap ends. An unsuccessful attempt was made to remove the cap assembly by means of a chisel, indicating that the cap to core bond was in excellent condition. Two transverse wafers were sectioned from the slug, one through the split in the jacket five inches from the cap end and the other through the edge of the swolle area two inches from the cap end. Examination of these wafers after electrocleaning revealed no evidence of uranium core cracking. Microscopic examination of the bond layer at the edge of the swollen area showed that the nickel plate had remained attached to the aluminum jacket and that the swelling occurred by undercutting of the bond layer by water. The bond in the unattacked area appeared to be in excellent condition. Diameter measurements of the wafers showed that the wafer taken through the split had been reduced in diameter as much as 0.050 inch by the surface attack of the uranium; the second wafer was only 0.005 inch less than the specified pre-irradiation diameter of 1.380 inches. Microscopic examination of a jacket cross-sectio taken from the bottom of the slug, five inches from the cap end, revealed a small area of very severe intergranular corrosion which had penetrated nearly two-thirds of the jacket thickness. Visual examination of the slug before sectioning did not reveal anything indicative of intergranular corrosion, although the edge of the cap end appeared to have undergone some corrosive attack, and a small longitudinal area of pitting attack was observed on the jacket near the cap end. Additional samples of jacket are being studied in an attempt to locate other areas of corrosive attack.

A standard AlSi canned solid uranium slug which had been irradiated to 710 MWD/T in the MTR at a specific power of 55-60 kw/ft was examined. Measurements of the canned slug indicated a decrease in length of approximately 0.008 inch at the slug center. Diameter measurements showed a small amount of ellipticity (0.004-0.006 inch between major and minor diameters) and a decrease in diameter of approximately 0.012 inch at a point 3/8 inch from the base end. A heavy white corrosion product or scale was observed on the cap end of the slug.

Examination of two mechanically bonded slugs from PT-105-575-A which received an exposure of approximately 800 MWD/T in the central zone of D Pile revealed no evidence of warping, bumping, or preferential corrosion at the closure end. The end cap was mechanically removed from one slug with the same degree of ease as caps from AlSi canned production material. No evidence of aluminum-uranium interaction was observed. Length and diameter measurements indicate that one slug was dimensionally stable

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while the other showed a decrease of 0.059 inch in length and a corresponding increase in diameter of 0.010-0.015 inch. Metallographic examination of samples, sectioned at the aluminum-uranium interface at the closure end, revealed no evidence of diffusion. To the contrary, a gap was found between uranium and aluminum at the slug cap end extending approximately 3/8 inch from the slug center to a point approximately 9/16 inch from the center.

Examination of the four cored enriched slugs from PT-105-513-SI was completed. Metallography and hardness testing on unruptured slugs from the test confirmed previous indications that beta phase heating existed near the core in all four of the slugs of the test.

An analysis of laboratory data from the 4669 KW investigation was made and a progress report prepared which presents a description of the slug and tube damage, a discussion of the processes which resulted from the heating, and an estimate of the temperatures that resulted throughout the slug column. In support of an understanding of the metallurgical phenomena associated with the KW startup incident, diffusion studies on AlSi bonded canned slugs have been carried out by boring a half-inch longitudinal hole in the center of canned slugs. A graphite resistance heater was used in the central hole to heat the slug, and helium was employed to cool the exterior of the slug. When a slug was heated to a surface temperature of 670 C at a heating rate of 68 degrees/minute, a portion of the can wall slumped down, but the uranium was covered at all points by a massive diffusion layer. Heating the can wall to 660 C at a heating rate of 135 degrees/minute stripped the can wall from the affected area much more completely The diffusion layer covering the uranium was thin enough to allow machining marks to be traced. A slug which has had the can wall stripped from the uranium in-pile without melting the uranium must have had the can wall heated very rapidly past the 600-660 C temperature region. Even at the 135 degrees/minute heating rate, the "cast" aluminum collected on the side of the slug was rich in uranium-aluminum compounds.

Five sections of an irradiated process tube from tube 3070 KW were received from the Fuel Development Unit to determine ultimate tensile strength, yield strength, and percent of elongation on specimens from each section submitted. The data are to be used in determining if high temperatures encountered during dry temperature coefficient test affected the physical properties of the aluminum tubing. Results from the tensile test show an average progressive decrease in ultimate strength from 21,050 to 20,350 psi, a decrease in yield strength from 19,850 to 18,225 psi, and an increase in elongation from 4.4 percent to 6.1 percent toward the longitudinal center of the tube. These data reveal only a slight effect of annealing on the mechanical properties.

Radiometallurgy Facilities

The metallographic cell resumed operation March 1 after a two-week shutdown for repairs. Further mechanical failures to the metallograph forced its shutdown again on March 15 for three days of repair work.

Twenty-five calendar days of in-cell use of the metallograph objectives were found to have darkened them sufficiently to reduce light transmission by about 50 percent for the lowest power to more than 90 percent for the highest power.

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The high temperature tensile test equipment, to be used for determining the elevated temperature properties of pile fuel and structural materials, was received from the manufacturer and is in the process of installation.

Modifications to the shielding, sample holder, crystal holder, goniometer arm, x-ray tube, lights and control system of the double crystal x-ray diffraction unit are now complete, and the entire unit is being realigned and adjusted.

Twelve 10-1/2-inch and four 15-inch standard lead glass viewers, having cerium stabilized glass cover plates, have been received and installed in the cells of the Radiometallurgy Building.

A radiation shield of one inch steel plate was added to the cab of the Brooks load lugger, used for transporting hot waste to the disposal grounds, to prevent excessive radiation to the driver. A waste carton shield of one inch steel was also fabricated to provide radiation shielding to personnel during cell decontamination operations.

A study is being undertaken to determine the corrosion rate of 2S aluminum in the 327 Building wet storage basin. A sodium nitrate concentration of 200-300 parts per million is maintained in the basin at all times. A water flow of 30 gallons/hour is used 7-8 hours a day to remove foreign material from the surface of the water. The foreign material goes down the overflow drain. Fifteen aluminum coupons were placed in the basin on March 10. These samples are located at various strategic locations to include the different conditions existing in the basin.

Separation Plant Corrosion

A program to determine the corrosivity of 2WW Purex waste acid concentrate by qualitative, semiquantitative, and quantitative methods upon types 304L, 347, and 312 stainless steel and A-55 titanium under heat transfer conditions is in progress. An inspection was made of the heat exchangers exposed in the F-4 pot(1) after an exposure to boiling synthetic 2WW of approximately 1000 hours. These heat exchangers were fabricated of types 304L, 347, 312, and 329 stainless steel. The only significant visible feature with respect to corrosion behavior of the material in the heat exchangers was "knife line" attack adjacent to the type 329 stainless steel welds. The magnitude of this "knife line" attack was deemed to be sufficient to warrant substitution of another type stainless steel for the type 329. The bayonet heat exchangers in the F-55 pot(1) were removed, weighed, and examined macroscopically after a third exposure of 446 hours to boiling 2WW. The total time of exposure at the end of this third period was 1510 hours (the first exposure was 526 hours and the second was 538 hours). The type 329 stainless steel bayonet showed that it had been severely corroded at the fusion zone and at the heat affected zones. The visual examination also revealed general type corrosion along the length of the 329 bayonet. These observations corroborated fully the conclusion that welded type 329 stainless steel heat transfer surfaces are not suitable for service in boiling synthetic 2WW.

(1) Cadwell, J. J., Quarterly Progress Report - Metallurgy Research Sub-Section - Oct., Nov., Dec., 1954, HW-34455 (SECRET).

AISI types 318, 304, and 309 sintered stainless steel filters were corrosion tested in two synthetic 231-Z process streams: 1) 1.5 M HNO_3, 50 g/l La at 30 C; 2) 9 M HNO_3 at 65 C. Samples of all three steel types were exposed to these two solutions for 123 hours. At the end of this period all three 1/8-inch thick samples from solution 2) could be easily fractured with the thumb and fingers of one hand. Percent weight losses were calculated for comparison purposes and no significant differences were noted; however, the physical structure of the filters appears to be quite important in determining the service life of the filters. Photomicrographs show that type 304 has a much more densely packed structure than the other two filters tested.

Welding Development

In an effort to eliminate the crevice corrosion associated with joining tubes to tube sheets in heat exchangers which have the corrosive media on the outside of the tubes, a joint has been developed to eliminate the crevice effect by providing an annulus to allow free flow of the solution in and out of the joint. The program of tensile testing representative samples of welded joint designs in various pipe sizes was continued, and additional data are as follows. Eight samples utilizing one-inch diameter schedule 160 pipe welded to 2 1/2-inch thick tube sheets were tested by recessing the pipe 3/16" below the surface of the tube sheet. Three samples had no annulus; one sample had a 1/16-inch annulus, and four had a 1/8-inch annulus. The joints with no annulus broke at a minimum stress of 56,000 psi in the pipe with an elongation of about eight percent. The sample with a 1/16-inch annulus broke the pipe at 74,000 psi with an elongation of 57 percent. The four samples with a 1/8-inch annulus broke in the heat affected zone adjacent to the weld at a minimum stress of 71,200 psi in the pipe with an elongation of about 36 percent. Metallographic examination shows that tubes welded with an annulus results in a joint without notches, crevices, solution traps, or stress raisers.

Four full-sized 4-inch uranium slugs for PCTR were precision cast in succession using a graphite mold. Dimensional accuracy and surface conditions were very good. Maximum deviation on the diameter was 0.002 inch. The total time for a complete casting cycle was reduced to 3-1/2 hours per slug. One slug was alloyed to approximately 0.2 percent plutonium. Radioassays of cross-sections of the slug indicated some segregation. A charging device was made to add the alloying metal to the molten bath instead of premixing the solid metals.

CONTACT ENGINEERING UNIT

PROJECT ACTIVITIES

Project C-431-B

The extrusions for the replacement horizontal rods have been completed by the Reynolds Aluminum Co. and are now being assembled by Western Gear. Delivery to the plant is scheduled for sometime in June.

Project CA-512-R

The mercury switches in the K area panellit gages are not compatible with the installed coordinate light system. It is possible under certain near trip conditions for both contacts of the single pole, double throw switch to be in the mercury pool at once. Depending on the location of the gage, this double contact can by-pass a portion of that row of gages from the safety circuit. To rectify this situation it is proposed to replace the present mercury switches with snap-action mercury switches. A sample of this type switch has been examined and appears suitable. Immediate steps will be taken to procure 400 of these switches for pile evaluation. If results are favorable both piles will be equipped with them.

It was recommended to the Design Council that the gamma monitoring system be made a part of the scope of CA-512-R and drawing SK-1-20874 and the criteria were approved.

A request was received from the Manufacturing Dept. for further scope changes to the poison column charging equipment. No unanimous recommendations were made.

The request by the Pile Technology Section that a sub-critical monitor be made part of the K scope was discussed. It was generally conceded that including it on the K project might expedite installation. Unanimous agreement was not reached and the matter was referred to the Design Council.

Project CG-558

The only item of scope significance concerned the proposed filter sampling system. The estimated cost is $37,000 per area. This facility was not included in the original estimate. It was agreed not to try to get it in as part of CG-558 but to handle it as a Manufacturing budget item.

Project CG-600

The original scope of modification to C area called for new nozzles and pigtails but no pump changes. This was based on the premise that the present motors could be overloaded up to 10% and thereby furnish 91,000 gpm to the pile. Subsequent tests have shown that the motors will not stand this much

overload. The scope has now been changed to include replacing the 190-C pumps with more efficient pumps. These will not overload the motors but will deliver approximately 95,000 gpm. The scope change will add about $250,000 to the project cost.

PROCESS STUDIES

Economic study of the application of pressurization to the old reactors continued. The analysis takes into account the economic incentive for changing annulus dimension whenever process tubes are replaced.

A study was initiated to determine the economic value of incremental increases in power level. Efforts to date have consisted of securing basic cost data.

SPECIAL STUDIES

A descriptive report on the 4669 KW incident was written and issued as HW-35819. Collection of data relating to the restoration of channel 4669 KW has been completed, and a rough draft report is circulating for comment. Assistance was rendered to design planning in the preparation of construction budget data sheets relating to pile modifications, and in preparation of project proposal for installation of continuous charge-discharge equipment at C pile.

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 March, 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

T. C. Nelson E. N. Olson	Cam Action Locking Device for Air Lock Door. (Report not yet issued)

O. H. Greager
Manager - Pile Technology
ENGINEERING DEPARTMENT

1267373

VISITORS AND BUSINESS TRIPS

D. M. Lang, P. R. VanStrum, Carbide & Carbon Chemical Company, Oak Ridge, Tenn. R. E. Leeds, AEC and R. V. Maier, Carbide & Carbon Chemical Company, Paducah, Kentucky visited Hanford 3-11 through 3-14-55, to discuss UO_3 problems and inspect the Redox plant.

V. N. Krivovok, International Nickel Company, New York, N. Y., visited Hanford on 3-22-55 to inspect the Purex Plant.

R. I. Martens, E. B. Sheldon, R. J. Christl and G. Mackey of duPont, Savannah River visited Hanford 3-14 through 3-22-55 discuss separations problems.

H. O. Aaron, duPont, Savannah River Plant visited Hanford on 3-14-55 to discuss calcination process problems.

D. S. Arnold and J. O. Davis, National Lead, Cincinnati, Ohio visited Hanford 3-21 and 3-22-55 to discuss thorium ore processing.

E. F. Miller, AEC, Washington, D.C. visited Hanford on 3-24-55 to discuss capacity and criticality separations of the Hanford Separations plants.

A. D. Tevebaugh and Toma Snyder of KAPL,Schenectady, New York visited Hanford on 3-30-55 to discuss KAPL assistance to Hanford.

A. M. Platt of Hanford attended the American Institute of Chemical Engineers at Louisville, Kentucky on March 20-23, and visited Carbide & Carbon Company at Oak Ridge, Tennessee on 3-24 and 3-25-55 to discuss Thorex process problems.

E. P. Galbraith visited the Brigham Young University, Provo, Utah, on 3-3 and 3-4-55 and the University of Utah, Salt Lake City, Utah on 3-29-55 to recruit technical personnel.

R. E. Isaacson attended the American Socieity of Metals show in Los Angeles on 3-28 through 4-1-55.

L. J. Lucas attended the American Society of Tool Engineers Convention 3-14 through 3-18-55 at Los Angeles, California.

J. L. Daniel attended the American Chemical Society and the Spectroscopy Society meetings in Pittsburgh, Pa on 3-1 through 3-4-55. He also visited the Metals and Controls Corporation in Attleboro, Massachusetts on 3-6-55 to discuss operation and application of Echelle spectrograph. He visited the Knolls Atomic Power Laboratory on 3-8-55 for exchange of information on spectrochemical analyses.

F. J. Leitz visited the Cal. Tech. at Pasadena, California on 3-1-55 and UCLA, Los Angeles on 3-2-55 and Univ. of California, Berkeley on 3-3-55 and Stanford, Palo Alto, Calif. on 3-4-55 to recruit technical personnel.

ORGANIZATION AND PERSONNEL

	February	March
Separations Technology General	2	2
Plant Processes Sub-Section	48	50
Chemical Development Sub-Section	82	81
Chemical Research Sub-Section	60	60
Contact Engineering Unit	4	4
Analytical Laboratories Unit	32	33
Technical Shops Unit	29	29
	257	259

Plant Processes Sub-Section: L. H. Clark, Engineer II, terminated 3-31-55, "another job". F. F. Cole, Engineer I and J. P. Duckworth, Engineer II transferred from Chemical Development on 3-1-55 to Plant Processes. F. E. Johnson, Technical Graduate-Rot. transferred into Plant Processes from Manufacturing,Reactor Operations on 3-14-55.

Chemical Development Sub-Section: M. D. Fitzsimmons, Engineer I transferred into the Sub-Section from the Project Section on 3/1/55. F. F. Cole, Engineer I and J. P. Duckworth, Engineer II transferred to the Plant Processes Sub-Section 3-1-55. George Rey, Engineer II, Jay L. Murray, Jr. Engineer and G. A. Nicholson, Engineer II transferred from weekly to monthly on 3-1-55.

Analytical Laboratories Unit: Carol E. Cooper, Lab. Asst. "B" was hired on 3-8-55.

Technical Shops Unit: Marciana D. Jones, Field Clerk C transferred into the Unit from the Fuel Technology Sub-Section on 3-7-55. Vida F. Zoda, Motor Messenger transferred into the Unit from Project Auxiliaries, Project Section on 3-21-55. Lawrence F. Heinl, Design III, was terminated on 3-14-55, "deceased". Mary B. Rose, Motor Messenger, transferred from the Unit to Project Auxiliaries, Project Section on 3-21-55.

PLANT PROCESSES SUB-SECTION,

REDOX PROCESS TECHNOLOGY

Summary

The plant operated with three uranium and three plutonium cycles and permanganate head-end throughout the month. The IA Column was operated on dual scrub for one week, following which processing was switched to the IS Column, operated on single scrub for one week, ending March 16. Operation reverted to the IA Column on March 18, following a shutdown caused by a 2AF pump failure. The dual scrub test was accompanied by a marked shift in Plutonium Cycle decontamination, the second cycle decreasing and the third cycle increasing in about the same proportion. The switch to IS Column resulted in a five-fold loss in over-all uranium decontamination but no effect on plutonium decontamination. The shutdown and startup resulted in extremely high contamination of both uranium and plutonium streams, necessitating column flushing, plutonium rework, and silica gel treatment of uranium product. Isolated instances of unusual losses (e.g., high uranium loss on the difficult startup following the 2AF pump failure, and high plutonium losses when the 3A feed tank and a dissolver were overflowed to the sumps) lowered the averages of otherwise exceedingly good product recoveries. It was demonstrated that, by means of heat and dichromate, plutonium oxidation in the 2AF and 3AF could be raised to at least 99.75 per cent plutonium(VI), making acid deficient Plutonium Cycle operation potentially feasible for decontamination improvement. The apparently successful use of mercury in the dissolvers to suppress the emission of iodine-131 was subject to some uncertainty due to silver reactor inefficiency, but has been proved to be of positive value and will be continued until the plant shutdown (tentatively scheduled for April 5, 1955). The auger in Tank 101 of the 241-SX waste farm has been motorized and is apparently successful in promoting continuous boil-off and preventing the sharp pressurizations heretofore observed.

Feed Preparation

Pile exposure of metal charged to the dissolvers averaged 208 MWD/T (206 to 209), with an average cooling time of 81 days (76 to 88). Iodine (I^{131}) emission has continued to be a problem, with an average of 5.1 curies per day out the stack, with approximately 10 per cent reaching the stack via the sand filter. The problem, largely the result of (a) the age of the metal, and (b) unusually poor performance of the silver reactors, has been partially solved since March 10, 1955, by the addition of mercury(II) nitrate to the dissolvers before the start of dissolving to make each cut approximately 7×10^{-4} M Hg^{++}. Since the start of this program on March 10, 1955, a decided improvement has been observed, but results and conclusions have been confused by sporadic large bursts which still occur in spite of the mercury. This is believed to be due primarily to the partial failure of the new C-3 reactor which was installed as a replacement on February 8, 1955.

Solvent Extraction Performance

Although decontamination performance was not uniform this month (due to several factors as discussed below), the averages were:

Cycle	Gamma Decontamination Factors, dF	
	Uranium	Plutonium
Head-End and First Cycle	4.15	4.20
Second Cycle	1.80	1.65
Third Cycle	0.70	1.60
Over-All	6.65	7.45

Uranium and plutonium recoveries averaged 99.5 and 99.2 per cent, respectively. The presence of mercury(II) nitrate in the feed solution resulted in little, if any, detectable mercury in the uranium product stream and less than 500 parts of mercury per million parts of plutonium in the plutonium product stream.

Uranium Cycles and Flowsheets

The IA Column was changed to dual scrub on March 3, 1955, and was run for one week, showing no unusual capacity limitation as a result of the change. On March 9, 1955, the operation was switched to the IS Column which was run single scrub. The change was necessitated by increased IA flooding tendency (indicating that a flush was needed) plus a definite capacity limitation imposed by the IAW letdown valve.

Although dual scrub operation showed no effect on the Uranium Cycle performance, the change to IS Column was accompanied by a major surge of activity to the Uranium Cycles resulting from rate changes, numerous column upsets, and raising the IA interface out of the packing. With the IS Column operation, the Uranium Cycles did not recover from this, and until the failure of the 2AF pump on March 16 necessitated a process shutdown, the final uranium product ran consistently with a gamma ratio of from 2.5 to 3.5, compared to an average of less than 1.0 for the previous three weeks.

During the enforced shutdown, an interface jet was installed in the 2D Column. When it was tested with 100 psi inert gas, the disengaging sections of all the columns were accidentally pressurized, and the diaphragms of the Magnehelic instruments were ruptured. Moreover, accumulated activity was blown from the vent header into the columns and, when operation was resumed (through the IA Column), extremely high gamma contamination was found in both uranium and plutonium streams. The plant was then again shut down, the second and third cycle extraction columns were flushed, the plutonium was reworked (by blending with IAF), and the uranium was sent to lag storage for treatment with silica gel. Following this, the performance very rapidly returned to normal.

Plutonium Cycles and Flowsheets

The use of the IA dual scrub flowsheet was accompanied by a shift in decontamination in the second and third Plutonium Cycles which saw the logarithmic decontamination

factors drop from the normal 1.8-2.0 to about 1.2 in the Second Cycle and, at the same time increase from the normal 1.0-1.2 to about 2.1 in the Third Cycle. The net result was an approximate improvement in final plutonium decontamination by a factor of two. The reasons for the shift are not known, but it is doubtful that dual scrub operation was the basic cause.

In preparation for the forthcoming test of acid deficient plutonium cycles, 2AF and 3AF temperatures were raised to approximately 45 to 65 C, and sodium dichromate was added to 3AF for approximately ten days. From normal average values of 20 per cent and two per cent for plutonium(IV) in 2AF and 3AF, respectively, the average plutonium(IV) content under the new conditions decreased to 0.15 and 0.25 per cent. Therefore, it appears that an acid deficient flowsheet to improve decontamination can be tested without the risk of abnormal plutonium loss to waste.

Stack Emission

Although iodine-131 is currently the only important fission product being emitted from the stack, arrangements were completed for flushing the stack through the top and middle spray rings. The first flush on March 4, 1955, contained 25 to 30 pounds of ammonium nitrate and appreciable gamma activity, primarily zirconium-niobium. The second flush on March 18, 1955, contained 50 to 60 pounds of ammonium nitrate, but only a small fraction of the total activity found in the first flush. There are no evidences of hot ammonium nitrate emissions, but, in spite of this fact, the stack flushing will be returned to a weekly basis.

The addition of mercury(II) nitrate to the dissolvers as mentioned under Feed Preparation was begun on March 10. The average daily emission of iodine-131 for the preceding week was 10.4 curies and for the succeeding twelve days was about 1.8 curies. Starting on March 21, 1955, mercury(II) nitrate was not added to C Dissolver for four successive cuts, during which time ca. 12 curies of iodine-131 were emitted from the stack as compared with a total of ca. four curies for the previous four days. After re-instituting the mercury(II) nitrate addition, less than one curie was emitted in the next 24 hours. During the entire report period, the iodine-131 passing to the stack through the sand filter averaged ca. 0.5 curie per day, with about a two to three-fold increase (from 0.3 to 0.8) noted three to four days after the start of the mercury(II) nitrate addition.

In general, iodine emission correlated closely with the operation of C Dissolver in spite of two hurried single charge regenerations which the C-3 Reactor was given on March 3 and March 7, 1955. (It was given the full two charge treatment on March 28, 1955.)

241-SX Waste Storage Tank Farm

Manual operation of the one foot diameter auger-agitator in Waste Storage Tank 241-SX-101 was continued on a once per shift basis until March 22, except for the period March 7 to March 11. From March 7 to March 9, the agitator was operated every four hours. From March 9 to March 11, the auger was not turned because escape of vapor from Tank 101 had contaminated the area around the agitator shaft. A packing gland, installed on the auger shaft on March 11, has prevented further contamination.

During this period, February 26 to March 22 (except for the two days during which the auger was not operated), bumping in Tank 101 has occurred on an average of twice a day, always following agitation. Peak pressures during these surges ranged from 18 to 42 inches w.g.

The auger was motorized during the last week of the report period. No pressure surges have occurred since operating it continuously at 125 rpm. Instead, a continuous boil-off of two to three gpm is being maintained.

The average temperature at the bottom of Tank 101 varied between 279 and 301 F, with individual point readings ranging from 266 to 325 F.

PUREX PROCESS TECHNOLOGY

Rough draft operating procedures are approximately 60 per cent completed. Those which have been completed are: Dissolver Operations, HAF Preparation, Co-Decontamination Cycle, and HCP Concentration.

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

BISMUTH PHOSPHATE PROCESS TECHNOLOGY

Decontamination Performance

Decontamination was poor on eight runs. Gamma scan analyses of the F-10-P solutions on these runs indicated radioactive lanthanum and barium. The runs were successfully reworked by adding a barium sulfate scavenger in A cell.

Production Test 200-2 - Supplement A, "Processing of Special Irradiated Uranium"

The processing of this special material 300 MWD/T and ~ nine months cooling time commenced with run No. T-55-03-41 on March 23. Prior to dissolution of this material, the uranium heels were removed from the dissolvers, and two acid flushes were made throughout the processing equipment.

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

Although samples of the 103-TY tank, segregated First Cycle waste, gave strontium analyses of 0.3 to 0.8 uc/ml, soil column tests indicated no radioactive isotope breakthrough with ten soil column volumes of solution filtering through the bed. Subsequently, the filling of 103-TY tank was completed, and the supernatant was pumped to the 104-TY tank. The 103-TY tank is receiving current scavenged First Cycle waste with better pH control. Samples of this tank will be taken to determine strontium and cesium decontamination.

Production Test 221-T-19, "Reduction of Time Cycle in Dissolver Section"

The production test has been completed with a total of 51 runs processed with this increased acid flowsheet. Of these 51 runs, 15 runs, or 34 per cent, were reworked in the extraction section due to high waste losses. Many of the reworks can be

attributed to high nitric acid concentration, two of the reworks were caused by high UNH concentration, and four of the reworks were not explained. The frequency of these reworks indicates that the concentrations of the dissolver solution cannot be controlled by a specific gravity measurement.

The data show no reduction was made in the dissolver section time cycle. However, the data are inconclusive since at no time during the test was dissolver capacity limiting production.

A final report for the production test is under preparation.

Stack Emission

Prior to February 15, the average iodine-131 emission from the T Plant stack was less than one curie per day. Subsequently, the emissions have been increasing with a maximum emission of 90 curies on March 16. Although shorter cooling times and increased production have contributed to this increase in emissions, either process technology or equipment failures exist. To date, the problem has not been defined. Sampling equipment, caustic scrubbers, flow meters, etc., are now being installed, and a sampling program will be pursued to determine the causes of these increased emissions.

A new silver reactor was installed on 4-5L, and the silver reactor on 3-5L was changed to the 3-5R dissolver system. A new reactor will be installed on 3-5L after the dissolver has been replaced by a new unit.

URANIUM RECOVERY PROCESS TECHNOLOGY

Summary

After replacement of the RAW letdown valve, instantaneous rates as high as 8.5 tons of uranium processed per day were achieved. Production, except for a period of shutdown for intercycle stripper modifications, has been limited only by the availability of feed supplied from the tank farms.

Decontamination was more than adequate for the 32 month minimum age uranium processed. Over-all plant logarithmic decontamination factors ranging from 5 to 5.6 were attained to produce TBP Plant product generally containing from 25 to 75 per cent of aged natural uranium gamma activity.

Significant reductions in condensate losses were effected by modification of the intercycle stripper tower to permit "dry" operation of the two top plates. These losses were reduced from approximately two per cent to less than 0.1 per cent.

In-line waste scavenging operations were continued. The strontium content of the scavenged supernates continued high with Sr^{90} concentrations ranging from 0.5 to 1.9 microcuries per milliliter. Because of the high strontium content of the supernatant, soil column tests were required on individual tank farm tanks to determine cribbing limitations. At month end, a modified scavenging technique

developed by Process Chemistry is being evaluated in plant tests. Although test results are not yet complete, preliminary results indicate a three-fold improvement in strontium scavenging by adding calcium (0.01 to 0.02 M) to the neutralized nickel ferrocyanide scavenged waste.

Metal Removal

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

Tank	Fraction of U	Age(a)	Average MWD/T(b)
109-111-112-BY	0.549	35	582
104-107-108-TX	0.448	32	582
104-C	0.003	86	203

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

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

Supernatant sluicing, carried on during the first part of the month in BY and TX Farms to reduce boil-off requirements, was discontinued, and water sluicing was started to improve sludge removal rates when additional concentration equipment (Section 7) became available.

Preparations are being made at U Farm for the resumption of sluicing and blending operations. Initial processing of the approximately one year minimum-aged 101-U tank should begin sometime during the next month.

Feed Preparation

Routine acidification, using 10,600 pounds of 100 per cent nitric acid per ton of uranium, followed by an average 65 volume per cent boil-off, gave RAF of the following average composition:

	Composition, M				M Na / M U	Per Cent ANU Gamma	RAW $K_{1/2}(NO_3)$, M
	U	HPO_4^{-2}	Na^+	H^+(1)			
Average RAF	0.27	0.27	4.3	2.8	16.1	8.2×10^6	5.1
HW No. 6	0.27	0.27	4.1	2.7	15	---	5.5

(1) "Titratable" nitric acid.

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 Phase Scrub Streams	
Cycle	Feed	Water Scrub	Intermediate Scrub	Extractant	Extractant	First	Second
First	85 to 120(1)	180(3)	100	120	65 to 75	100	100
Second	85 to 100(1)	100 to 160(2)	100 to 160(2)	115 to 125	90	100	0 or 10

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

(2) To provide RAIS (back-cycled RDW) at the flowsheet rate, while the first cycle operated at a higher rate than the second.

(3) To minimize RCU acidity.

(4) Normally not used. Used only while processing off-standard feed (RDF) containing organic phase either entrained into the feed tank through the RD Column vent line and/or pumped through the intercycle stripper-evaporator as undecanted RCU.

Other departures from flowsheet conditions included the use of: RCX and REX containing 0.005 M nitric acid (vice 0.01 M) and heated to 55 C; RDIS containing 0.4 M sulfamic acid (vice 0.2 M); and organic wash streams containing three weight per cent sodium carbonate (vice sodium sulfate).

Average uranium losses from the solvent-extraction battery were:

Per Cent of the Feed Uranium			
RAW	RCW	RDW	REW
0.4	0.3	0.7	0.08

The average RAW loss was about two-fold higher than the steady-state loss because of high losses during abnormal operating periods (e.g., column startup and the routine weekly interface jetting). RCW losses continued about ten-fold above the normal loss experienced during parallel operation and showed no significant variation with minor changes in RCX rate. Laboratory work aimed at defining the cause of the RC Column emulsification, instability, and high loss is being carried out.

Average decontamination data are:

Cycle	Logarithmic Gamma Decontamination Factor	Product Gamma Activity, Per Cent ANU	Plutonium, Parts Per Billion Parts Uranium
First	4.0	860	6
Second	1.3	43	3

There were no significant variations in decontamination performance during the report period. The nitric acid concentrations of the RCU and REU were consistently low, and averaged 0.07 and 0.05 pounds per pound of uranium, respectively. These values are below the 0.1 pound per pound limit set to minimize evaporator corrosion.

Intercycle Concentration and Stripping

Uranium losses from the intercycle stripper tower (T-8-4) have averaged approximately two per cent during the past two months. To reduce these losses, the intercycle stripper tower (T-8-4) was modified to permit operation of the tower with two "dry" plates above the feed point. Holes were cut in the outlet weirs of the top two trays of the tower. When the modified tower was operated, the stripper waste losses initially decreased to approximately 0.2 per cent, with no reflux water added to the tower. The addition of reflux water (one to two gallons per minute) further reduced the losses to less than 0.1 per cent as determined by condensate grab samples. The stripping efficiency of the tower with reflux added to the tower is currently being evaluated.

Waste Handling

The Section 9 concentrator was reactivated for the concentration of scavenged waste. Approximately 6,600 gallons of scavenged waste per ton of uranium, at an average pH of 9.2, were returned to storage for settling in the 106 and 110-BY tanks. The average composition of the waste and the specified methods of disposition, based on soil column studies, are summarized below:

Tank No.	Average Analysis $PO_4^{=}$, M	Average Analysis Sr^{90} μc/ml	Average Analysis Cs^{137} μc/ml	Average dF Sr^{90}	Average dF Cs^{137}	Disposition of Supernatant
5-107-BY	0.074	0.5	0.08	2.0	3.0	660,000 gallons to BY No. 2 crib.
6-108-BY	0.177	1.9	0.11	1.4	2.9	May not be cribbed or ditched.
7-106-BY	0.108	1.34	0.10	1.6	2.9	Will be cribbed in BY No. 3 crib.

Laboratory tests made by Process Chemistry have indicated a several-fold improvement in strontium scavenging as a result of adding calcium to the nickel ferrocyanide scavenged waste. On the basis of these preliminary laboratory studies, two 11,000 gallon test batches were made on typical nickel ferrocyanide scavenged waste in TK-4-6. On the first test, the pH was low (7.6), and the calcium (0.016 M) addition produced only a slight improvement in Sr^{90} removal. On the second test, the pH of 9.3 more closely approximated the pH employed in the laboratory studies, and a three-fold improvement in strontium scavenging was noted. A third plant test is planned employing a 90 C calcium scavenging temperature. Samples from this test are to be submitted to Earth Sciences for Sr^{90} soil column retention studies.

Equipment

Section 9 Reactivation - The reactivation of Section 9 as a waste concentration section was completed at the end of last month, and concentration of the building's nickel ferrocyanide scavenged aqueous wastes was started February 27.

Section 10 Modification - The modification of Section 10 to permit its use as either a waste or a first cycle feed concentrator has been started. The old Section 10 evaporator and York mesh-packed tower was removed and will be stored as an operational spare unit. The tower will be replaced with the old Section 8 bubble-cap tower after the seal pot has been modified to give a twenty inch water seal in place of the original ten inch seal. A new evaporator is to be provided for Section 10.

The condenser which was removed from Section 6 last month because of an excessive pressure drop will be used as the replacement condenser in Section 10. The scale, believed to be the cause of the high pressure drop, was removed by boiling out with an $HF-HNO_3$ mixture.

Intercycle Concentrator Thermohm Failure - Over a one week period, the temperature sensing unit of the Intercycle Feed Evaporator indicated a steady increase in the operating temperature of E-8-1. This temperature increase was not verified by an increase in the specific gravity of the evaporator contents or by a material balance across the unit. A complete check of the accessible portions of the temperature recorder failed to reveal any sources of instrument difficulty, and it was concluded that the remotely located thermohm unit was faulty. To prevent the meletron unit from shutting the evaporator down, the temperature actuated safety device was removed from service. Temperature control is retained by limiting the steam chest pressure to 30 psig.

RAW Valve - The plug in the two inch RAW valve (1-1/4 inch trim) was changed on March 7-11, from one with equal percentage characteristics to one with linear characteristics. As a result of this change, the limiting processing capacity of the first cycle is increased to approximately nine tons of uranium per day (at HW No. 6 conditions).

URANIUM CONVERSION PROCESS TECHNOLOGY

Summary

Total metallic impurities, fission product gamma activity, and plutonium in product UO_3 averaged 138 parts per million parts of uranium, 58 per cent of aged natural uranium gamma, and <5 parts per billion parts of uranium, respectively. The average reactivity was 1.12, using 0.05 weight per cent sulfamic acid as an additive.

A decision has recently been made to install a continuous calcination unit in the drum loading room of the 224 Building. This unit (possibly the first production unit) will be a prototype of the production units used in the 224-U expansion program. It is to be installed as soon as possible to permit full scale testing of the unit and to provide early operator training.

Anti-Caking

Tests using 0.02 weight per cent (based on uranium) "Petro AA", an alkyl aryl sodium sulfonate, indicated that this pot additive was not effective in reducing or eliminating pot caking under the conditions tested. Moderate foaming occurred during one-third of these test calcinations.

Equipment

Major down time of Luckey Pot 19 occurred when the pot agitator was forced up 3/4 inch. This was caused by excessive pot sag and/or cake buildup under the agitator shaft. It was necessary to disassemble and remove the agitator from the pot to install a shaft sleeve. To prevent a recurrence, residual pot cake will be dissolved in acid prior to pot charging. No visual evidence of pot bottom malformation was apparent upon examination when the agitator and shaft were removed.

The dismantled ED-2 final product concentrator showed no visible evidence of serious corrosion. A more thorough examination was prevented by the presence of scale and the high radiation level associated with the unit (eleven rad/hour at contact). Head gasket failures appear to have been responsible for the process leaks.

When the ventilation (X-11) header valve on a Luckey pot was inadvertently left open during a calcination, all eight filter bags failed, requiring replacement. The bag houses were corroded generally.

Z PLANT (ISOLATION, PURIFICATION, AND FABRICATION) PROCESS TECHNOLOGY

Isolation Building

Feed material during this period originated from both the Redox Plant and T Plant. Redox material that contained mercury was processed through a single peroxide strike with no difficulty. Mercury purification factors of seven to ten were obtained with a single peroxide precipitation leaving 30 to 70 ppm mercury in the AT solution produced. A white precipitate, tentatively identified as barium sulfate, was found after the peroxide cake dissolution of several runs that had been scavenged with barium sulfate in the Concentration Building. The cakes involved were difficult to dissolve and losses to recycle were higher than normal.

Final Inspection

The new final inspection area has been occupied. When production is resumed, these facilities will be utilized.

Crucible Services

Fabrication of RCDS crucibles for the new Task III, thin-wall casting crucibles for Task IV and melting crucibles for the plutonium metallurgy laboratory were major service activities for the month. Two engineering assistants normally assigned to final inspection activities worked in the crucible shop this month.

234-5 DEVELOPMENT

Mercury in Task I Feed

It has been recommended that a limit of 1000 ppm be placed on the mercury content of plutonium nitrate feed to Task I. Any mercury(II) oxalate which gets as far as Task II will be subject to decomposition in the Task II process, with the formation of free mercury and resultant attack upon the gold and gold alloy components of the filter boat liners.

Recuplex - Laboratory Studies

Under the conditions found with hydrogen peroxide in killed oxalate supernatants, it was shown that plutonium(V) would not be formed during the reduction of plutonium (VI). After one hour at room temperature, no plutonium(V) was detected at acidities greater than one molar (Task I and Recuplex conditions). However, at an acidity of 0.16 molar, the same conditions yielded almost 100 per cent plutonium(V).

Recent studies of solvent damage by alpha particles have shown the following:

(1) The pink color previously observed in aged solutions of plutonium in 15 per cent TBP-CCl_4 and associated with "unstrippable" plutonium is caused by a dibutyl phosphate plutonium(IV) complex, with a DBP: Pu mole ratio of two. A preliminary survey indicates that the color of the complex may serve as a basis for the quantitative estimation of DBP.

(2) "Unstrippable" plutonium concentrations in a 15 per cent TBP system increase from two to three times faster in a CCl_4 diluent than in a Shell spray base diluent. Hood lights exerted no detectable effect upon solvent damage rates in either diluent, at a plutonium concentration of 23 grams per liter.

(3) The chloride ion concentration in Recuplex product (CCP) may range as high as 0.15 g/l and may be a cause for severe corrosion in the product evaporator.

Plutonium distribution measurements have given the following equation for plutonium behavior in the scrub section of the Recuplex extraction column:

$$E_a^o = 0.22 \text{ (moles/liter } HNO_3 \text{ in aqueous effluent)} + 0.13$$

The equation applies for plutonium(IV) concentrations of 40 to 50 grams per liter in the effluent organic phase and nitric acid concentrations of 0.8 to 2.0 molar in the effluent aqueous phase.

Recuplex Installation

Construction of the Recuplex facility in the 234-5 Building is approximately 99 per cent complete. The Solvent Extraction Hood and the outdoor chemical storage facility have reached beneficial use status. All major components have now been accepted from construction forces, with minor exceptions. Calibration of vessels will be completed, and acid runs in the Slag and Crucible Hood will be started by April 4, 1955.

Nickel Carbonyl Coating

A total of seventeen coatings were applied, fourteen of which were applied using conditions stipulated for a test designed by the Statistics Unit. The objective of this test is to evaluate the effect of surface area, blower speed, temperature, gas outlet diameter, and initial X-gas pressure on coating time.

Two tripod legs made of a hollow Pyrex glass equipped with iron and constantan wires, respectively, have been used to measure piece temperature. This thermocouple indicates temperatures 0-15 C greater than the conventional thermocouple located in the third leg. Life testing of this unit is now in progress to determine its advantage, if any, over the conventional thermocouples now employed.

CHEMICAL DEVELOPMENT SUB-SECTION,

PUREX DEVELOPMENT

The writing of the Purex Technical Manual has been completed. At the month's end the Manual was being processed for issuance early in April. Initial copy coverage will be made primarily with the objective of aiding in the Purex Plant startup.

Chemical Engineering Development

Back-Mixing in Pulse Columns. The decontamination factors obtained upon countercurrent scrubbing in the A-type columns would be impaired by the rise of a fraction of the radioactive feed-point aqueous solution -- against the net downward aqueous scrub flow -- to the less-radioactive top of the column. The extent to which such back-mixing occurs in pulse columns has been previously studied on a 2-in.-diameter scale by Burger and Swift, Chemical Research Sub-Section (Report HW-29010). The present pilot-plant work was undertaken to extend the early 2-in.-column findings on a 4-in.-diameter scale to obtain a preliminary indication of the effect of diameter scale-up.

The new results indicated no significant scale-up of eddy diffusivities upon going from a 2-in. to a 4-in. diameter. On the basis of these preliminary studies there is no reason to expect adverse decontamination performance from the Purex Plant pulse columns. The studies will be extended to full plant-scale columns, and new information developed is expected to be useful in prescribing optimum operating conditions to improve decontamination performance.

Equipment Development

A Johnston 3-stage deepwell turbine pump (Test Pump No. 1), equipped with CS-312 graphite and CSGHF pile graphite bearings and Type 347 stainless-steel journals, was inspected after pumping Purex HAX at 153 gal./min. against a 35-ft. head for 762 hr. Diametral bearing wear of 1 to 4 mils and negligible journal wear indicate satisfactory performance of the graphite bearings in this service.

Pulse Generator Development. The Purex Plant pulse generator installed on the 321 Building prototype HA Column (standard cartridge) has accumulated 333 hr. of operation with the piston weep hole closed pulsing simulated Purex HAX. The piston leakage rate has remained less than 0.1 gal./min.

Agitator Development. A Purex-Plant agitator installed in the 321 Building Tank Farm has been operating satisfactorily for 3040 hr. in 60% nitric acid. The operating period includes 73 cycles of draining and refilling the tank. There have been no apparent changes in agitation or mechanical performance.

Instrument Development. A simulated Purex flow control (rotameter) system which operated satisfactorily in water service for 1552 hr. has completed 455 hr. of satisfactory operation in 2 M ANN service.

HOT SEMIWORKS PUREX STUDIES

Operations at the Hot Semiworks during the past month have consisted of calibration and shake-down runs using unirradiated uranium. All flow instruments have been calibrated with the proper process solutions. Operating experience and a check of equipment and column performance, the objectives of the "cold" uranium runs, are being completed at the present time.

Instrument Development: In-Line Chemical Instruments. With the exception of the uranium polarograph on the IAW line and plutonium photometer for the 2AP line, all of the in-line chemical instruments planned for the Hot Semiworks have been installed and checked for operability.

REDOX DEVELOPMENT

Process Chemistry

Thiosulfate Feed Pretreatment Procedure. Further experimental work was carried out during the month on the thiosulfate feed pretreatment procedure which is of potential interest for the Redox Plant.

A typical thiosulfate precipitate was shown to be readily removed by centrifugation, and was identified as 94.8 per cent free sulfur and 4.0 per cent non-ignitable ash. During a series of five pretreatment runs in a stainless-steel beaker (containing a steam coil), in which residual solid was not removed between runs, a small amount of the solid adhered to the submerged surfaces, particularly to sharp corners and projections. The solid was easily removed by a jet of water. When the steam coil was not submerged and steam was passed through it, the adhering solid was converted to a form not removed by a water jet. However, a solution 10 per cent in NaOH and three per cent in H_2O_2 did remove it.

Gamma irradiation of the thiosulfate precipitate, at a radiation level approximating that expected in dissolver solution, caused some decrease in the head-end ruthenium decontamination. The arithmetic D.F. for the thiosulfate treatment step decreased from 70 at zero irradiation time to 55 at three hours while the D.F. for a non-irradiated control increased from 70 at zero time to about 100 at three hours. No further decrease in D.F. was found for the irradiated samples after three hours. The samples were irradiated in a pile "cooling" basin at approximately 2.5 x 10^6R. hr. for times varying from 0.5 to 96 hr.

A feed solution for simulated Redox first-cycle solvent extraction was prepared by thiosulfate pretreatment of 20% activity level, 0.2 M acid-deficient dissolver solution followed by digestion of the precipitate to dissolve the ruthenium. The ruthenium decontamination factor (log) for the RCU after a batch-contact solvent-extraction cycle (including two scrub contacts) was 3.07 was compared to 2.24 for a non-pretreated feed. In a similar run in which ruthenium was dissolved off the pretreatment precipitate by dichromate the solvent extraction dF was 3.68. These runs demonstrate the improved solvent-extraction removal of ruthenium obtainable as a result of the thiosulfate pretreatment of acid-deficient feeds even though the precipitated ruthenium was dissolved off the sulfur precipitate prior to the solvent-extraction step.

Chemical Engineering Development

Thiosulfate Scavenging. "Cold" pilot-plant studies (with non-radioactive Ru) of sodium thiosulfate "scavenging" as a potential head-end treatment step, for ruthenium decontamination without volatilization, were begun. The pilot-plant procedures are based on those developed in the Process Chemistry Laboratory (described in Document HW-35649). The first two tests yielded cloudy centrifugates upon passing of the treated feed through a 26-in. Bird solid-bowl continuous centrifuge at a centrifugal force of 1100 times gravity, with a 4 to 8-min. bowl holdup. Modification of digestion conditions in attempts to obtain more readily centrifugeable precipitates will be among the objectives of further pilot-plant tests.

URANIUM RECOVERY DEVELOPMENT

Process Chemistry

Intercycle Steam Stripping. Three samples of RCU and three samples of the same material concentrated to RDF were obtained from the TBP Plant and analyzed for DBP after standing approximately three weeks. The DBP content of the RDF samples ranged from 20 to 26 ppm. (U basis), whereas the RCU samples contained 50, 270, and 320 ppm. -- most of which was presumably formed in the RCU samples (while the samples stood for three weeks), by hydrolysis of TBP originally present in the un-stripped RCU. These data indicate effective removal of TBP by the intercycle steam stripper.

Flash Points of TBP (Soltrol 170 - Shell E-2342) Mixtures. As an aid in determining the feasibility of diluting the present TBP Plant RAX inventory (TBP-Shell E-2342) with TBP-Soltrol 170, flash points of 20 volume per cent TBP (Soltrol - Shell E-2342) mixtures (water saturated) were determined. The flash point was found to be directly proportional to the Soltrol content. A fifty per cent displacement of Shell E-2342 with Soltrol increased the RAX flash point by 11°F., whereas complete displacement increased it by approximately 30°F., i.e., to 186°F. Tag closed cup flash point.

Continuous Calcination

The 16-inch diameter by 8 feet long semi-plant scale agitated trough-type continuous denitrator continued in operation. Approximately 34 tons of UO_3 were produced during 10 runs with reactor feed-point temperatures covering the range of 230°C. to 325°C. (discharge temperatures were 250°C. to 325°C.) and with sulfur additions of 0, 330, and 1000 parts of sulfur per million parts of uranium. All runs were made with an agitator speed of 80 rev./min. Product rates up to 260 pounds of UO_3 per hour (2.6 tons of uranium per day) were obtained, and reactivities ranged from 0.84, with 333 ppm. S (as H_2SO_4) at 230°C. feed point temperature, to approximately 1.30, with 1000 ppm. S at feed point temperatures of 260 to 325°C.

Two test lots of continuously produced UO_3, each containing approximately 4000 pounds, were shipped to K-25 for testing in the K-25 feed plant pilot plant. These lots were produced at 290°C. feed point temperatures with nominal sulfur addition, as H_2SO_4, of 330 and 1000 parts sulfur per million parts of uranium. Average reactivities were 1.13 and 1.30, respectively.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

Process Planning

U-233 Recovery in the Redox Plant. A brief evaluation of the technical and economic feasibility of using the Redox Plant to recover uranium-233 for irradiated thorium has revealed the following.

(a) It appears technically feasible to recover U-233 in the Redox Plant at a processing rate of 50 tons of thorium per month. The feasibility of recovering thorium is probable, but firm recommendations are dependent on the results of laboratory studies now underway in the Chemical Research Sub-Section.

(b) The alteration of major equipment items would tentatively be confined to replacement of the present 3-inch 2B Column with a 4-inch diameter column. A number of additional alterations to minor equipment (pumping, valves, etc.) would be required, but these changes have not yet been studied in detail.

(c) Manufacturing costs (essential materials, labor, waste storage, etc.) are estimated to be about $6,000 per ton of thorium when processing at a rate of 50 tons per month. This cost is equivalent to about $3 per gram of "23" at a reactor irradiation level of 2000 g. "23" per ton of thorium.

Process Chemistry

Waste Treatment: Current TBP Plant Waste Scavenging Program. Studies of the effect of process variables and the use of various additives have been continued in an effort to improve the removal of radioactive strontium over that currently obtained in the plant. Strontium removal was improved by the addition of either ferrous or calcium salts to the waste. Calcium appears to be the more effective of the two. Decontamination factor improvements as great as 10 were obtained when 0.015 to 0.03 mole of $Ca(NO_3)_2$ was added per liter of waste at pH 9.5. This process modification is being explored further via 10,000-gallon-scale tests in the TBP Plant.

Equipment Development

$BiPO_4$ Centrifuge Studies. A study to determine the physical characteristics and behavior of $BiPO_4$ centrifuge cake (decontamination step) has been undertaken in an effort to obtain information that will allow rescoping of the critical mass limitations and permit increasing the batch size.

Initial runs made with C.P. chemicals (Pu and F.P. free) and employing flowsheet precipitation and digestion conditions, produced a loosely packed and finely granular cake. The cake slurried readily in water during normal stopping of the 12-inch Bird centrifuge. There appeared to be no tendency for the cake to ball up, form a heap, or otherwise assume an uneven distribution.

CHEMICAL RESEARCH SUB-SECTION,

PUREX

The HW#3 Flowsheet may result in high product waste losses in the 1AW stream because of plutonium hydrolysis in the HCP concentrator to yield nonextractable species. Experiments were performed in which solutions corresponding to HCP and HPC compositions were examined for plutonium extractability after the solutions had been subjected to various conditions of acidity and temperature for different times. In the dilute HCP solution, hydrolysis occurred both at room and near boiling temperatures leading to over fifty percent waste loss on samples measured after 24 hours. However, evaporation of the solution to HPC concentration reversed the hydrolysis so that the plutonium loss was greatly reduced. The nonextractable plutonium was quantitatively recovered from the waste by simulating recycle of the acid recovery bottoms to the dissolver. Varying the acidity of both the HCP and HPC streams from Flowsheet HW#3 to Flowsheet HW#2 concentrations did not produce a significant reduction in waste loss. Although not firm values, as much as two to five percent of the plutonium may be recycled with the 1AW.

Continuous distillation experiments simulating the Purex #1 nitric acid concentrator have been extended to the long acid residence times indicated in HW#4 Flowsheet to test ruthenium decontamination. Using a 2 M HNO_3 feed and an 8 M HNO_3 - 1.5 M $NaNO_3$ concentrator solution in two eight-hour runs, logarithmic gamma decontamination factors of only 3.5 and 2.3 (bottoms/distillate) were obtained for acid residence times of 1.6 and 10 hours, respectively. The HW#4 Flowsheet calls for a logarithmic gamma decontamination factor of 5 under approximately these conditions with a residence time of 7 hours at a 10 tons U/day process rate. On addition of nitrogen dioxide to the nitric acid feed to suppress ruthenium volatilization, the logarithmic gamma decontamination factor increased significantly, reaching ca. 5.6 in 10 hours and remaining at about this level for an additional 14 hours of operation. In this run, the acid residence was 10 hours and the mole ratio of nitrogen dioxide to nitric acid used in the feed was 0.8. The effectiveness of nitrogen dioxide at lower consumption rates will be investigated.

The effect of nitrite concentration on the degradation of 30 percent TBP-Soltrol 170 was measured at 50 C. The aqueous phase initially contained 0.09 M UNH and 5.2 M HNO_3. The rate of solvent degradation was found to be directly proportional to the nitrite concentration. Further, the temperature coefficient of Purex solvent degradation has been determined for representative two phase systems; the rate of deterioration as measured by the "C" test was shown to increase a factor of two for every two to three-degree temperature rise.

Shell Diluent E-2342 in 30% TBP has been tested for stability to chemical attack and found to be intermediate between Shell Spray Base and Soltrol 170. No improvement was noted when the solvent was periodically stripped and washed.

At 25 C the radiation damage of 30% TBP-diluent mixtures (as indicated by "C" contact tests) was found to vary linearly with the logarithm of the dosage. The same relation was also found to depict the behavior of 30% TBP with Soltrol, Amsco, and Bayol-D diluents at 50 C when the chemical effect was subtracted out. A second similar relationship was found to be necessary for expressing the radiation damage of 30% TBP in Shell Spray Base at 50 C with the chemical effect subtracted out; greater damage being observed with this solvent. Radiation damage per se to Purex solvent should be insignificant under normal plant operation since the expected average lifetime of the solvent in the plant is approximately one-tenth the time required to build up significant deleterious effects.

Chloride ion will be present at five to ten ppm in the feed to the Purex acid recovery system (mainly from process water) and at 25 to 50 ppm in the vacuum fractionator feed. In general, 80 to 90 percent will appear in the fractionator overhead; thus, negligible recycle will occur via the recovered acid. Calculations of the chloride profile in the Purex acid fractionator show that with an overhead distillate of 0.01 M HNO_3, a 200 to 300-fold buildup of chloride will occur in the 15 to 20 percent nitric acid region. This buildup of chloride was shown to be relatively unaffected by variations in the reflux ratio from 0.03 to 0.20. A similar chloride buildup at the 35 to 40 percent plate can occur if the reflux ratio is about one-tenth. However, this second peak should not appear in the actual Purex fractionator because it is anticipated that the unit will operate with a 0.20 to 0.25 reflux ratio; the latter chloride buildup is particularly sensitive to the reflux ratio. The chloride buildup in either region could be reduced four to fivefold by taking 0.05 M HNO_3 overhead; however, this appears difficult with the Purex fractionator as it was designed for high nitric acid recovery.

REDOX

Discontinuation of permanganate head-end treatment to avoid ruthenium contamination difficulties will require substitution of some other ruthenium decontamination method to achieve desired product purity. A relatively simple possibility (for replacing the permanganate head-end's incremental log decontamination factor of 0.7 for the uranium stream) suggested by recent work at ORNL is treatment with nitrite between the first and second solvent extraction cycles. Results from nitrite treatment of full level F-1 solution indicate some improvement in ruthenium decontamination in the subsequent 2D-2E solvent extraction. Logarithmic ruthenium decontamination factors obtained using a simulated 2D-2E extraction-scrub-strip cycle were 1.9, 2.1, and 2.7 for an untreated control, a sodium nitrite treated solution, and a nitrogen dioxide treated solution, respectively. Sodium nitrite treatment consisted of heating for three hours at 85-100 C resulting in a final nitrite concentration of 0.04 M; five hours at 80-95 C was employed for the nitrogen dioxide treatment, resulting in a final nitrite concentration of 0.11 M. The effect of temperature and heating time will be studied further using nitrogen dioxide as the source of nitrite.

THOREX

The extractability of thorium into hexone is being investigated in behalf of establishing the feasibility of processing irradiated thorium in the Redox plant. Particular attention is being given to the development of a chemical flowsheet which provides for the maximum utilization of existing plant equipment. Using batch contactings, the distribution coefficient of thorium was determined over the concentration range of thorium nitrate from 0.01 to 1 M, aluminum nitrate from 0.8 to 2.25 M and acidity from + 2 M to 0.5 M deficient. Thorium extractability is generally low and decreases rapidly with decreasing aluminum nitrate and/or nitric acid concentration. Thus, thorium recovery by hexone extraction will probably require salting strengths in the range of 2 M ANN and acidities of 0.5 to 2 M. These conditions are very similar to those of the second plutonium cycle in the current Redox operation. Future plans include flowsheet development using batch countercurrent and Mini operation and determination of fission product distribution (in particular, ruthenium) under the required strong salting conditions.

The chemical stability of hexone in the presence of strongly salted, acidic, aqueous solutions is being investigated. Thus far, no catalytic effects or abnormal reactions have been encountered due to the present of 1) thorium ions or complexes, and 2) concentrated solutions of ANN and thorium nitrate having acidities up to 3 M HNO_3 and temperatures as high as 70 C. Hexone does, however, react with nitric acid at concentrations as low as 0.3 M (in the organic phase) when nitritas are present. These reactions are slow and the products removable by the Redox solvent recovery treatment. Furthermore, hydrazine may be employed to inhibit this reaction, if desired.

Secondary consideration has been given to TBP-hexone mixtures as an alternate solvent for a Thorex process. The hexone promises operability in the existing packed columns, and the TBP reduces the salting condition requirements; hence, solvent stability and fission product decontamination may be significantly improved. Hexone and TBP have been shown to be completely miscible. With 30% TBP-hexone solvent and salting with but 1 M ANN, thorium distribution ratios ranged from 6 at 0.1 M Th to 0.8 at 1 M Th and were not markedly affected by acidity (0 to 1 M). Further, no third phase formed under conditions which produce this objectionable phenomenon when using conventional aliphatic hydrocarbon diluents with TBP.

The radiation stability of hexone is not likely to be a problem if the Redox Plant should be converted to thorium processing. Two hexone samples which were irradiated to a dose of 1.5×10^7 R (58 watt-hour/liter) were not found to differ from unirradiated hexone (on the basis of coalescence time and uranium stripping tests). During the irradiation, one of the samples was contacted with an aqueous phase containing thorium nitrate, ANN, nitric acid, and a small amount of uranium. The other sample was irradiated in the absence of an aqueous phase.

Radiation-induced decomposition of manganese dioxide and its inhibition has been studied because of its importance in head-end protactinium removal. Coformed MnO_2 (0.06 M) precipitated from and in contact with 1 M Th - 1 M HNO_3 solution completely dissolved on exposure to 5×10^7 R in the pile basin, in good agreement with previous results on head-ended 3200 g/t - 90-day-cooled Thorex feed. Sulfamic acid (0.25 M) decreased the rate of dissolution by a factor of three. Urea, another nitrite suppressor, was less effective. Cupric, bromide, bromate and iodate ions provided very little protective effect.

ISOTOPE

Mass spectrographic analyses of samples taken during the thermal diffusion experiment using the uranyl nitrate-tributylphosphate complex have been completed. The data show that the approach to the equilibrium value of one percent enrichment of U-235 at the top of the column was much more rapid than anticipated; the rate of attainment of equilibrium was such that the relaxation time (time required to obtain approximately 62 percent of the equilibrium separation) was two days. Although the rapid approach to equilibrium significantly reduces the size of the separation plant, the required product inventory necessary for the attainment of any reasonable production rate is still enormous.

The second thermal diffusion run with acidified aqueous uranyl nitrate was terminated after 51 days of operation. No precipitation of uranium in the column occurred during this run, in contrast to the rapid plugging observed in the first run. At a production rate of 200 milligrams of uranium per day, the maximum enrichment of U-235 observed was 1.0032. This rate of production is equivalent to a residence time in the column of about 13 days.

An additional duplicate run on the separation of copper isotopes by electromigration in fused salt was completed. Isotopic analyses made by neutron activation of Cu-63 indicated an approximate five percent depletion of this isotope in the interface sample. This run was made using a 300 milliampere electrolysis current over a period of 61 hours. Further analytical data is being obtained on this and a previous run. Laboratory facilities are near completion for plutonium isotope separations work using the electromigration technique.

The distribution of Pu(III) between Dowex 50 ion exchange resin and sodium tartrate buffer solutions has been determined. This investigation is being made to set conditions for operation of an ion exchange experiment in the separation of plutonium isotopes. The optimum condition for such separation

FLUREX PROCESS

Construction and installation of an enlarged experimental electrolytic cell for investigation of the Flurex process was completed. The shakedown run yielded approximately one kilogram of product (KUF_5) in one and one-half days' operation. Operation during this run was at 0.15 amperes per square inch of cathode area; the current efficiency was not measured during the run. The operating voltage was nine volts, of which six to seven represent the resistance drop in the cell. This indicates about a 25 percent power efficiency which is comparable with other electrolytic processes. Although the data from this run indicate a uranium processing capacity of about 8 lbs U/sq ft-day, it is anticipated that by appropriate cell redesign, the production capacity could be increased to ca. 25-40 lbs U/sq ft-day. The uranium double salt produced in the experimental cell will be used for a series of metal reduction experiments.

ANALYTICAL DEVELOPMENT

The development of a spectrographic method of water analysis using an ion exchange method for concentration of impurities in water was continued. In the spectrographic work, excitation methods were studied, and the copper spark yielded much better sensitivity than a porous cup electrode. A graphite electrode method, although not quite as sensitive as the copper spark, is being studied further because of some advantages inherent in electrode preparation. In the ion exchange studies, ten common elements were studied in concentrations in water comparable to pile and process water. Using 10 percent citric acid for elution, which proved to be the optimum concentration, all of the elements are removed from the ion exchange column within a five milliliter band, and thereby concentration factors of at least 1000 are possible. Coupled with copper spark spectrographic analysis, this method lends itself to rapid and very sensitive analysis when a large number of constituents of a given sample are desired. Quantitative evaluation is continuing.

A new, high resolution spectrograph with an Ebert mounting was studied and compared with the Echelle spectrograph during a recent business trip. As a consequence of our interest in such an instrument for uranium isotopic analysis and for thorium, uranium, and zirconium in the presence of each other, arrangements have been made with the manufacturer for some test spectrograms on an Ebert spectrograph with Hanford standard samples.

In order to set up spectrographic methods for the analysis of thorium, as required to support Thorex and other thorium process activities, high purity thorium is needed for the preparation of standards. The purification of thorium for this purpose is being attempted by peroxide precipitation and by ion exchange methods. Single attempts to obtain purification by solvent extraction and by crystallization of the nitrate were unsuccessful.

In the study of uranium fluorimetry, the factors affecting sample preparation have been carefully evaluated. Fusion of the sodium fluoride pellets with a gas flame under carefully controlled fusion and annealing conditions is the most generally satisfactory method considering sensitivity, ease of dish cleaning, and cost of equipment. The cleaning of the platinum dishes is an important and time consuming step. The most complete and rapid removal of uranium from contaminated dishes has been accomplished by supplementing acid digestion with a 15-minute fusion of sodium fluoride in the dish. Using the techniques mentioned above, a limit of detection of about 10^{-11} g of uranium was accomplished, and the precision at 5×10^{-10} g was better than ±30 percent.

Research on methods for determining free acid in thorium nitrate solutions resulted in the conclusion that such solutions can be grouped generally as low acid (below 0.2 M) and high acid. The former are most accurately analyzed for free acid by the conductimetric method mentioned previously. This method will be supplied to the Analytical Laboratories. The high acid solutions can be titrated directly by the oxalate complexing method. For process control, the more rapid, though less precise, pH method would probably be preferred.

The fluoride complexing, conductimetric titration method for acid mentioned above was applied to aluminum nitrate solutions with success. Although more time consuming than the methods presently used at HAPO, it is more precise at very low acidities and is valuable as a referee method.

In order to resolve a question of bias between the vendor and HAPO on the acid deficiency value reported on essential material 72 percent aluminum nitrate, seven of such samples were analyzed both by the HAPO pH method and by the vendor's fluoride complexing method. In addition, one sample was analyzed by the above conductimetric method. All results were in good agreement, and no reason for discrepancy was found.

A standard sample of known and slightly depleted uranium-235 content was submitted to the 325 Building Analytical Laboratory. The average of six values was not significantly different from the assigned value. In addition, the analytical precision for the routine uranium isotopic determinations during the past two months was found to be approximately ±0.06 percent (σ). Two standard samples of uranyl nitrate solution were submitted to the Redox control laboratory in a cooperative study with Manufacturing personnel, and a total of ten determinations were made by x-ray absorption. A slight bias (-0.3 percent) in the instrument calibration was discovered, and an additional error in sample dilution is suspected.

IN-LINE ANALYSIS

The testing and repair of samplers and associated in-line analytical instrumentation in the Hot Semi-Works continued throughout the month. One tank sampler and six line samplers are not yet functioning satisfactorily. The line sampler systems require modification, chiefly by the addition of a small

reservoir in the process line, in order to provide sufficient sample for the gamma monitors; design of the modifications is under way. The uranium photometer consoles are operating properly, and two of the sensing units were checked out on-the-line. The remaining four sensing units have been checked electrically, but on-line testing will be delayed until the sampler system modifications have been made. One sensing unit failed in test and was replaced. Both pH units were placed in service during the month, and the uranium polarographs were tested electrically and will be checked on process samples as soon as the shielding modifications have been completed.

Laboratory tests of solenoid valves having thiokol rubber and irradiated polyethylene seats were made, and because of the very good results, installations on the Hot Semi-Works in-line analytical instruments are being made. The thiokol rubber functions well on clean, cold organic solutions, and the irradiated polyethylene serves on any process stream. The latter material supersedes polyethylene and teflon because of its greater elasticity and supersedes neoprene and other rubbers because of its chemical inertness.

Some in-line gamma monitor cells of polyethylene have been received from a vendor, and these are being assembled into cells for testing in the Hot Semi-Works. A set of 15 photomultiplier tubes purchased for gamma monitoring applications were returned to the vendor after they were tested and found to be of low quality. Four thulium sources which have been irradiated in the MTR have been received, and two have been used to make the gamma absorption photometer sensing units for the Hot Semi-Works and the Recuplex plant. The gamma intensity from each of these sources is about 50 rad/hr. Tests with uranyl nitrate solutions indicated that concentrations down to one gram per liter may be detected.

A high rate of failure of pH monitor probes in the Metal Recovery plant was investigated, and the main cause appears to be the quality of the Scotchcast used in fabrication. The present lot of Scotchcast has a somewhat higher cubical expansion during setting than previously experienced, and breakage of components or leakage around electrodes is occurring. The same problem has also been encountered recently with polarograph probes. To provide an immediate solution to the problem, some modifications in probe design have been made, and the Scotchcast parts have been eliminated. A few used pH probes obtained from the Metal Recovery plant for diagnosis after apparent failure have been inspected, and a few such failures have been simulated in the laboratory to assist in understanding the problem.

In the work with the Savannah River Plant oxygen analyzer for pile gas mentioned last month, it has been possible to substitute potassium bicarbonate for potassium hydroxide as the electrolyte and obtain adequate sensitivity. The cell is, therefore, applicable to gas streams containing carbon dioxide. The analyzer will cover at least the range of zero to 0.3 volume percent oxygen in pile gas, and a precision of ±5 percent is expected if a reasonably constant flow rate and temperature are maintained.

Other design and development activities included experiments with three prototype chambers for a gas scintillation fission counter; tests of a source enclosure for the spectrographic analysis of radioactive samples; design assistance was given in the fabrication of an x-ray photometer for the Purex laboratory; and a prototype of a miniature gamma ray detector was made and tested, yielding results which indicate usefulness down to 100 and possibly 10 mrad per hour intensities.

LABORATORY SERVICES

Activities of Laboratory Services for the month of March may be summarized as follows:

One million gallons of "retention" level waste was processed to ground in the 300 Area.

Seventy thousand gallons of "cribbing" level waste was transported to 200-W Area for discharge to 200 SL cribs. Average gross plutonium analysis was 2.0×10^{-4} uc/ml. Average gross beta analysis was 2.1×10^{-2} uc/ml.

A decrease in the pumping capacity during loading of the crib waste trailer has been noted in recent months. The pump was adjusted with resulting improvement in pumping capacity of about five percent. Since the pump is a critical bottleneck in the crib waste system, a new pump was ordered to be available as a replacement standby.

Crib waste trailers are being modified to provide a 3" flanged riser on the top of the trailer to allow a hose connection for water flushing. Radiation buildup has reached a point where occasional flushing appears necessary to keep the readings within acceptable limits.

Three slug cut-off "gunk-catchers" and four cell trap filters from the Radiometallurgy Building were concreted at the 300 North burial ground. Survey readings in these units were about 500 rads/hr at six inches.

All other decontamination, laundry and building service functions were completed in a routine manner.

CONTACT ENGINEERING UNIT

Purex Chemical Flowsheet HW No. 4 for increased Purex Plant capacity was issued for Design Section review. This flowsheet makes certain modifications to process flow streams to achieve an instantaneous capacity of 21 to 25 tons of uranium per day without major alterations to the Purex equipment.

Specifications for new Purex 1BX and 10 pulse column intervals to meet the increased capacity of the HW No. 4 Flowsheet were issued for Design and Project Section action.

[redacted]

ANALYTICAL LABORATORIES,

General Chemical Laboratory

Major effort consisted of support rendered the 300 Area UO_3 pilot plant operation. Product assays by X-ray absorption and U_3O_8 gravimetry differed by less than 0.1%.

Ether extraction of iron improved the accuracy of colorimetric chromium determination in concentrated, inactive Purex waste.

Sodium, potassium, and phosphorous were determined in a variety of biological tissues.

Radiochemical Laboratory

To gamma count liquid samples, a well type scintillation counter was assembled and operated. A NaI (Tl) crystal was used with a 1.7 cm diam well 4 cm deep. Performance was compared to that of present type plant scintillation counters routinely requiring dried counting specimens. The use of a 900mg Pb/cm^2 absorber (in the form of a thimble) and a 0.07 Mev threshhold indicated adequate beta discrimination and, compared to present counters, a change (increase) in counting yield essentially independent of gamma energy-at least for materials of separations importance. The latter condition permits ready conversion of gross gamma measurements to equivalent readings on present type counters. The ability to gamma count liquids immediately permits the following improvements:

1. Six-fold sensitivity increase.

2. Accuracy increase (no possible ruthenium and iodine losses and no creeping of organic materials as sometimes occur when drying is required).

3. Labor economy in sample preparation.

Half the month's effort consisted of U-, UX-, HNO_3-, cold K tracer-, and miscellaneous determinations in support of cold Hot Semiworks runs. High level TBP was assayed by the HW-34141 flame photometric method. Application of flame photometry is comtemplated for determining TBP in aqueous streams.

Direct colorimetric nitrite determination was inaccurate for the $\frac{U}{NO_2^-}$ greater than 4 condition. Uranium interference was avoided by application of customary methyl nitrite volatilization.

As a part of measuring U-235 burnup due to fission in ANP fuel element, adequate uranium leaching and no steel or nichrome leaching was accomplished by a two-hour 10% HNO_3 boil.

Spectrochemical Laboratory

As parts of the enclosed arc-spark source for "Hot" work, the optical bench was completed and the source was mounted. Shielding construction and contingent operations are incomplete.

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[redacted]

Mass Spectrometer Laboratory

The General Electric Mass Spectrometer operated and carried the Consolidated-Nier sample load preparatory to moving that instrument to 325 Building.

During the past six months the large Consolidated-Nier spectrometer was utilized to perform duplicate weight % U-235 determinations on 119 natural uranium standards. Precision was ± 0.0011 95% CL. Improved operation over the past two months was demonstrated by a ± 0.0008 precision 95% CL for the final 36 standards.

Water Quality Laboratory

Building 1706-KE laboratory facilities status is unchanged.

Work volume statistics for the Analytical Laboratories Unit is as follows:

	February		March	
	Number of Samples	Number of Determinations	Number of Samples	Number of Determinations
Research and Development				
Pile Technology				
Metallurgy Research	54	426	56	782
Pile Materials	300	1494	148	1032
Fuel Technology	89	1781	26	500
Physics Research	----	----	2	84
Separations Technology				
Chemical Research	810	1252	212	363
Chemical Development	339	401	528	2015
Plant Processes	86	113	17	26
Process Technology	441	1412	354	815
Customers	78	589	128	482
Totals	2197	7468	1471	6099

TECHNICAL SHOPS UNIT -

Mechanical Shops

The consolidation of the Instrument Machine Shop and the Electronic Construction Shop with the Technical Shops is proceeding as scheduled. The physical combining of the machine shops will take place April 4 with the Electronic Shop scheduled to move May 1.

The experimental machining facilities formerly located in the 3730 Building are in full operation in the 306 Building (Fuel Element Pilot Plant). The shop layout was well planned and with the new equipment provides a distinct contrast with the crowded conditions and inadequate equipment experienced in the 3730 Building. Increased productivity as well as a boost in personnel morale is very evident.

Buildings and Grounds

Technology Sections Landlord

The cost distribution system for maintenance of common laboratory facilities and utilities was reviewed and a simplified method adopted based on occupancy studies compiled by the Buildings and Grounds Engineer.

Contact Engineering

Reasonable progress is being made on Project CG-576 (Laboratory Area Improvements). The design work is essentially complete on all phases and construction work is proceeding satisfactorily.

General

The Buildings and Grounds Engineer is assisting in compiling a prospectus of the Technology Sections contributions to a catalog of equipment used in radiation laboratories. This catalog is being sponsored by the A.E.C. on a nation wide basis and is intended to disseminate information to avoid duplication in the design and development of hot laboratory equipment.

Drafting and Design

Total productive man-hours for the month was 2280 with an estimated backlog of 280 man-hours. Major design jobs for the month were as follows: Shield Equipment for Snout Assembly - (4) Stage Vibration Test - Automatic Roll Type Conveyor-PU Gamma Photometer - Rear Assembly P.C.T.R. - P.C.T.R. Rear Face Elevation and Details - Double Crystal Neutron Spectrometer.

Personnel requisitions for two drafting trainees were sent tc the Employment Unit for processing.

Glass Shop

Total productive man-hours for the month was 1256 with practically no existing backlog. A total of 142 jobs were completed with no major or outstanding jobs being encountered.

Photo Laboratory

Work requests received from the Technology Sections were as follows:

	Orders	No. of Negatives	No. of Prints
Pile Technology	61	443	5688
Separations Technology	7	23	286

Using the standard rates for photography work which will be adopted April 1, 1955 the Technology Sections would have incurred costs of $4,279.70.

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)

None

R. B. Richards

Manager, Separations Technology
ENGINEERING DEPARTMENT

RB Richards:khs

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MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

C. S. Slenning of Minneapolis-Honeywell Regulator Company, Richland, Washington visited Hanford March 1st and 2nd to perform instrument modification work on Brown Instruments.

D. R. Norman of Panellit, Incorporated, Skokie, Illinois visited Hanford March 10th through 17th to calibrate temperature monitor system and inspect pressure monitor gage instruments.

Alden Webber of the Bristol Company, Seattle, Washington visited Hanford March 21, 1955 to assist in the modification of the strip chart recorder.

J. H. Clawson of the General Electric Company, Medium Induction Motor Department, Schenectady, New York visited Hanford March 21, 1955 to discuss new developments in motor insulated materials.

T. A. Carter of the General Electric Company, Seattle, Washington visited Hanford March 21, 1955 to discuss developments in motor insulated materials.

C. W. Newman and C. M. Hotes of the Vickers Company, Seattle, Washington visited Hanford March 23, 1955 to discuss hydraulic applications.

W. L. Pearl visited the Dorr-Oliver Company, Stanford, Connecticut on March 1, 1955 to discuss cyclone separaters; and on March 30th and April 1st visited General Electric Company, Schenectady, New York to attend carbon steel meeting.

E. J. Barrett visited the Bonneville Power Administration, Portland, Oregon on March 4, 1955 to discuss transmission tower design for 230 KV system.

R. F. Corlett visited the Pacific Oerlikon Company, Tacoma, Washington on March 8th through 10th to discuss resistance temperature detector program.

J. W. Kolb visited the Thomas A. Edison Company, Orange, New Jersey on March 16, 1955 to approve thermometer bulbs for temperature monitoring system.

J. D. Fogelquist visited Panellit, Incorporated, Skokie, Illinois on March 16th through 18th to inspect pressure monitor gages.

W. A. Richards visited the Thomas A. Edison Company, West Orange, New Jersey to approve proposed temperature element drawings; Simplex Valve & Meter Company, Lancaster, Pennsylvania for consultation on filter plant equipment; Minneapolis-Honeywell, Brown Division, Philadelphia, Pennsylvania for consultation on segmental recorders; and the Bailey Meter Company, Cleveland, Ohio for consultation on power calculator, from March 16th through March 23rd.

G. L. Locke attended the annual meeting of AIChE - ASME, Louisville, Kentucky on March 20th through 23rd.

Design Section

B. J. Beaty visited General Electric Company, Aircraft Nuclear Propulsion Department, Cincinnati, Ohio on March 21st through 24th to interview for transfer.

L. M. Finch visited the Blaw-Knox Construction Company, Buffalo, New York; Allis Chalmers Company, Milwaukee, Wisconsin; and Struthers-Wells Company, Warren, Pennsylvania on March 24th through 30th to obtain data for the design and fabrication of a continuous type calciner.

W. P. Ingalls visited the Allis-Chalmers Company, Milwaukee, Wisconsin; the Blaw-Knox Construction Company, Buffalo, New York; and the Struthers-Wells Company, Warren, Pennsylvania on March 25th, 28th and 29th respectively, for consultation on fabrication of continuous calciners.

G. R. Hosack visited the Illinois Institute of Technology, Chicago, Illinois on March 30th to April 1st to attend the American Power Conference.

ORGANIZATION AND PERSONNEL

Personnel Statistics:	February 28			March 31		
	Exempt	Non-Exempt	Total	Exempt	Non-Exempt	Total
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	71	14	85	71	12	83
Design Planning Unit	16	12	28	16	14	30
Design Engineering Sub-Section	85	12	97	85	12	97
Design Drafting Unit	8	85	93	8	84	92
Total Section Personnel	182	124	306	182	123	305
Technical Graduates (Rotational)	-	5	5	-	5	5
Total	182	129	311	182	128	310

Accessions - 3
Separations - 3

GENERAL

Design Section engineering and drafting effort for March was distributed approximately as follows:

	Engineering Man Months Expended	Drafting Man Months Expended	% of Section Effort
1952 Hanford Expansion Program	34.7	13.9	19
Reactor Plant Modification for Increased Production	22.0	19.8	16
4X Program	22.0	14.6	14
Design Development	58.7	13.4	28.5
Other Projects and Design Orders	33.2	26.1	22.5
	170.6*	87.8*	100.0

*Equivalent man months expended includes 6.6 months of engineering and 0.2 months of drafting overtime, which represents approximately 8.5% 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.

The Design Drafting Unit production for March was 172 new drawings and 518 drawing revisions for an equivalent of 6.5 man days per drawing.

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DESIGN DEVELOPMENT

Statistics:

The total number of engineering and drafting man months applied to design development activities during March were as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
Metallurgical Design Development	2.2	3.7	0.1	0.7
Reactor Plant Design Development	27.8	47.4	6.2	46.3
Separations Plant Design Development	25.3	43.1	4.8	35.8
Chemical Processing and Reduction Design Development	1.4	2.4	1.4	10.5
234-5 Design Development	2.0	3.4	0.9	6.7
	58.7	100.0	13.4	100.0

Metallurgical Design Development

Further work was accomplished on preliminary studies for the automatic processing of fuel elements by the point closure method. A review has been made of vendor bids for a high speed automatic sizing and closing press required for a prototype point closure fuel element preparation unit.

Limited progress was achieved during March on the problem of excessive noise associated with the 313 Building semi-automatic cut-off machine. Study of methods for industrial noise level reduction continued.

Reactor Design Development

A draft was completed formulating plans for an extended experimental test program conducted with high density concrete exposed to temperature cycles. It is proposed to determine the physical behavior of various types of high density concrete subjected to temperatures in the range 100°C to 350°C.

Studies were conducted on several alternate zone temperature monitoring systems for existing reactors. Factors evaluated included degree of protection provided, potential production gains, procurement and installation time, and capital cost.

The study of reactor disaster safety systems was completed during March. Preliminary scope and cost estimates were prepared for the following alternate emergency cooling systems; graphite wetting; massive wall; frangible wall with graphite wetting; and swimming pool.

A development program was initiated for improved reactor process inlet tube connectors on the 100-K reactors. Procurement of prototype connectors for testing was started.

Work continued on the preparation of preliminary design scope for continuous charge-discharge facilities.

An interim report was completed for protective coating test for 105 Building effluent lines and for 100 Area retention basins. Based on tests conducted Neoprene 100 and Emjay Kolmetal show promise for protective coating applicat

Mechanical development studies active during the month included: process tube flow monitoring; underwater slug examination facility; and ruptured slug detection.

Separations Plant Design Development

Preliminary scope was completed for a proposed Purex Plant capacity expansion to 2.75 times instantaneous design rate based on Purex Chemical Flowsheet HW #4. This work provided the basis for a request to A.E.C. for authorization of design and procurement funds for increasing the capacity of the Purex Plant. To achieve the 2.75 capacity factor requires process equipment changes including 1 O and 1 BX Column internals, 18 canyon jumpers, miscellaneous cold side piping and instrumentation changes.

Thorex separations studies which evaluated several alternate building and equipment arrangements and process flow sheets were completed during March. These studies were directed toward establishing preliminary scope for a minimum separations plant which included only essential facilities and excluded high cost equipment and construction features.

Tests were completed with the mock-up facilities for the proposed Redox Canyon ventilation system. The downward air flow velocities required to eliminate thermal drafts from opened cells was found to be outside the limits of practical ventilation capacities. Further study will be given to alternate methods of canyon ventilation.

A study was initiated to review the need for improved iodine removal facilities in existing separations plants.

Mechanical development studies in progress during March included column interface monitor, centrifuge wobble meter, and ultrasonic decontamination of separations tools and equipment.

Work was started on a development program to provide improved metal liners for underground waste storage tanks. Installation of test units of various metals will be made in Redox and Purex waste storage tanks.

Chemical Processing and Reduction Design Development

Testing of the vertical, replacement type, Task II furnace continued throughout the month. All mechanical debugging was satisfactorily completed and several heat cycles were run.

Preliminary designs were completed for the adaptation of vibrating tube continuous fluorination equipment and continuous filtration equipment to existing Task I and Task III equipment. Because of the large space requirements for the vibrating tubes, the feasibility of a spiral feeder-type furnace is under consideration.

234-5 Design Development

Preliminary scope design was started on a permanent mold casting process as a replacement for the present Task IV casting operation.

Development work for remote final shape machining is continuing.

Engineering Standards & Materials Development

Cost to date for development of engineering standards for the current fiscal year is $61,089.

The following standards were completed and issued during the month:

D-1-20 15 AMP - 120 V Receptacle Plant Building
D-1-21 15 AMP - 120 V Receptacle Clock Outlet
D-1-22 15 AMP - 120 V Receptacle Existing Plant Buildings
D-1-23 15 AMP - 120 V Receptacle Cord in Tension
D-1-24 15 AMP - 120 V Receptacle Instrumentation
D-1-35 20 AMP - 120 V Receptacle Plant Buildings
D-1-40 15 AMP - 240 V Receptacle Plant Buildings
D-1-45 20 AMP - 240 V Receptacle Plant Buildings
D-1-46 20 AMP - 240 V Receptacle Plant Buildings - Bus Heaters
D-1-50 50 AMP - 240 V Receptacle Plant Buildings
D-1-51 60 AMP - 120/240 V Receptacle Plant Buildings
D-1-60 20 AMP - 480 V Receptacle Shop Buildings
D-1-70 30 AMP - 480 V Receptacle Shop Buildings
D-1-90 Sound Powered Telephone Receptacle
D-1-91 Telephone - Plant System
HWS-8000-S - Motor Control Centers - 600 Volts and Less, Revision 1

Status on progress of standards and studies during the month is as follows:

a. Basic work continued on process specifications for jumpers fabricated on site, non-code vessels fabricated on site, off-site fabrication of non-code Class I vessels, and replacement agitators and pumps for 200 Area.

b. A report was completed summarizing results of tests conducted with concrete anchors for guying poles.

c. A study is in progress to determine if plastic flow markers are economical for use in designating plant floor areas.

DESIGN PROJECTS

Statistics:

Engineering and drafting effort of the Section on projects for the month of March was as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
1952 Hanford Expansion Program	34.7	31.0	13.9	18.7
4X Program	22.0	19.7	14.6	19.6
Reactor Plant Modification for Increased Production	22.0	19.7	19.8	26.6
Other Design Projects	17.9	15.9	12.8	17.2
Miscellaneous Design Orders	15.3	13.7	13.3	17.9
	111.9	100.0	74.4	100.0

CA-512 - 100-K Area Facilities

Design personnel were assigned to the 100-K reactors on a three shift basis during March to provide design assistance in support of start-up. Major effort included testing and overhauling of the temperature monitoring system. Work has started on the development of a new resistance thermometer for the temperature monitoring system. Modifications to the radiation type process monitor are progressing on schedule. As a result of revised calculations by the Pile Physics Unit, the purchase order for boron steel balls has been reduced to provide one-half of the 3X System with boron balls rather than complete replacement of the carbon steel balls. Start-up tests indicate that a mixed ball column will achieve the required inhour value specified by the design criteria.

The 100-K construction as-built program advanced to 76% complete.

Design for the 1706-KER Facility advanced to 94% complete. The revised design criteria and scope drawings were approved by the A.E.C. during March. Detailed design is essentially complete with the exception of electrical and instrument drawings.

The preliminary design scope for a gamma water monitor system for the 100-K reactors was issued for approval during March. Total project cost is estimated at $385,000.

CA-513 - Purex Separations Facility

Structural, electrical and hoist arrangement drawings for the Purex disposal tunnel were completed and issued for comment. Work is in progress on design for the water filled doors.

Design for the Purex tank farm condensate and cooling water crib was revised in accordance with approved scope.

CA-514 - 300 Area Expansion

Design activity was limited to miscellaneous revisions to 313 Building equipment layout drawings to incorporate latest vendor information on equipment design.

CA-539 - Additional Waste Storage Facilities

Design for Project Revision No. 5 has been completed and approved for Part A and B. Detailed design for Part C which includes special jumpers and shielding covers is in progress.

CA-546 - Fuel Element Pilot Plant

Design for the semiworks equipment for the Fuel Element Pilot Plant is approximately 18% complete and design for the equipment installation is 10% complete. Schedules for drawings, requisitions and acceptance test procedures were completed and issued for comment.

CG-551 - Expansion of 234-5 Building Facilities

Design activity is complete with the exception of design field services in support of construction.

CG-558 - Reactor Plant Modification for Increased Production

Total design advanced to 69.5% complete, an increase of 6% during March. Design scope is complete and detailed design 64% complete.

Design for the 190-B and 190-D Annex Buildings was completed in sufficient detail to award lump sum contracts for construction, including placing of equipment. Design for the other 190 Buildings is progressing on schedule and is nearing completion.

The detailed design for the 183 Buildings (Filter Plant) is well advanced and design for the 181 Buildings (River Pump House) is essentially complete with the exception of F and H Areas.

Further progress was made during the month on the 105 Buildings, 151 Sub-Stations, and the effluent water systems.

CG-578 - Effluent Water Monitoring Improvements, 100-D, B, DR, F and H Areas

Detailed design advanced to 98% complete. All plans and specifications for the project were completed and the preparation of acceptance test procedures is essentially complete. The first prototype monitoring unit was delivered by the vendor and is undergoing test.

CG-579 - Effluent Water Monitoring Improvements, 100-C Area

Detailed design increased to 64% complete, an advance of 12%. A total of 26 drawings are scheduled for this project, of which 17 have been approved and nine are issued for comment.

CA-586 - First Capacity Increase - 230 KV System

Detailed design for additions to the 230 KV System advanced to 23% complete. Plans and profiles for the transmission line were completed and tower sizes and locations determined. Preparation of specifications for the transmission towers is in progress.

CG-598 - Purex Vacuum Fractionator

General Electric design proceeded on a priority basis during March following receipt of the vendor design for the fractionator. Detailed design for the 202-A Building modifications, acid fractionator building addition, and associated outside facilities is 30% complete. A revised drawing schedule including 63 required construction drawings was completed and issued.

CG-599 - 4X Program - 100 Areas

Design scope is 97% complete and detailed design advanced to 80% complete, an increase of 15% during the month. Procurement has started for 600 stainless steel buckets and one cask car.

CG-600 - 100-C Alterations

Detailed design advanced 11% during March to 83% complete. Revision of the present design scope for the project is under consideration to include provisions for new pumps to replace the present process water pumps in 190-C.

CG-603 - Hanford 4X Program - Bismuth Phosphate Plants

Design scope is essentially complete and detailed design reached 90% complete in March. Scope design was revised to reflect the reduced project scope based on revised production schedules and requirements. Approximately 24 drawings were cancelled this change and revised drawing schedules were issued based on 210 required drawings. Thirty-four drawings were completed during the month with a total of 183 drawings completed to date.

CG-613 - Hanford 4X Program - Metal Conversion Plant

Design scope reached 98% complete and detailed design advanced on schedule to 21% complete. Design of the 224-U Building modifications is well advanced with architectural, ventilation and piping drawings for cell modification issued for comment. Detailed drawings were started for Building 224-UA (new annex). Preliminary equipment arrangements, material handling layouts, and ventilation schematics were prepared. Work has been initiated on the selection of a vendor for the design of the continuous calciners and drives. Design criteria for the calciners is in progress but will not be issued until comments have been obtained from the vendor.

CG-614 - Hanford 4X Program - 300 Area

Design scope is 100% complete. Detailed design advanced to 63% complete based on 60 new and revised drawings.

CG-616 - Installation of Acid Feed Equipment, 100-B, C, D, DR, F and H Areas

Design activity was limited to the preparation of scope and preliminary design pending authorization of detailed design. Preparation of the project proposal is essentially complete.

CG-617 - Additional Air Drying Facilities - Building 234-5

Design has started on three required drawings. Procurement is in progress for the engineered equipment.

CG-621 - Redox Contamination Control Facilities

Design for In-Cell Ozonization is 10% complete. Drawings for the critical items, including ozone equipment installation, modifications to Tank 124 and to Tower 124, were issued. A project proposal was completed during the month which requests funds for design and procurement and installation of: 1) In-Cell Ozonization, 2) Pre-condenser for the J-6 vent filter, 3) centrifuge cover, 4) replacement of contaminated equipment. Design funds for canyon clean-up facilities were also requested.

A drawing schedule based on 28 required drawings and the engineered equipment list were prepared and issued.

CG-625 - Additional Waste Storage Facilities - 200 Area

Authorization was received from the AEC late in the month for the design of additional waste storage facilities in 200 Area. Design was initiated for Phase I to include an eight tank farm addition to the existing 241-SX Tank Farm. The design authorization provides for an additional tank farm unit of 8 tanks (Phase II).

D. O. 100757 - "As-Built" Area Maps

Design drafting for the revisions to HAPO Project Maps advanced to 88% complete. A total of 327 drawings have been started including 74 electrical drawings.

D. O. 100946 - Foxboro Dewcel Moisture Monitoring System (CG-583)

Detailed design of a moisture detection system for existing reactors advanced 5% to 90% complete. All required drawings have been issued for comment.

D. O. 101036 - Moisture Monitoring System, 105-C Building (CG-584)

Design for the installation of the Foxboro dewcells for 105-C was inactive during the month. Status remained at 85% complete.

D. O. 101045 - Discharge Area Television Viewer, 105-B Building (CG-593)

Vendor drawings for the closed circuit television chain were received for approval. Vendor drawings for the monorail equipment and controls were reviewed and returned to the vendor for correction. Design status is 60% complete.

D. O. 101062 - Nitric Acid Decontamination Facility, 100 Areas

The project proposal was prepared and issued for comment.

D. O. 101063 - Alum-Activated Silica Water Treatment Facility, Phase II

Design scope was completed and the preparation of a project proposal started. The proposal is scheduled for submission to the AEC in May.

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 and submitted to Management for review.

D. O. 101153 - Redox Railroad Tunnel Covers - Project Proposal

The project proposal was completed and forwarded to the AEC for approval on March 21, 1955.

D. O. 101190 - Irradiation Test Facility - HTRE Fuel Tests

The preparation of the engineering feasibility report for the ANP gas-cooled test facility was curtailed during the month pending receipt of additional authorized funds.

D. O. 101195 - Replacement of Existing 313 Building Roof (CG-610)

Design for this work is 80% complete. Drawings are being prepared for the replacement of a section of 313 Building wooden roof with a steel deck.

D. O. 101212 - Classified Scrap Disposal

This design involves installation of a paper pulper in the 300 Area Library for the disposal of classified scrap. Design is 25% complete.

Design Section

D. O. 101218 - General Improvements to Laboratory Area Buildings (CG-576)

Detailed design advanced to 80% complete.

D. O. 101244 - TBP Plant Cell Conversion

Preliminary design has started on concentrator revisions in the 221-U Building.

D. O. 101249 - Gage for MEF Slug Breaker, 105-C

Design was started for the installation of a transducer on the slug breaker for metal examination facilities at 105-C.

D. O. 101283 - Building 327 - Cell for Tensile Testing Machine

Design was started on the preparation of three drawings for the installation of a shielded cave in the Radio-Metallurgy Building.

D. O. 101298 - Chute Liner Replacement

Design is progressing on replacement of the chute liners in 105-B, D and F. Three required drawings are scheduled for completion in April.

D. O. 101230 - Irradiation Facility - WAPD Fuel Test Program

Preparation of the engineering feasibility report for the installation of a pressurized water cooled test facility for the Westinghouse Atomic Power Division continued. Issue of study document is scheduled for early in April.

Design Work Completed During March

D. O. 101114	440 Volt Sub-Station - 189-D
D. O. 101118	Product Unloading & Recovered Acid Loading Facility - 200-W
D. O. 101126	Laboratory & Instrument Shop - 105-KW
D. O. 101146	Mechanical Drafting Services (CG-609)
D. O. 101148	Dissolvers for Recuplex Installation
D. O. 101149	Modifications of Disengaging Sections - Recuplex
D. O. 101183	Remote C Clamp - 202-S Building
D. O. 101194	T Plant Bucket Design
D. O. 101206	Rehabilitation of the 105-KW Unit
D. O. 101214	Redox Plant - Revisions to 191 Tank Lines
D. O. 101216	Redox Plant - Gasket & Gauge Ring Design
D. O. 101221	TBP Plant - Concentrator Seal
D. O. 101222	Redox Plant - Pump Arrangement
D. O. 101224	Mock-Up Shop - 200 Area
D. O. 101225	Instrument Analysis & Development - Reactor
D. O. 101233	Redox Plant - Sealing Container for H-4 Tower
D. O. 101234	Redox Plant - Gasket Design
D. O. 101252	Redox Plant - Modification of Stack Flush System
D. O. 101271	T Plant - Design for Liquid Level Connector
D. O. 101273	321 Building - Fire Protection & Staging Study
D. O. 101274	Building for Physical Constants Test Reactor
D. O. 101281	Layout of Particle Sampler Test Assembly
D. O. 101308	Roof Repair 1171 Building

INVENTIONS

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

P 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	Apr.	May	Jun.	Jul.	Aug.	Sep.	Bal. of FY 1956 & Later	Total
1952 Exp. Program*	58.9	20	16.3	23.5	62.6	13	11	9	7	6	5	11.6	62.6
CG-558 & CG-600	18.9		3.7	5.3	15.2	3	2	2	2	2	2	2.2	15.2
4X Program	32.5		2.0	2.9	30.5	2	2	2	2	2	2	18.5	30.5
Reactor Design Develop.	116.5		20.6	29.7	95.9	22	22	22	23	23	23	243***	378.0
Sep. Design Development	69.4		17.5	25.2	51.9	18	19	19	20	20	20	180***	296.0
Met. Design Development	6.1		1.7	2.4	4.4	2	2	2	2	2	2	24***	36.0
234-5 Design Develop.	11.5		1.1	1.6	10.4	1	1	1	1	1	1	15***	21.0
Weapons Design Develop.	5.3		.7	1.0	4.6	1	1	1	1	1	1	9***	15.0
Other Proj. & Misc.	17.2	10	5.8	8.4	21.4	7	6	6	5	5	5	45**	81.4
Ant. Future Work							3	6	7	8	9	98	131.0
Totals		30	69.4	100.0		69	69	70	70	70	70	646.3	985.3

DESIGN ENGINEERING SUB-SECTION

1952 Exp. Program*	95.9		16.6	20.5	79.3	13	11	9	7	6	5	28.3	79.3
CG-558 & CG-600	223.3		16.7	20.6	206.6	16	16	16	16	16	16	110.6	206.6
CG-578 & 579	8.9		.8	1.0	8.1	1	1	1	1	1	-	3.1	8.1
CG-586	17.0		1.2	1.5	15.8	2	3	2	2	2	2	2.8	15.8
CG-598	22.2		2.8	3.5	19.4	4	4	3	3	2	1	2.4	19.4
CG-621	17.0		1.6	2.0	15.4	3	3	3	2	1	1	2.4	15.4
CG-625		47			47.0	4	7	7	4	5	6	14.0	47.0
4X Program	79.9		17.5	21.5	62.4	15	12	11	9	7	5	5.4	62.4
Design Develop. Program	51.3		12.3	15.2	39.0	12	12	13	13	14	14	127***	205.0
Other Maj.,Minor, Misc.	87.9		11.5	14.2	76.4	10	10	10	10	10	10	109.4**	169.4
Ant. Future Work						2	3	7	15	18	21	324	390.0
Totals			81.0	100.0		82	82	82	82	82	81	729.4	1218.4

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	174	50	224
Mechanical	267	130	397
Electrical	125	72	197
Instrument	194	100	294
Standards	68	38	106
Totals	828****	390	1218

*Includes 1706-KER Recirculation Facilities
**Includes Minor & Miscellaneous Work for FY 1956

MONTHLY NARRATIVE REPORT - MARCH, 1955

PROJECT SECTION

I. SUMMARY

A. ORGANIZATION AND PERSONNEL

Following is a summary of personnel changes in Project Section during the month:

	February 28, 1955	March 31, 1955	Net Change
Employees on Payroll	365	360	-5
Tech. Grad. - Rotational	1	3	+2

The end-of-month status involved these changes:

	Project Section	Tech. Grad. - Rotational
Payroll Additions	9	
Payroll Removals	5	
Transfers into Section	7	2
Transfers from Section	16	
Transfers within Section	3	

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	100%	100% *
CA-512	100-K Area Facilities (Excluding 1706-KER which has not been scheduled)	100	99.9
CA-513-A	Purex Facilities, Part "A"	100	98.6
CA-514	300 Area Expansion	74**	74**
CG-535	Redox Capacity Increase, Phase II	99	97
CG-539	Additional Waste Storage Facilities - Redox	87	87
CA-546	Fuel Element Pilot Plant	100***	54
CG-558	Reactor Plant Modifications	8	5
CA-603	Hanford 4X - Bismuth Phosphate Plants	12	16

* Project was complete, and is being closed out with exceptions April 1, 1955.
** Based on Revision #3 to the Project Proposal, approved by A.E.C. on March 31, 1955.
*** Based on original scope.

C. CRAFT LABOR

The machinists in Minor Construction shops caused a work stoppage by walkout at noon on March 16. This walkout occurred when the J. A. Jones Company refused demands of the machinists' business agent for an additional superintendent, foreman, tool crib attendant,

and apprentice machinist. Following extensive negotiations, and the assignment of the additional apprentice, the machinists returned to work on the morning of March 23.

D. SAFETY AND SECURITY

Seven regular meetings for discussions of safety, security, and health topics were attended by about 205 persons. Minor Construction forces attained a record on March 29, 1955 of 2,000,000 manhours without a lost-time injury. During the month, four Monday morning tool box meetings and four mass safety meetings were conducted in the field for service contractor personnel. Six special hazards orientations were given to 141 new and re-hired employees.

E. HIGHLIGHTS

Project Auxiliaries Sub-Section

Reproduction output increased to a total of 499,134 square feet as a result of large AEC orders on Reactor Modification Program and Hanford 4X Program. Engineering Files distributed 209,715 prints. Estimating completed 25 estimates, of which five were for project proposals. An analysis of project administration was made, including the use of more detailed estimates and interim estimates. Progress on property evaluation was good; Parts "C" and "D" of CA-513 were ready for publication, and Part "B" was about 90% complete. Five major histories are being prepared. Field Surveys Unit continued with assistance on the re-survey of Richland, and furnished survey and optical instrument services on six other requests. The manpower budget was reviewed to June 30, 1957.

Inspection Sub-Section

The workload for off-site inspection increased slightly, both in number and money value of orders. Evaluations under Corrosion Testing Program increased by about 35% to 165, and about 88% of the evaluations were made at the eastern (Lukens) laboratory. Inspection problems center on reactor equipment, particularly boron steel balls, resistance thermometers, and pressure monitoring gauges for 100-K Area; and process pumps and pump drives for the Reactor Modification Program. The monetary value of the 129 orders completed during the month was about $1,345,000, of the new orders assigned to inspectors about $1,460,000, and of total orders assigned about $11,330,000. The inspection supervisor of the Los Angeles Area was transferred to Richland, and that position was filled by the supervisor from the Pittsburgh-Akron Area. A new area was formed from Chicago, Akron, and Pittsburgh.

Minor Construction Sub-Section

The Sub-Section completed assigned work on 14 work orders. New work received consisted of 28 work orders and two project assignments. The current workload includes 13 project items and 23 work orders. Total authorized funds amounted to about $9,400,000, of which about $6,800,000 has been expended or committed. Upon the basis of recent decisions, the "contract number" of employees is based upon the number of manual employees present for work. This average for March, 1955 was 908. Minor Construction Sub-Section has been assigned custodial and administrative responsibility for the stainless steel inventory held by Blaw-Knox. This steel will be transferred at acquisition cost, less a reserve of 80%.

Project Engineering Sub-Section

Work was done on 43 projects, two informal requests, and miscellaneous engineering requests. The Sub-Section completed assigned work on CA-532, FY 1954 Water Tank Replacements; CA-544,

Electrical Utility Headquarters; and ER A-2749, Sheltered Welding Manifolds - 200 Areas. Initial work was accepted on CA-625, Additional Waste Disposal Facilities - 200 Area; and six engineering requests. Work was done on the following major projects; Recuplex, Activate Task I - RMA Line, 300 Area Expansion Program, Fuel Element Pilot Plant, Reactor Plant Modification, Effluent Water Monitoring Improvements, Hanford 3X - Irradiation, 100-C Alteration and Hanford 4X - Bismuth Phosphate Plants.

Reactor Projects Sub-Section

Sub-Section personnel continued assistance during preparations for start-up of 105-KE. The exception list for 100-K Water Plants was reviewed, and work orders were prepared for clearing of remaining items. Installation work included completion of the insulated thrust collars at 181-KW pumps on March 7, and at 181-KE on March 29, 1955. The two remaining acceptance tests were scheduled for completion during April, 1955. The 1706-KE Building was essentially complete, and current work consists of equipment installation, instrument testing and repairs, painting, and acceptance testing. Delivery of fittings for the 1706-KER loops has continued to be a limiting factor in the start-up of 105-KE. Of the critical fittings required, about 55% have been received. Structural work for 1706-KER included completion of floor slabs in Cells 1, 2, and 3; the waste crib; placing of about 200 feet of the 42-inch line to the By-Pass Crib; and bending of all the 2 1/2" carbon steel pipe and about 25% of the 2-inch stainless steel pipe.

Separations Projects Sub-Section

Preparations were completed for transfer of remaining Purex work from the construction contractor to Minor Construction. Structural items at 202-A Building were essentially completed except for painting. Operational pipe jumpers were completed, and spare jumpers were fabricated except for eight. Calibration of instruments was essentially completed, as was the acceptance of electrical facilities. Exceptions at 203-A Storage were cleared, and the facility was accepted March 31, 1955. Work under the remaining lump sum contract, 241-A Tank Farm, included installation of the 24-inch vapor header, control systems, and the 271-A Control House instrument panel board. A Work Authority dated March 31, 1955, authorized engineering and procurement to achieve a capacity increase of 2.75 times the design basis. G.E. funds were increased to $7,537,000. Plans were completed to transfer Projects CG-187-D-III, CG-535, and CA-539 to Project Engineering Sub-Section.

F. MONTHLY REPORT OF INVENTIONS AND DISCOVERIES

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

INVENTOR	SUBJECT	REPORT OF INVENTION (DATE)
H. Radow	Soldering Iron Attachment	3-25-55

1237819

F. S. McMahon, Manager - Projects

II. STATISTICAL AND GENERAL

A. SIGNIFICANT ASSIGNMENTS

1. Initial Reporting

CA-625 - Additional Waste Disposal Facilities - 200 Area

Scoping and design are being managed by Design Section. The project proposal requesting $115,000 was transmitted to AEC on March 18, 1955.

ER A-1223 - Irradiation Facility for HTRE Fuel Testing Program

The feasibility study is almost completed, and the report has been prepared.

ER A-1224 - Westinghouse Atomic Power Division - Feasibility Study

The feasibility report has been prepared and submitted.

ER A-1225 - Continuous Charge - Discharge Facility at 105-C

The engineering request authorized $400 for preparation of the project proposal. The project is being studied, and the force forecast and construction schedules are being prepared.

ER A-2760 - "T" Plant Second Cycle Waste Facilities

Scoping and design are being managed by Design Section. Three rough sketches of alternate proposals for the waste facilities have been made, and a tentative construction schedule was determined for each proposal.

ER A-3117 - 321 Building Fire Protection and Staging Study

The study was prepared and sent to Chemical Development Sub-Section. A work order has been issued for preparation of a project proposal.

ER A-3119 - Renovation of Rooms 36, 38, and 40 - 3706 Building

With the project proposal about 50% complete, Financial Department has advised that the proposed renovation can be considered as unusual maintenance. Work was temporarily suspended to await official notice from Technical Information Unit.

2. Final Reporting

CA-532 - Fiscal Year 1954 Water Tank Replacements

Construction progressed 2% of completion. Lump sum work on all tanks has been completed with the exception of painting safety slogans on tanks 2902-E and W. The work was inspected and accepted on March 9, 1955. Information for issuance of the Physical Completion Notice is being assembled for the G.E. portion of the project.

CA-544 - Central Distribution Headquarters

Upon request of the Electrical Utility Section, work was suspended. This Section will occupy quarters in the 2101-M Building.

ER A-2749 - Sheltered Welding Manifolds - 200 Areas

Following request of the Manufacturing Department - Separations Section, all work has been stopped. It is indicated that the proposed work could be accomplished by other methods.

3. Current Projects

CG-496 - Recuplex Installation - 234-5 Building

Design had been completed previously; construction progressed 6% to completion. Plans were completed for closing out the project on April 1, 1955 with exceptions. Vessel calibrations on the hoods and start-up work were being performed. Beneficial use has been attained on Solvent Extraction Hood, Hood ventilation System, Chemical Storage, and Caustic Trailer Facility. Information for the Physical Completion Notice has been assembled.

CA-512 - 100-K Reactor Facilities

Although design was considered as complete, some work was done in support of plant start-up, preparation of As-Builts, and instrumentation. Installation work included insulated thrust collars in the 181 Buildings. This work was completed in the KW pump motors on March 7, 1955 and in the KE pump motors on March 29, 1955. Installation of the thrust bearing temperature relays must await delivery of material. Work was begun on modification of the motor cooling water lines to provide protection during freezing weather. The approved exception list for 100-K Water Plants has been reviewed, and work orders have been prepared for the uncompleted items. The two remaining acceptance tests are scheduled for completion during April, 1955.

1706-KER Recirculation Facilities

Design was about 94% complete. The principal remaining work was concerned with electrical and instrument design. The final stages of construction work have not been scheduled. The 1706-K Building was essentially completed, and final painting is being done. Electrical work has progressed to the stage of clearing punch list items. Instrument installations are being completed, including adjustment and repairs during testing. Five mechanical acceptance tests have been completed, and four others are about 75% complete. Electrical acceptance tests were completed with minor exceptions. In the 1706-KER Facility cell floor slabs have been completed in Cells 1, 2, and 3, and the floor of Cell #4 is being graded. The waste crib has been completed, and back filling was about 85% complete. For the 107 emergency by-pass crib six sections of the 42-inch line, consisting of about 200 feet, have been placed. Bending work was completed on all of the 2 1/2-inch carbon steel pipe, and on about 25% of the 2-inch stainless steel pipe. The 1/2-inch vent lines have been installed from the front to the rear of the 105-KE Reactor. Electrical work has been virtually stopped because of lack of manpower.

Special equipment is being prepared for lay-away.

CA-513-A - Purex Facility

Design work was limited to miscellaneous revisions and design changes, particularly revision to jumpers to provide the 1.5 capacity ratio. The construction contractor has submitted 1016 marked-up drawings from which 205 As-Builts have been completed.

The 202-A Building was 98.6% complete. Structural items were essentially completed except for painting. Operational pipe jumpers were completed and spare jumpers were fabricated except for 8. Calibration of instruments and acceptance of electrical facilities were

essentially completed. Preparations were completed for transfer of remaining work from the construction contractor to Minor Construction forces.

Exceptions at 203-A storage were cleared, and the facility was accepted March 31, 1955. Lump sum contracts were considered complete except for 241-A Tank Farm. Work on this portion included installation of the 24-inch vapor header, control systems, and the 271-A Control House instrument panel board. The 10-inch cooling water line has been completed. Electricians have started work in the valve pit and the Sampler Pit #2.

The Work Authority dated March 31, 1955 authorizes engineering and procurement to achieve a capacity increase of 2.75 times the design basis. This authority included an increase of G.E funds to $7,537,000. Two meetings were held with representatives of Manufacturing Department to discuss final testing, cold runs, and start-up of the Purex Facility. Unreconciled items were scheduled for further discussion.

CA-514 - 300 Area Expansion Program - Production Facilities

Design had been completed previously; construction progressed 10% to a total of 74%. Interim funds of $240,000 were authorized by AEC on March 21 to allow continuation of construction wor A revised project proposal, requesting $5,900,000 and a completion date of June 15, 1955 was forwarded to AEC on March 18, 1955. This proposal stated certain deletions to be made. Minor Construction has increased its work forces in an attempt to meet the completion date.

Equipment installation included placing of the sleeve cleaning machines, slug pickle machine and furnace area conveyors. All final inspection area conveyors and tube gauge assemblies have been received and installed. A sketch of modifications to the methanol still house has been given to Minor Construction.

Work was continued on structural phases of the project related to steam and water lines, ventilating units, roof penetrations, and removal of old partitions.

The Patrol Headquarters Facility was completed, and the First Aid portion of the building was completed except for finishing work such as painting and tile setting. Fire alarm tie-ins were completed at 3706 Building on March 1, 1955.

CG-535 - Redox Capacity Increase, Phase II

Design had been completed previously; construction progressed 1% to a total of 97%. Minor Construction completed clean-up of exceptions for the 233-S Building on March 19, 1955. Plant forces are calibrating instruments, balancing heating and ventilating system, and making minor adjustments to equipment. The tie-in of process piping to Building 202-S is to be completed by Minor Construction after cold runs have been completed. Delayed delivery of the neutralizing tank for the Silica Gel Facility has become a limiting factor. The ready-for-use date on April 15, 1955 cannot be met because delivery dates of various components extend from April 6 to early June 1955. All jumpers for Silica Gel Facility have been fabricated. Mock-up work was begun on the adsorption column 205-S-T-101.

CA-539 - Additional Waste Storage Facilities for Redox

Design progressed 6% to a total of 96%; and the progress consisted of equipment for Tanks 106, modifications to the existing 305 Tanks, and the design work on special jumpers. On March 17, Minor Construction was authorized to proceed with the emergency water facility, valve manifold jumpers, safety water seal, and other miscellaneous work. A construction

contract for the additional work was awarded by telegram on March 29 at a contract price of $139,600. The Notice to Proceed also was issued by telegram. By mutual agreement with AEC the contract completion date for the additional condenser facility was extended to September 1, 1955.

CA-546 -Fuel Element Pilot Plant

According to the original scope, design was completed; however, the revised project proposal includes changes which reduce the completion status of design to 56%. Construction progresse 3% to a total of 54%. Minor Construction has assembled the swaging machine, and has continue relocation of equipment from Building 3730. The two salt bath furnaces were started and sealed in the presence of the vendor's representative, and these units have been shut down to await procurement of related equipment. By using new and related equipment, Technical personnel began actual development work in late February and early March 1955.

The revised project proposal is being routed for signatures. It decreases funds from $2,000,
to $1,650,000, plus $126,000 worth of transferred capital property. G.E. funds are to be decreased from $1,285,000 to $935,000.

CG-558 - Reactor Plant Modification for Increased Production

Overall design was on schedule at about 64% complete; construction progressed 1% to a total of 5%.

A revised project proposal was approved by the AEC Review Board on March 31, 1955 and is bein forwarded to Washington for final approval. This revision provides for deletion of all water plant work in "F" and "H" Areas and substitution of Panellit gauge replacement for back-up instrumentation.

Design for the 190-B and 190-D Annex Buildings was completed sufficiently for contracting purposes. Design for the other 190 Buildings progressed on schedule. Design for the 183 Buildings was essentially complete. Further design progress was made on 181 and 105 Buildings 151 Sub-Station and the effluent systems.

Construction and clean-up in "F" Area were completed March 4, 1955. In 100-B Area the effluent line and outfall structure, and the 13.8 KV feeders to 190-B Building were completed. Forms and reinforcing steel are being assembled for the effluent diversion box, and the base for the 105 gate box has been placed. Other electrical installations were continued, and instrument piping is being relocated. At 100-H Area all preparatory work for the rod shut-down and removal has been completed; however, the actual rod shutdown has been postponed at the request of Manufacturing Department in consideration of production requirements. In 100-D Area, electrical lines are being relocated, and the 2400-volt emergency circuit is being established. Bases for pumps in 181-D Building are being reinforced, and temporary power is being installed. It is now planned to test the first new pump for the DR system during or before the horizontal rod outage scheduled for April 18, 1955.

CG-603 - Hanford 4X Program - Bismuth Phosphate Plants

coping and design are being managed by Design Section, and design scope was essentially complete.

Revised drawing schedules were issued during the month to reflect the reduced project scope based on revised production schedules and requirements. Construction progressed 10% to a total of 15%. Part II of the project proposal is being prepared. Minor Construction forces continued work on the "T" Plant first cycle waste scavenging. Plant forces started work on 221-T first cycle waste scavenging and installation of C-9 Tank in 224-T. Work was continued on testing of valves and piping, and re-gasketing of cell jumpers and repair of existing cell equipment. Fabrication of new cell jumpers was about 20% complete. The re-gasketing of trenc jumpers was completed. Advance ordering of material was continued.

CG-613 - Hanford 4X Program - Metal Conversion Plant

The design work was about 22% complete, representing a 14% advance during the month. Revision No. 1 to the project proposal, requesting total authorization of $3,000,000 was forwarded to AEC on March 31, 1955. Because of abnormal short delivery time required, the AEC was requested to negotiate a contract for six continuous calciners. Representatives of the AEC and of General Electric have visited possible vendors to exchange information. Prospective vendors are expected to submit estimates to AEC by April 4, 1955. A revision to the project proposal is being prepared to request construction funds.

B. OTHER ASSIGNMENTS

CG-187-D-II - Redox Production Plant

Design had been completed previously; construction progressed 31% to a total of 32%. Jumper fabrication has been delayed by other work required for operation of the Redox plant. Three of the 31 jumpers required are partially fabricated. The D-14 vessel is scheduled for deliver by May 2, 1955.

CA-187-D-III - Redox Cooling Water Disposal Basin.

Both design and construction have been completed, and Manufacturing Department has signed the acceptance papers. Testing of the cribs for capacity and percolation rate was continued.

CA-431-C - Metal Examination Facility - 105-C

Design had been completed previously; construction progressed 5% to a total of 94%. The repaired hydraulic cylinder which was returned by the manufacturer has been re-installed and tested. Acceptance tests were run on Basin #1, and Basin #2 is being prepared for testing. Equipment is being installed in Basin #4.

CA-533 - Hanford Works Official Telephone Exchange

Design had been completed previously; construction progressed 27% to a total of 82%. A preliminary inspection of the building was performed on March 11, 1955, and interim inspection was held on March 18, 1955. Installation of equipment by the vendor progressed satisfactorily. Half-tapping of work cables was started by plant forces on March 23, 1955.

CG-543 - Replace Sanitary Tile Field 200 West Administration Area

Design had been completed previously; construction progressed 23% to a total of 35%. The concrete bases have been placed for the manholes and diversion boxes in both fields, and the diversion box for the Administration Area field has been completed.

CA-548 - Reactivated Project Proposal for New YSR Test Tower

With preliminary design completed, the project proposal is being routed for General Electric approval signatures.

CG-549 - Activate Task I, RMA Line - Building 234-5

Design had been completed previously; construction progressed 4% to a total of 99%. Construction work consisted of tie-ins and equipment adjustments by plant forces. Operations personnel are familiarizing themselves with this facility.

CG-551 - Expansion of 234-5 Building Facilities

Design had been completed previously; construction progressed 1% to a total of 99%. The new Task III line was inspected and accepted by Manufacturing Department on March 17, 1955, and minor exceptions are being cleared. All Minor Construction work was accepted, and building maintenance forces are performing clean-up. Operations personnel have completed a series of trial runs and are preparing to begin production in early April, 1955.

CA-555 - Graphite Hot Shop and Storage Building

Design had been completed previously. The revised project proposal is being routed for General Electric approval signatures.

CG-562 - Waste Metal Recovery Plant Modifications

Design had been completed previously; construction progressed 23% to a total of 97%. The intercycle stripper was modified to reduce UNH losses to the waste crib tanks. With these modifications completed, the stripper is being observed during operation for about two weeks before taking further action.

CG-572 - Particle Problem Animal Exposure Equipment

Design progressed 15% to completion; construction remained at 32% complete. The order for laboratory furniture has been placed, and delivery was promised for eight weeks after approval of the shop drawings. Requisitions for other engineered materials are being prepared.

CG-574 - Irradation

Scoping and design are being managed by Design Section. Construction progressed 20% to a total of 96%. All four casks have been completed and accepted. Delivery was completed on the "J" Shop Buckets and the 200 galvanized handling buckets. All metal handling equipment has been fabricated. Completion of the air mask system is awaiting arrival of the compressor.

CG-576 - General Improvements to Laboratory Area - 300 Area

Design progressed 10% to a total of 45%; construction progressed 5% to a total of 38%. Detailed design has been completed for lighting and ventilation items in the 328 Building and for the MG set and induction generator installation in 325 Building. Plant forces continued alterations work in Room 47-B of 326 Building, painting in 328 Building shop, and modification of cell pallets in 327 Building. Work release is being prepared for items in 328 Building which are to be assigned to Minor Construction.

CG-578 - Effluent Water Monitoring Improvements 100-B, D, F, DR and H Areas

Scoping and design are being managed by Design Section; construction progressed 1% to a total of 5%. The first prototype spectrometer has been received and is being tested extensively. The major revision now believed necessary is elimination of the fine adjustment on the high voltage power supply. Plant forces are fabricating the cooling duct for 100-DR.

Three more turrets have been received, making a total of four of the 26 turrets required.

CG-579 - Effluent Water Monitoring Improvements - 100-C Area

Comments same as CG-578 above.

CA-586 - First Capacity Increase - 230-KV System

Design progressed 14% to a total of 25%. Plans and profiles for the transmission line have been made, and tower size and locations have been determined.

It has been decided that AEC will furnish material for the transmission line, and Bonneville Power Administration will provide the relay equipment at Midway Sub-Station. Bids for the 230-KV switching station were opened March 29, 1955.

CG-587 - TBP Waste Scavenging

Design had been completed previously; construction progressed 10% to a total of 82%. One of the four additional cribs was completed with the exception of the "Hot" tie-in, which is to be completed during early April along with piping for all four cribs. Drilling of test wells was progressing.

CG-588 - Ammonia Scrubbers, Redox

Design is being managed by Design Section. Actual work was suspended during the collection of performance data.

CG-589 - Dejacketing and Ultrasonic Equipment - 105-C Building

Design had been completed previously; construction began and progressed to 1% complete. Shop work has been started on the ultrasonic grain size determination equipment. A fabrication and construction schedule is being prepared.

CA-590 - Fly Ash Collection Equipment, Building 384

With preliminary design completed, the project is being re-considered by Manufacturing Department to establish better justification.

CA-595 - Car Pullers 184 Building Coal Yard - 100-B, D, F, and H Areas

Design had been completed previously. The revised project proposal, requesting change in performance of tie-ins, is being routed for approval signatures. The contractor has placed concrete foundations in the 100-B and F Areas.

CA-596 - Central Mask Washing Station, Building 2723-W

Detailed design is being managed by Design Section, and the drawings and specifications are being considered by AEC.

CG-599 - Hanford 4X Program - 100 Areas

Scoping and design are being managed by Design Section. A sketch was received from a potential vendor offering to bid if the dimensions on the sketch were found acceptable.

CG-600 - 100-C Alterations

Design progressed 12% to a total of 84%. Construction work as scheduled for the present has been completed. Work is to be resumed about September 1955 on the poison column and toggle valves.

CA-601 - 300 Area General Improvement Program

With preliminary design 85% complete, the project proposal is awaiting authorization by AEC.

CG-608 - Redox Crane Viewing Room

Completion remained design 100%, construction 24%. The revised project proposal requesting an extension of the Physical Completion Date is being routed for signatures.

CG-610 - Replacement of 313 Building Roof

Detailed design was on schedule and 20% complete. A rough draft of the specifications has been completed and is being reviewed. The start of construction awaits progress of related work on 300 Area Expansion Program.

CG-611 - Mobile Laboratory

With preliminary design completed, the project proposal is being re-considered by AEC.

CA-612 - Alteration of 713 Building for Electronic Data Processing Machine

Scoping and design are being managed by Design Section. All material to be procured by General Electric has been ordered, and some materials have begun to arrive. The date now established for completion of deliveries is May 15, 1955, and the completion date has been established accordingly as June 15, 1955.

CG-614 - Hanford 4X Program - 300 Area

Scoping and design are being managed by Design Section. It has been decided that all installation work in 313 Building is to be performed by plant forces. A meeting was held to review the cost estimate, manpower requirements, and schedule.

CA-615 - Mechanical Maintenance Shop Centralization - 100 Areas

With preliminary design completed, the project proposal which was transmitted to AEC on January 12, 1955 is still awaiting authorization.

CG-616 - Installation of Acid Feed Equipment - 100-B, C, D, DR, F and H Areas

Scoping and design are being managed by Design Section. Preparation of the project proposal was essentially complete.

CG-617 - Additional Air Drying Facilities - Building 234-5

Scoping and design are being managed by Design Section.

CA-619 - Alterations to 186-D Building

With preliminary design 85% complete, the project proposal was transmitted to the AEC on March 10, 1955.

CG-620 - Melt Plant Modifications - 314 Building

With preliminary design completed, this project was authorized by AEC on March 14, 1955. A work order is being issued to Plant Engineering for completion of detailed design.

CG-621 - Redox Contamination Control Facilities

Scoping and design are being managed by Design Section. Procurement progressed satisfactorily and the revised project proposal requesting funds for construction is in the final draft stage

IR-183 - Study of Classified Scrap Disposal Problem - 300 Area Library

The pulping machine has been tested sufficiently to obtain necessary design information, and one defective part on the machine is being replaced. Detailed design work has been started.

IR-184 - Tocco Induction Heating Unit, 314 Building - 300 Area

Design had been completed previously; installation work was about 57% complete; and it considered all work on instruments, switches, and drains. Delivery of the induction heating coils is expected about May 1, 1955.

* * * * * * * * * * * * * * * *

The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month.

ER A-761 - Decontamination Facilities, First Aid Station - 100-H and 200-W Areas

The final draft of the study report was transmitted to the Industrial Medical Sub-Section during late March 1955.

ER A-765 - Painting Water Plant Structures - 100-DR Area

A letter authorizing the preparation of a project proposal is expected from Manufacturing Department - Reactor Section.

ER A-1219 - 105-KW Laboratory

The project scope was approved by Pile Technology Section, and the project proposal is being prepared.

ER A-1220 - Minor Construction Fabrication Shops Modifications

A rough draft of the project proposal is being prepared.

ER A-1221- Modifications to 105 Transfer Areas

Design Section has been requested to furnish additional scoping information. The project proposal is being prepared.

ER A-2756 - FY-1955 - Water Tank Replacements - 100-200 Areas

The rough draft of the project proposal was submitted to Manufacturing Department for review and comment.

ER A-3113 - Development of Independent Water Supply Source - 300 Area

The project proposal is being routed for General Electric approval signatures.

ER A-3114 - Relocate Oxide Burner North of Building 314

Preparation of the information request is being postponed at the request of Engineering Department.

ER A-3118 - Replacement of 300 Area Fence

The project proposal is being prepared to request installation of a standard cyclone fence, five gates, and the removal of existing fence.

C. RELATED FUNCTIONS

The workload for off-site inspection increased slightly both in number and money value of orders. The current workload was 455 orders valued at about $11,300,000. The principal inspection efforts now are concerned with boron steel balls for the Ball Third Safety System, resistance thermometers and process monitoring gauges for 100-K Area; the process pumps and drives for the Reactor Modification Program also required continuous attention. Total evaluations under Corrosion Testing Program increased to 165, and the emphasis shifted to work on the east coast.

Following is a resumé of inspection activities during the month:

Item	Number	Value
New orders received during the month	174	
Total orders for items requiring inspection	455	
Cumulative orders assigned to inspectors	422	$11,334,000
Orders assigned to inspectors this month	169	1,469,000
Orders completed during the month	129	1,345,000

Reproduction output increased by almost 150,000 square feet to a total of 499,134 square feet. This large increase resulted from AEC orders on the Reactor Modification Program and the Hanford 4X Program - Bismuth Phosphate Plants. Engineering Files distributed 209,715 prints. The largest orders were 11,180 prints for the Reactor Modification Program and 4,787 prints for Bismuth Phosophate Plants.

Estimating completed 25 estimates during the month. The completed estimates comprised the following: project proposal - 5, fair cost - 2, preliminary - 7, scope - 8, high spot - 2, and cost-to-complete - 1. Studies were conducted throughout the month on methods and procedures for estimating, both to obtain more information during the estimating process and to perform estimates during the periods of design and construction. It is now contemplated that these studies will result in an Organization and Policy Guide.

Field Surveys Unit completed coal inventories in seven areas; staked new test well in the BX Tank Farm, 200-East Area; and provided additional survey data on such items as 100-K Transmission Line, re-alignment of railroad tracks; and underground lines. Personnel of this Unit also furnished assistance with optical instruments in the 190-C Building, and continued with assistance on the Survey of Richland.

Project Control activities included work on five major histories, property evaluations, and an analysis of project administration. The manpower budget was reviewed to June 30, 1957.

D. CRAFT LABOR

Construction plumbers and electricians are again pressing demands for hazardous and/or onerou pay for work performed in radiation or contamination zones. Resistance by contractors, AEC, and G.E. is very firm.

The union agreement between the Office Workers Union and construction contractors expires on May 31, 1955. Even with the decrease of office personnel, negotiations are continuing; and the business agent has stated that an organizer is being sent in to build up union membership. The only remaining local source of new members is the General Electric Company.

A work stoppage in both Minor Construction shops was caused by demands the Machinists Union made upon the J. A. Jones Company. The demand for an additional superintendent, foreman, tool crib attendant, and apprentice was refused by Jones. All Minor Construction machinists walked off the jobs on March 16; but they returned on March 23, following negotiations in which one apprentice was the only addition.

REPORT OF VISITORS

To Hanford

L. P. Sharts of L. H. Butcher Company, Seattle, Washington, and H. Palm, Udylite Corporation, Detroit, Michigan, visited P. J. O'Neil and R. J. Cavanaugh on March 1 - 9 to consult on installing equipment for the 300 Area Expansion Program; and Mr. Henderson of Pako Corporation visited on March 2 for the same purpose.

Phillip Atwood of Ajax Electric Company, Philadelphia, Pennsylvania, visited E. S. Davis March 4 - 12 to start salt bath furnaces in the Fuel Element Pilot Plant.

E. W. Byrd of U. S. Pumps, Inc., Los Angeles, California, visited J. T. Lloyd on March 16 to inspect site for pump test and to arrange for alteration of the contract.

Mr. Coffin of Western-X-Ray, Seattle, Washington, visited R. J. Cavanaugh on March 21 - 24 to install equipment for the 300 Area Expansion.

Marvin Lederman of Merco Company, San Francisco, California, visited D. L. Ballard from March 22 - 25 to test equipment for 300 Area Expansion Program.

Perry Brown of Johnston Pump Company, Los Angeles, California, visited R. C. Hollingshead on March 23 to consult on pumping problems for Purex.

L. E. Temple of Bingham Pump Company, Portland, Oregon, visited J. R. Kelly and C. W. Harris on March 23 - 25 for investigation of vibration in primary pumps, 190-KW Building.

Official Trips to Other Installations during March, 1955

D. E. Newby visited Lambert and Lent, Seattle, Washington, on March 2 and 3 to determine reason for discrepancies in analyses.

W. Seeburger and R. M. Griffith visited Fruit Packers, Inc., Yakima, Washington, on March 11 to inspect equipment.

G. C. Gabler visited General Electric offices in Schenectady and New York, N. Y., and in Cincinnati, Ohio, for consultation.

C. A. Lyneis visited the following companies from March 25 - 29 for discussion of fabrication of calciners: Allis-Chalmers, Milwaukee, Wisconsin; Buflovak Equipment Division, Blaw-Knox Company, Buffalo, New York; Struther Wells, Warren, Pennsylvania.

J. C. Hamilton and G. L. King visited the following locations from March 28 through April 1 to discuss new expense account policy with inspectors: Newark, New Jersey; Akron, Ohio; Chicago, Illinois; Los Angeles, California; Oakland, California.

H. E. Hanthorn visited Southwestern Engineering Corporation of Los Angeles, California, from March 28 - 30 to render engineering assistance on equipment fabrication.

ADVANCE ENGINEERING SECTION

MONTHLY REPORT

MARCH, 1955

Consolidated Proposals for Research and Development Programs within the Engineering Department for fiscal years 1956 and 1957 have been prepared.

Study has been given to the economic considerations involved in irradiating uranium to high exposure at Hanford, and then separating the plutonium isotopes to yield a product equivalent to that obtained from low exposure.

W. K. Woods

Manager, Advance Engineering
ENGINEERING DEPARTMENT

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SUMMARY - MARCH, 1955

PERSONNEL PRACTICES SECTION

The Attitude Survey was administered on March 25 without any serious incident. Although some questionnaires are still being returned, we already have 86.4% participation among those available to participate. Substantially less than 1% of those returning questionnaires removed the coding stickers and this low percentage is indicative of a high level of confidence on the part of employees that they will, in fact, remain anonymous. The IBM key punching program is well ahead of schedule.

The number of applicants interviewed in March was 2,137 as compared with 1,982 for February. In addition, 113 new applicants applied by mail. Open, non-exempt, non-technical requisitions decreased from 470 at the beginning of the month to 286 at month end. Two hundred and twenty-two employees were added to the roll and 84 removed during the month. The Separation rate for fiscal month of March was 1.14% and for fiscal month of February .78%. These rates when converted to annual rates are 11.89% and 10.17% respectively. During March 85 new requests for transfer to other type work were received by Employment, and 36 transfers were effected. Attendance recognition awards were distributed to 248 employees in March, including 26 who qualified for five-year awards.

Five employees retired during the month of March and two employees died. One hundred twenty-nine visits were made to employees confined to Kadlec Hospital, and 34 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98.3% , in the Insurance Plan 99.4%, and the Employee Savings and Stock Bonus Plan 50.4%. At month end there were 555 non-veterans registered under Selective Service and 608 military reservists were on the roll. Since August 1, 1950, 394 employees have terminated to enter military service, of which 145 have returned, 34 have not claimed re-employment rights, leaving 215 still in military-leave status.

Eighty-eight adopted suggestions were approved for awards in March, resulting in cash awards totaling $2,260 with a total net savings of $18,000.64.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION

The News Bureau issued 61 news releases during the month, 17 of which were especially planned for national publicity purposes and were sent to the Schenectady News Bureau. Eleven manuscripts were approved for publication and three technical papers received all required approvals. Arrangements were made for 7 speeches to be delivered before public groups. The Community Newsletter was written and distributed to community leaders in Pasco, Kennewick and Richland. Five Management NEWS Bulletins were developed and distributed to all exempt personnel during the month.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION (Continued)

Two photographs taken at Hanford appeared in the March 28 issue of LIFE magazine. One showed a toy train and the other a toy wagon which GE scientists have adapted to perform useful work. Also at the request of a representative from LIFE magazine, information on sheep experiments here at Hanford was collected and given to them. This was boiled down to a cutline over a picture in a general article on weapons fall-out and the effects of radioisotopes in the LIFE issue dated March 21.

Fifty abstracts prepared by GE people at Hanford for consideration for the Conference on Peaceful Uses of Atomic Energy to be held at Geneva, Switzerland in August were sent to R. G. Lorraine of GE's Atomic Products Division in Schenectady.

Communications concerning Union Relation matters included: a full-page GE NEWS message on the 9-Point Job Program, a letter to Field Technicians in Radiological Sciences Department concerning the April NLRB election for the Manager's signature Biophysics Section and a full-page advertisement in the March 28 "Progress Edition" of the COLUMBIA BASIN NEWS.

The month of March has shown itself to be the biggest month in the history of the Photography Unit concerning total number of assignments covered, negatives exposed, and photographic prints produced. A total of 340 photographic assignments were covered, 1,914 negatives exposed, and 19,073 prints produced.

Radio Station KHQ, Spokane has indicated their desire to broadcast a HAPO-produced radio show as a public service. Their specific request was for a ten minute version of INSIDE HANFORD which will be supplied them on a weekly basis as soon as a definite time is allocated and format features are worked out with the KHQ Program Director.

Graphics has been contacted by representatives of the Engineering and Financial Departments and informed that material will be required for a presentation to the Philadelphia Electric Group early in April.

SALARY AND WAGE ADMINISTRATION SECTION

The study of non-exempt jobs is progressing on schedule. To date approximately 700 different non-exempt jobs have been analyzed. It is expected that during the next week the testing phase of the study will be completed.

The results of a survey related to scientific personnel were analyzed and documented. A summary was also forwarded to interested department and section managers.

UNION RELATIONS SECTION

The Company is seeking dismissal of a petition submitted by the Laboratory Assistants in the Manufacturing Department, and a hearing has been scheduled by the National Labor Relations Board in Richland on April 5 to decide the appropriateness of the unit.

The Company agreed to a consent election to be held April 6 involving 22 Field Inspectors, A, B, and C in the Regional Radiation Measurements Unit, Radiological Sciences Department.

UNION RELATIONS SECTION (Continued)

A Stipulation of Facts was executed by the Company and the Hanford Guards Union and forwarded to Judge Harold Seering, Seattle, who will arbitrate the dispute alleging that the Company violated the call-in procedure.

During negotiations in March, agreement was reached with Material Expediters and Take-Off Men on the seniority arrangement and a revision in job titles.

We have served notice on the four HAPO bargaining units of a desire to open our Pension and Insurance Agreements which expire May 16.

Demands for hazardous and/or onerous pay for work performed in radiation or contamination zones are again being made by construction plumbers and electricians but contractor, AEC, and GE resistance to these demands remains very firm.

The union agreement between the project construction contractors and the Office Workers Union expires May 31, and the business representative for this group has stated that an organizer is being sent in to build up the union membership. GE is the only source of personnel on which they can expend their efforts.

EDUCATION AND TRAINING SECTION

There are 102 employees presently affiliated with nearby schools for graduate study, as compared to 68 in 1954.

All of our training "correspondents" throughout the Departments met on March 3 and heard our program and procedures for employee training presented with the assistance of J. J. McCarthy of the New York Office.

Plans are under way for assembling data on appropriate members of the Employee and Public Relations Department for transmission to the Company-wide inventory of Employee and Public Community Relations Services in New York.

HEALTH AND SAFETY SECTION

There were no major injuries, but there was an increase of about 10% in minor injuries over the record high of 458 last month. High winds, failure to wear protective equipment, and improved reporting contributed to the increase.

An unpredicted low census at Kadlec Hospital will increase the budget overrun from one thousand to twelve thousand dollars.

Proposals for inclusion of Richland in the Benton-Franklin Counties Public Health Unit received favorable consideration and it is expected that details will be worked out for the transfer in the late summer of this year.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

Radio operating tests were made from the top of Rattlesnake Mountain to determine effectiveness of radio communications coverage of planned evacuation routes from Richland. All tests were successful with the exception of a few that occurred while the car was on the ferry or in some of the canyons in the Horse Heaven Hills area.

AUXILIARY OPERATIONS AND PLANT PROTECTION (Continued)

The annual inventory of "Secret" Research and Development reports was completed on March 17, and certified to the Commission. A total of 34 reports in this category were unaccounted for to date. Twenty-nine of the 34 have previously been reported to the Commission.

There was a net increase of 4 unaccounted for documents during the month, bringing the total to 229.

COMMUNITY SECTION

Invitations to Bid were mailed to 25 prospective Lessees in connection with establishing trailer court facilities on two plots of land in the vicinity of Richland. Proposals will be opened and read on April 12.

The Uptown Thrifty Drug Store reopened for business on March 24, after being closed for remodeling and alteration work necessitated by a recent fire.

A change in the housing policy was approved by the Atomic Energy Commission, to be made effective April 4, wherein female heads of families who are full-time employees on the Project, and whose employers have quotas, are eligible for government-owned housing.

ORGANIZATION AND PERSONNEL

Total on roll February 28, 1955	1769
Accessions	30
Separations	30
Total on roll March 31, 1955	1769

*Total includes 29 Rotational Trainees.

Employee and Public Relations

PERSONNEL PRACTICES

General

The Attitude Survey was administered on March 25 without any serious incident. Although some questionnaires are still being returned, we already have 86.4% participation among those available to participate. Substantially less than 1% of those returning questionnaires removed the coding stickers and this low percentage is indicative of a high level of confidence on the part of employees that they will, in fact, remain anonymous. The IBM key punching program is well ahead of schedule.

Employment	February, 1955	March, 1955
Applicants interviewed	1,982	2,137

483 of the applicants interviewed during March were individuals who applied for employment with the Company for the first time. In addition, 113 applications were received through the mail.

	February, 1955	March, 1955
Open Requisitions		
Exempt	--	1
Nonexempt	470	286

Of the 470 open, nonexempt, nontechnical requisitions at the beginning of the month, 351 were covered by interim commitments. Of the 286 open, nonexempt, nontechnical requisitions at month end, 215 were covered by interim commitments. During March, 102 new requisitions were received requesting the employment of 143 non-exempt, non-technical employees.

	February, 1955	March, 1955
Employees added to the rolls	114	222
Employees removed from the rolls	71	84
NET GAIN OR LOSS	+ 43	+ 138

Separation Rate:

Fiscal Month February, 1955		Fiscal Month March, 1955	
Male	Female	Male	Female
.50%	2.09%	.74%	3.01%

Over-all Separation Rate:

Fiscal Month February, 1955	Fiscal Month March, 1955
.78%	1.14%

Employee and Public Relations

PERSONNEL PRACTICES

During March, 14 employees left voluntarily to accept other employment, 6 left for business for self, and 7 left to enter military service.

Transfer Data

Accumulative total of requests for transfer received since 1-1-55	219
Number of requests for transfer received during March	85
Number interviewed in March, including promotional transfers	75
Transfers effected in March, including promotional transfers	36
Transfers effected since 1-1-55, including promotional transfers	109
Transfers effected in March for employees being laid off	2
Number of stenographers transferred out of steno pool in March	10
Transfer requests active at month end	306

ADDITIONS TO THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
New Hires	7	197	3	207
Re-engaged	-	---	-	---
Reactivates	4	11	-	15
Transfers	-	---	-	---
TOTAL ADDITIONS	11	208	3	222

TERMINATIONS FROM THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
Actual Terminations	10	40	--	50
Removals from rolls(deactivates)	4	28	--	32
Transfers	2	--	--	2
TOTAL TERMINATIONS	16	68	--	84

GENERAL

	2-1955	3-1955
Photographs taken	215	331
Fingerprint impressions	173	215

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	2-1955	3-1955
General Electric cases	217	205
Facility cases	28	14
TOTAL	245	219

Employee and Public Relations

PERSONNEL PRACTICES

On March 9, a representative of the Employment Unit visited commercial classes in Kennewick High School and on March 16, traveled to Yakima to speak to approximately 50 commercial students at the Yakima Senior High School. Applications were given out and where possible, appointments were scheduled for stenographic tests. While in Yakima, she also interviewed six applicants at the Washington Employment Security Department who were from the two local business colleges.

On March 24, 1955, fifteen candidates for stenographic and secretarial positions were interviewed at Washington State College, Pullman, Washington. Six of the prospects were interested enough to request applications. On March 25, two groups of business administration students were addressed at the University of Idaho, Moscow, Idaho. Approximately 100 students attended the two meetings. Between the two talks, an informal meeting to discuss employment possibilities was held with twelve undergraduates who do not plan to return to college in the fall.

We contacted three schools in the Mid-West to inquire if they will be graduating students in the near future who might fill our openings for electrical draftsmen. Those contacted were: Chicago Technical College, Chicago, Illinois; Lain Drafting College, Indianapolis, Indiana; and Finlay Engineering College, Kansas City, Missouri.

Personnel Records and Investigations

INVESTIGATION STATISTICS	2-1955	3-1955
Cases received during the month	386	372
Cases closed	223	443
Cases found satisfactory for employment	320	404
Cases found unsatisfactory for employment	56	66
Cases closed before investigation completed	45	56
Special investigation conducted	6	10

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	5083
One-year awards made in March for those qualifying in February	55
Total two-year awards to date since January 1, 1950	2781
Two-year awards made in March for those qualifying in February	54
Total three-year awards to date	1527
Three-year awards made in March for those qualifying in February	64
Total four-year awards to date	633
Four-year awards made in March for those qualifying in February	49
Total five-year awards to date	130
Five-year awards made in March for those qualifying in February	26

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	5053
Five-year Service Recognition Pins presented during March to Exempt personnel	14
Five-year Service Recognition Pins presented during March to Non-exempt personnel	22

Employee and Public Relations

PERSONNEL PRACTICES

During March, 17 people whose continuity of service was broken while in an inactive status were so informed by letter.

Employee Services

The following contacts were made with employees during the month:

Employee contacts made at Kadlec Hospital	129
Salary checks delivered to employees at Kadlec Hospital	31
Salary checks delivered to employees at home	3

At month end, participation in the Benefit Plans was as follows as compared with last month's participation:

	February	March
Pension Plan	98.2%	98.3%
Insurance Plan	99.4%	99.4%
Savings and Stock Bonus Plan	50.9%	50.4%

Thirty letters were written concerning deceased employees and their families during March, regarding payment of monies from the Company and answering questions.

Since September 1, 1946, 163 life insurance claims have been paid totaling $1,069,51[illegible]

Five employees retired during the month of March, namely:

Jefferson R. Beadles	W-11978	Optional Retirement
Rogers B. Sturges	M-169	Optional Retirement
Walter H. Hansen	W-8456	Normal Retirement
Perry B. Glendenning	W-4365	Normal Retirement
Walter A. Glenn	W4750	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.

Two employees died during the month, namely:

3-16-55	Fieldman, Engineering Dept.
3-14-55	Design III, Engineering Dept.

During March, 49 letters were written concerning retirement and retired employees, providing information of a general or specific nature. To date 339 employees have retired at Hanford, of which 174 are continuing their residence in this vicinity.

A total of 208 new employees attended Orientation Programs given by members of this group during the month of March. Of this number, 96% have signed to participate in the Pension Plan, 99% have signed up to participate in the Insurance Plan and 84% have signed up to participate in the Good Neighbor Fund.

[illegible]

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Service

Total number of non-veteran employees subject to military service training through Selective Service System.		555
Number Classified 1A	102	
Number Classified 2A	110	
Number Classified 3A	220	
Number Classified 4F	75	
Number Classified 1D	45	
Number Classified 4A	3	
Total	555	
Number of Non-Technically Trained and Engineering Personnel for whom deferments are currently being requested.		4
Number of Technically Trained and Engineering Personnel for whom deferments are currently being requested.		106
	Total	110
Accumulated total of deferments requested		1453
Accumulated total of deferments granted		1167
Current number of deferments requested pending		30
Current number of deferment requests denied		8
Current number of deferment requests granted		14

During Month of March

Number of deferment requests pending at Local Board Level		20
Number of deferment requests pending at Appeal Board Level		10
Number of deferment requests pending at Presidential Appeal Level		0
	Total	30
Number of deferment requests denied by Local Boards		6
Number of deferment requests denied by State Appeal Boards		2
Number of deferment requests denied by Presidential Appeal Board		0
	Total	8
Number of deferments granted by Local Boards		11
Number of deferments granted by State Appeal Boards		3

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Services

Number of deferments granted by Presidential Appeal Board		0
	Total	14
Number of Technically Trained & Engineering Personnel denied, or requesting no further appeal, now pending induction.		27
Number of Technical Graduates with over two years of deferments		79
Number of Selective Service vulnerable Technical Graduates Enlisted		1
Number of Selective Service vulnerable Technical Graduates Drafted		0
	Total	1

Reservists Data - Total Number of Reservists on Roll

Number of Active Reservists		142
Number of Inactive Reservists		453
Number of employees in the National Guard		13
	Total	608
Reservists and National Guard members subject to drills, tours of Duty, Cruises, Summer Camp and/or Weekly or Monthly meetings.		223

Military Service Leaves of Absence - August 1, 1950 through March 31, 1955

Reservists		124
Selective Service System		263
Female Employees Enlisted		7
	Total	394
Total number returned to roll		145
Reservists	66	
Selective Service System	79	
Known number not claiming reemployment rights		34
Number of employees still on military leaves		215

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Suggestion Plan	February	March	Total Since 7-15-47
Suggestions Received	252	281	16421
Acknowledgements to Suggesters	202	316	
Suggestions Pending Acknowledgement	90	55	
Suggestions Referred to Depts. for Investigation	252	417	
Suggestions Pending Referral to Departments	143	93	
Investigations Completed and Suggestions Closed	217	332	
Suggestions Adopted - No Award	1	2	
Adopted Suggestions Approved by Board for Award	81	88	
Total Net Cash Savings	$9,319.11	$18,000.64	
Total Cash Awards	$1,335.00	$2,260.00	
Total Number Suggestions Outstanding to Departments	654	707	

An award of $300 was divided equally between two employees in the Metal Preparation Section for their suggestion to replace metal rotor blades with fibre blades in the Moto-air samplers. Adoption of this suggestion resulted in labor and material savings.

Another employee in the Metal Preparation Section received $150 for his suggestion to use transite liners on refractory walls of the Ajax furnaces. Savings in material resulted from adoption of this suggestion.

Life Insurance

Code information which is known only to Home Office Life Underwriter's Association has been furnished 79 insurance companies and investigation agencies during the month of March, 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	February, 1955 Long Forms	February, 1955 Short Forms
	42	533
	March, 1955 Long Forms	March, 1955 Short Forms
	77	762

Total Since September, 1946 - 25,271

Claims reported to Travelers Insurance Co.	February, 1955	March, 1955
	13	* 16

Total Since September, 1946 - 964

*Of the claims reported to Travelers Insurance Company during the month of March fourteen were property damage, and two were bodily injury claims.

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Insurance Statistics (Continued)

It is significant, without apparent explanation, that short form claims reported to the Department of Labor and Industries increased from 293 in January, to 533 in February and to 762 in March. Our previous average had been approximately 300 per month. A corresponding increase was noted in long form reportings which increased from 32 in January, to 42 in February, to 77 in March.

The number of requests for code information on life insurance applicants increased from 21 in January, to 49 in February and to 79 in March.

Workmen's Compensation

a. — Date of Injury: Indefinite; Employer: Nature of Injury: Alleged Loss of Hearing.

— Date of Injury: Indefinite; Employer: ; Nature of Injury: Alleged Loss of Hearing.

On March 15 and 16 the hearing loss claims of Messrs. were heard in Richland by the Chairman of the Board of Industrial Appeals. The claimants were represented by Williams and Critchlow, Richland attorneys, and was represented by Mr. Gerald DeGarmo and Mr. Seth Morrison. The hearings concluded the four appeals before the Board brought by employees alleging loss of hearing as a result of working in power buildings in the 100 Areas.

b. — Date of Injury: 10-9-52; Employer: Nature of Injury: Fractured Left Ankle.

case was closed with payment of medical bills only on December 26, 1952. He requested reopening several times on the basis of aggravation and was refused each time. On February 3, 1955 he submitted an appeal to the Board and a conference was held in Yakima on March 28, 1955. It was determined that the only way to dispose of the case was by a regular hearing before the Board.

Liability Insurance

a.

The case was tried before a jury in the Superior Court for Franklin County on March 8 and 9 resulting in a verdict of $330 to the plaintiff. The amount represents his special damages up to the time he went to the Mayo Clinic. The action had been brought against the as a result of an alleged injury on June 30, 1953 while was being taken to the Kadlec Hospital in an ambulance. The amount claimed was $45,000, general damages, plus $1,000 special damages, against each defendant.

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Liability Insurance (Continued)

b.

A copy of Judge B. B. Horrigan's Memorandum Decision has been received sustaining the demurrers in the action brought by against , Justice of the Peace, and Messrs. and . Judge Horrigan sustained the demurrer in this case "because of several causes of action improperly united". The action had been brought by as the result of an alleged false arrest by Messrs. employees in the Richland police force.

c.

On February 8, 1955, the Travelers' attorney, Mr. John MacGillivray, argued the appeal in the case before the Supreme Court. The Superior Court had previously awarded $22,323 which was later reduced to $7,500. In March we learned that the Supreme Court reversed the Superior Court and held that was not liable as a matter of law.

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	54	14	10	27
Mechanical	37	6	8	28
Electrical	24	5	8	17
Chemistry	26	11	4	36
Physics	18	1	9	21
Metallurgy	10	1	2	15
Other	3	2	—	—
Totals	172	40	41	144

Offers to be extended (pending spot check) - 10.

To date 49 colleges and universities have been visited.

In order to meet the requirements of the Rotational Training Program, 2 manufacturing-training program and 15 engineering program candidates were interviewed during the month. Arrangements have been made to contact these men again in April.

Experienced drop-in candidates interviewed in the office totaled 12 during March. Other experienced activities during the month may be summarized as follows:

Field	Open Invitations	To Visit	Open Offers	Acceptances, but not OTR	Offers to be Extended	On the Roll
Engineering:						
Electrical			1		1	
Mechanical	1			2		
Chemical		1		1	1	
Industrial		1				1
Chemistry		1	1	1		
Metallurgy				1		
Other	—	2	1	5	1	2
Totals	1	5	3	10	3	3

A total of 440 PhD cases have been reviewed, with 175 visit invitations extended to date. Of this total, 105 candidates have accepted, 49 have rejected, and 21 invitations remain open. During March, 24 PhD candidates visited HAPO, bringing to 56 those who have completed their visits. Of the remaining 49, 12 have firm dates scheduled, while the remainder are indefinite as of this time. To date 4 new PhDs have reported on the rolls since October 1, and one more is definitely scheduled to report about May 15. The visit invitation acceptance rate continues to be highest among engineers and lowest among physicists. The number of candidates

still under consideration following HAPO visits remains high due to awaiting completion of their interviews at all G.E. locations or the expression of G.E. preferences by the candidates. In addition to the above new PhDs, one experienced PhD physicist was made an offer and reported on the rolls this year, and another visited for interviews during March.

It should be noted that if we can achieve a ratio of one offer acceptance for every 10 or 12 visit invitations extended, we still need to issue an additional 75 invitations in order to fill our minimum PhD requirements for the 1954-55 season. Actually, in view of the opportunities or choices open to candidates this year, together with the limited number of candidates available, it is going to be very difficult to achieve that ratio. Furthermore, at the present time we have only about 25 candidates available to consider for possible additional invitations.

During the month there were 11 terminations of exempt employees, not including industrial physicians. Three entered military service, 2 transferred to other G.E. sites, 4 left for other jobs, and 3 left for other reasons. A total of 10 were signed on HAPO rolls, 7 for direct placement and 3 on the Rotational Training Program.

Five professors have been employed for the coming summer, and negotiations are active with two others. Five graduate students have been employed for the summer.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

During the month of March the News Bureau issued 61 releases. The breakdown by category, distribution and content was as follows:

Subject		Distribution	
Pay and Benefits	7	Hanford Area	40
Employment services	19	West Coast Area	4
Good Will	4	National	17
Technology and research	14		
Safety and fire	2		
Real Estate	2	Content	
Richland-Hanford Protection	2		
Education & Library	1	Information	4
Health and medicine	3	Pictures	5
Plant services	2	Short	39
Organization changes	3	Long	3
Police, Fire	3	Feature	10

The following nine releases were sent to the Schenectady News Bureau with carbon copies to N. P. Jackson for use for national publicity: a short story describing the wild life found on the 600-square mile Hanford reservation; picture and cutline of a GE engineer machining a test piece of plutonium; a picture and short story about an unusual type of instrument used at Hanford to measure the radiation given off by very small amounts of radioisotopes as they move from one organ of a mouse to another; a picture series on the Hanford laundry; a picture, cutline and story on the "soup bowl monitor" an instrument designed to respond to radiation in a manner similar to the human body; high-density concrete picture, cutline and story used at Hanford for shielding around reactors; pictures and story on the goose net gun used at Hanford for catching wild geese so that they can be banded; story and pictures describing the storage facility for hot samples in Hanford's Radiometallurgy building; and story with pictures describing tensile strength testing equipment used at Hanford also in the Radiometallurgy building.

Two photographs taken at Hanford appeared in the March 21 issue of LIFE magazine. One showed a toy train and the other a toy wagon which GE scientists have adapted to perform useful work. Protests were lodged from Hanford, Schenectady and Chicago because the story carried no mention of GE and because the subject in one of the photos was misinterpreted.

At the request of a representative from LIFE magazine, information on sheep experiments here at Hanford was collected and given to them. This was boiled down to a cutline over a picture in a general article on weapons test fall-out and the effects of radioisotopes in the LIFE issue date March 21.

The National Veterans Administration Headquarters informed us that photographs and pictures of W. R. Smith, a Hanford employee, were used in a news story released nation-wide through the wire services on March 30. A story about Mr. Smith will also be used nation-wide on VA radio programs. An additional story will appear in a magazine called PERFORMANCE published by the VA.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Considerable national publicity was attained from a story based on a talk about the future of atomic energy given by Dr. W. K. Woods before the Oakland Chamber of Commerce. The story was distributed from Schenectady, San Francisco and Richland. We received a report that a TV newscaster in Seattle, with an estimated 1,000,000 listeners, used most of the release. When Parris Emery, Movietone News representative at Seattle, received the release he called to arrange to come to Hanford and take sound-on-film TV footage of a GE representative discussing the information in the release. A two minute statement by the General Manager was photographed and recorded by Mr. Emery, and distributed to 100 television stations throughout the nation for use on newscasts on March 22.

Final proofs of copy and photos were approved at Hanford for a booklet, "Putting the Atom to Work." This booklet will be published at Schenectady by GE and will be made available to interested people throughout the country. It is specifically aimed at college students and college graduates.

A duplicate of the Hanford News Bureau's permanent photo file was sent to Joe Morton at Schenectady. When photos are added to the Hanford file, copies will be sent to Schenectady. Joe Morton will use the file when he contacts national media about Hanford stories.

A story and pictures on a rather simple system used here at Hanford to make sure that after someone points out that a condition or piece of equipment is a safety hazard, the man in charge of it isn't allowed to forget about. It was sent to three safety magazines, SAFETY MAINTENANCE AND PRODUCTION, OCCUPATIONAL HAZARDS, and NATIONAL SAFETY NEWS.

A picture story consisting of six pictures and cutlines plus a 200-word summary on a Hanford burial was sent to NUCLEONICS for use as a one or two page picture layout to show one of the problems in operating a nuclear plant.

A letter and a self-addressed post card, two sample stories and an explanatory note were sent to 39 weekly newspapers in Washington state for their reaction to a seven-article series on atomic energy. The series is to begin the week of June 13 and if reader interest proves good, it will be tried out in other states. Twenty-two of the 39 have answered and all requested the series plus many comments for future material.

Twelve requests for information were received and answered during the month. Fact sheets on Hanford and Richland, cartoon booklets, and a clipping booklet were sent to each requester.

Two requests were received and answered also. One was for information from the publisher of the NEWPORT MINER, Newport, Washington concerning the GE Company crew installing three large generators at Albeni Falls Dam on the Pend Oreille River; a letter was sent to R. W. Jackson at the San Francisco office referring the matter to him, and a carbon copy of our letter went to the publisher at Newport. The second request was from the managing editor of AMERICAN DRUGGIST, New York City, for pictures of the toy train and they were sent to him.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Fifty abstracts prepared by GE people at Hanford for consideration for the Conference on Peaceful Uses of Atomic Energy to be held at Geneva, Switzerland in August were sent to R. G. Lorraine of GE's Atomic Products Division in Schenectady.

A description and photographs of Hanford's Aquatic Biology display were sent to R. G. Lorraine at Schenectady for inclusion in an exhibit to be displayed at the Geneva Conference. Other exhibit material from Hanford will be sent to Mr. Lorraine early in April.

Manufacturing Department has canvassed employees in all sections to get suggested topics for signed articles. We have received from H. A. Carlberg a list of 264 topics for signed articles, some with suggested authors indicated. Interviews have started with 14 key people in Manufacturing Department to eliminate duplications and determine the most important articles from the list of 264.

Five articles scheduled for Hanford authors for inclusion in the special July issue of the GE REVIEW have been mailed. Of the four other articles, one of them is "Technical Education for Nuclear Science and Engineering" Co-authored by D. W. McLenegan, a second is "Boiling Heat Tranfer" now in Schenectady for approvals, the third is "A Decade in Chemical Separation of Plutonium" just recently de-classified, and the fourth is "Reactor Operational Problems" now being de-classified.

A list of trade magazines that are most desirable as media for Hanford signed articles was compiled and sent to Harold Mallia, Schenectady News Bureau, for his comments. The list will be used to make sure that Hanford articles are placed with media that contribute most to our public relations objectives.

Eleven photographs with cutlines were mailed to the Advertising and Sales Promotion Department at San Francisco for consideration for inclusion in a display panel called "GE Manufacturing in the West."

The Supervisor of the Public Communications has been designated to collect timely unclassified information from all Department Managers the first thing on Monday and Thursday mornings. This information will be compiled in a report, cleared with the General Manager and sent by telegram the same day to N. P. Jackson at Schenectady who will forward it to Mr. C. W. LaPierre. The first report was submitted on March 28.

The March Newsletter was sent to Community Leaders in Paco, Kennewick and Richland.

The following speeches were arranged during the month:

Presentation or Submittion Date	Subject and Organization or Publication	Author
April, 1955	"Toxicity of Radiodine" at Harwell, England	Colonel John H. Rust

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

March 18, 1955	"Central Oregon, Its Volcanoes and Quicksilver" to the meeting of the Oregon Section of the A.I.M.E. in Portland, Oregon.	R. E. Brown
April 15, 1955	Will introduce and show the films, "A is for Atom" and "Here's Hanford" to the Chief Kamiakin Junior High School in Sunnyside, Washington.	W. A. Halteman
April 6, 1955	"Science and Engineering Shape Our Lives," at the Inland Empire Science Fair at Spokane, Washington on April 6.	D. W. McLenegan
April 7, 1955	"Human Relations" to a Nursing Service Group at St. Elizabeth Hospital in Yakima, Wash.	V. J. Byron
March 16, 1955	"Peacetime Use of Atomic Energy," to the Management Conference Committee of the Oakland California Chamber of Commerce in Oakland, California.	Dr. W.K.Woods
March 25, 1955	Will show "A is for Atom" and examine a cyclotron built by science students at the Moses Lake High School assembly.	D.J. Donahue

Dinner-information meeting conducted by the Manager-Employee and Public Relations was arranged, including development of material presented. Those in attendance were Section Managers and those exempt employees reporting directly to Section Managers.

Full page community relations advertisement was prepared and published in the March 28 special "Progress Edition" of the COLUMBIA BASIN NEWS.

Final arrangements were made for a March 14 Radiological Sciences Department information meeting held in the Jason Lee School auditorium.

Publicity concerning the March 25 Employee Attitude Survey was concluded with publication of photograph and accompanying caption in the March 25 GE NEWS, and an item in the March 31 Management NEWS Bulletin.

Five Management News Bulletins were produced and distributed to the exempt personnel.

Cost estimate on six Civil Defense communication items was prepared at the request of the Civil Defense coordinator. Actual production will proceed shortly.

Supervisors were informed of proposed $25 "deductible" feature as applied to dependent insurance through March 17 Management NEWS Bulletin. Follow-up letter and series of questions and answers were developed, approved and slated for distribution early in April.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

At the request of Union Relations, a letter to Field Technicians in Radiological Sciences Department, concerning the April 6 NLRB election, was prepared for the signature of Manager - Biophysics Section.

Layout for COLUMBIA BASIN NEWS community relations advertisement was developed, and layouts for two instrument technicians recruiting advertisements were prepared.

Pamphlet artwork completed during the month included: April health bulletin and safety topic, Radiological Sciences pamphlet, and covers for forthcoming training and development catalog of courses.

Radio Station KHQ, Spokane has indicated their desire to broadcast a HAPO-produced radio show as a public service. Their specific request was for a ten-minute version of INSIDE HANFORD which will be supplied them on a weekly basis as soon as a definite time is allocated for format features are worked out with the Program Director.

A proposal was formulated by Audio-Visual Communications and forwarded to the AEC in Washington D. C., requesting approval of a recommended policy to extend the production of training, education and documentary motion pictures to include other fields of distribution. These films will be of an education, orientation and informational type, thereby providing a multiple-purpose film including television, in our endeavors for national publicity. The television featurette HANDS ACROSS THE ATOM, plus scripts and recorded narration were sent to Washington as a pilot-film to illustrate the type of television film that would be produced.

HOO,AEC, asked that Audio-Visual prepare to make a recording of the entire public auction to be held next month, and agreed to request this service in writing. They stated that the tape recording made of their previous auction saved them many thousands of dollars.

A "showpiece" print of the HAPO produced color film, HERE'S HANFORD, was received from the studio and shipped to Jim Holdsworth and Dave Burke of Audio-Visual Services, Schenectady, for review in connection with the nation-wide distribution of the film by G-E.

Separations Section Management have requested an estimate from Audio-Visual Communications on a training-educational motion picture to cover complete operations of installation and removal of cell equipment by remote methods. They estimated several thousand dollars could be saved during emergency operations through graphic training of all personnel. Initial contacts, costs and basic filming necessities have been outlined and proposed for this project.

A meeting was arranged between Public Relations and AEC personnel for the purpose of developing the scoping of the final motion pictures that are being produced for the Commission on the 1952 Expansion Program. The meeting resulted in final footage estimates for the "Secret" training films on 105-K construction, principal display films for general distribution (unclassified) on 100-K and Purex construction, two "Secret" films on the highlights of the 100-K reactor and Purex construction and the editing of all accumulated film footage exposed on the Construction Program according to subject which will not be processed with sound. A schedule was established for preliminary production and final completion of the two display films.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

The Supervisor of Audio-Visual Communications served as consultant to the Richland Chamber of Commerce in the production of a "live" television program broadcast this month. The General Manager of HAPO and AEC's Hanford Operations Manager were the principals in a panel discussion conducted on a topic concerning Richland disposal legislation.

Graphics March assignments were distributed as follows:

	Percent
General Administrative (Includes Operations Research)	6
Employee and Public Relations	20
Engineering	34
Manufacturing	20
Financial	12
Radiological Sciences	4
Atomic Energy Commission	4

	February	March
Total Assignments completed	50	49
Total assignments backlog	34	21

Graphics has been contacted by representatives of the Engineering and Financial Departments and informed that material will be required for a presentation to the Philadelphia Electric Group early in April. Information required to accomplish this assignment has not been released to Graphics to date.

The "1954 at Hanford" annual report was printed and submitted to Classified Files for distribution. All revisions and corrections were made in the first week of March and the master plates were submitted to Printing on March 7, 1955. The first copy off the press was made available to the General Manager on March 16, 1955 for review.

Work continued in the preparation of display panels requested by the AEC-HOO Manager for use in the Weapons Display Room at Sandia, N. M. Completion of these displays was delayed due to problems encountered in obtaining photographs that would completely show the Hanford production process. The latest assignment issued to the Photo Unit was for pictures of up-to-date equipment used in metal preparation and photographs of new separation facilities.

Eleven large visual aids of a semi-automatic charging machine were prepared on a rush basis for the Reactor Operations Engineering Unit.

Three illustrations were prepared for use in an article to be released to the GE REVIEW for publication.

Visual aid assignments included preparation of ten slides for the Manager of Operations Research to use in an off-site lecture, twelve slides for a representative of the Metabolism Unit to use in a lecture on effects of radiation, two slides for Radiological Training on Ruthenium Emission and two large lecture aids for discussions on exposure hours and skin contamination.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

The embossograph sign unit was transferred to the Duplicating Unit on March 14, 1955. A total of 234 embossograph signs were completed in March by Graphics prior to the above transfer date.

Graphics Statistical Summary

	Charts or Graphs	Illustrations	Others
Report Material (Includes Technical Publications)	84	1	11
Technical or Scientific Illustrations		13	
Mechanical Art (Flow charts, schematics, maps, etc. - not for publication)	6	2	2
Lecture Material (Includes plates for slides)	9		
Posters and Embossograph Signs	1	2	234
General (Posting of current data, assembly, revisions, etc.)	51	15	61
	151	33	308

Embossograph signs completed	234
Charts, illustrations, etc.	258
	492

A total of 340 photographic assignments were covered for the month, and 19,073 prints were produced, of which 8,678 were "A" and "B" employee identification photographs. A total of 10,395 were area and news subjects.

The last month for trial liquidation reflected the following facts: 16% of our work was produced for Employee and Public Relations Department; 71% for the Engineering Department; 6% for the Manufacturing Department; and 7% for Radiological Sciences Department. A total liquidation against these Departments totals $7,757.30. An additional $1,338.70 was not liquidated as $819.10, charged against Security identification prints, is normally absorbed and $519.60, charged against construction filming program, is also absorbed. With the amounts actually liquidated against departments on this trial and those amounts not liquidated, a total $9,096.00 is accounted for. At this time a cost report is not available on the Photography Unit's overall expenses for the month but it is predicted that its expenses will be liquidated on this trial for liquidation for March, 1955.

Motion picture film exposed for the month was 2,500 feet.

See attached statistical report for Photography Unit.

PHOTOGRAPHY UNIT MONTHLY REPORT MARCH, 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	4" X 5" Color Transp.	16mm M.P. Film
EMPLOYEE & PUBLIC RELATIONS													
COMMUNITY ENG.				6	12			12					
Library				2	11			11					
Public Works & Recreation				8				5					
Fire			36	52	8			52					
Police			120		41			50					
EDUCATION & TRAINING				2	3			2					
EMPLOYEE COMM. & PUBLIC RELATIONS													
Audio-Visual Comm.	6				29			5			10		2,100'
Employee Comm.		59	18	6	149	2		205			13		
Photography						1							
Public Comm.		180	3	10	726			170				17	100'
Graphics	2		25			27							
HEALTH & SAFETY					12			2		4			
Industrial Medical									6				
PERSONNEL PRACTICES													
Employment	1,515							303					
Employee Services		8			4			14					
Technical Recruitment			15					7					
AUXILIARY OPERATIONS & PLANT PROTECTION													
Security & Patrol	2,982	4,054			42	2		30					
Fire Protection					14			5					
Telephone				2						2			
ENGINEERING													
ADVANCED ENGINEERING					62			6			6		
DESIGN			133	20	20	705		225					
Instrument Design						84		19					
PROJECT			13			798		159					

(Continued)

PHOTOGRAPHY UNIT MONTHLY REPORT MARCH (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	4" X 5" Color Transp.	16mm M.P. Film
ENGINEERING (Con't.)													
PILE TECHNOLOGY		19	222		378	5,069		443			83	18	300'
SEPARATIONS TECHNOLOGY					2	261		23			7		
MANUFACTURING													
METAL PREP.						4		2					
Instrument & Development Shop						3		2					
PLANT ENGINEERING			10					5					
REACTOR					30	301		50					
SEPARATIONS			3		40	88		32		8			
ELECTRICAL UTILITY					18			10					
RADIOLOGICAL SCIENCES					74			3		18			
BIOLOGY					6					16	14	20	
Aquatic Biology				150						8			
Metabolism					25		5						
BIOPHYSICS			13	12		22		17		2			
RADIOLOGICAL ENGR.			45										
RADIOLOGICAL RECORDS & STANDARDS				4		48							
OPERATIONS RESEARCH STUDY											7		
A.E.C. SAFETY					50			21					
A.E.C. SECURITY	77	50			15			24					
TOTALS	4,582	4,370	656	274	1,771	7,415	5	1,914	6	58	140	55	2,500'

	JANUARY	FEBRUARY	MARCH
TOTAL ASSIGNMENTS	266	223	340
TOTAL NEGATIVES	1,291	1,370	1,914

Employee and Public Relations

UNION RELATIONS

Union Relations - Operations Personnel

The National Labor Relations Board has scheduled a formal hearing to be held in Richland on April 5 to decide the appropriateness of a unit composed of Laboratory Assistants in the Manufacturing Department. The Company has sought dismissal of the petition on the basis that the unit is not sufficiently comprehensive, lacks a community of interest with production and maintenance employees, and exercises an analytical control function over the process which precludes its affiliation with the Chemical Workers. The meeting will be conducted by a local field examiner from the Seattle office with a transcript of the meeting to be forwarded to the NLRB in Washington without recommendations.

The Company has agreed to a consent election involving 22 Field Inspectors A, B, and C in the Regional Radiation Measurements Unit, Radiological Sciences Department. The election is scheduled for April 6 in the 300 Area.

Judge Harold A. Seering, Seattle, has been selected to arbitrate a dispute between the Company and the Hanford Guards Union. The Guards allege a violation of the call-in procedure. A Stipulation of Facts has been executed by the parties and forwarded to Judge Seering. This statement will provide the basis for the arbitrators award. However, the parties will argue their case by briefs, the first of which is to be presented to the arbitrator by April 12. These briefs will be exchanged between the parties and each will have an opportunity to present a second brief by May 2.

A negotiating meeting with the Material Expediters and Take-Off Men took place on March 1 and no further meetings have been scheduled. Agreement has been reached on a seniority arrangement and a revision in job titles but with no change in salary grade or progression.

We have served notice on the four HAPO bargaining units of a desire to open our Pension and Insurance Agreements which expire May 16. We propose to extend those Agreements to September 30 (terminal date of our local basic Agreements) to more nearly conform with the negotiations in the East. With respect to dependent insurance which is not technically a part of the Pension and Insurance Agreement but has always been handled informally by letter, we propose to negotiate a $25 deductible feature in an attempt to bring the cost of this coverage more in line with the premiums charged the employees.

Five exempt members of this section attended the Pacific Northwest Personnel Management Association meeting in Yakima on March 8.

Grievance Statistics:

A total of forty-one (41) grievances were received and five (5) Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

Employee and Public Relations

UNION RELATIONS

ALL DEPARTMENTS

	HAMTC	HGU	BSEIU	Total Unit	Total Nonunit
Received this month	41	0	0	41	0
Received this year	127	2	0	129	5
Step I					
Pending February 28	7	0	0	7	0
Settled this month*	29	0	0	29	0
Settled this year	61	2	0	63	1
Pending March 31	4	0	0	4	0
Step II					
Pending February 28	92	0	0	92	1
Settled this month**	20	0	0	20	1
Settled this year	33	1	0	34	4
Pending March 31	61	0	0	61	0
Arbitration					
Pending February 28	4	1	0	5	
Settled this month	0	0	0	0	
Settled this year	0	0	0	0	
Pending March 31	4	1	0	5	
Total Settled this month	49	0	0	49	1
Total Settled this year	94	3	0	97	5

BY DEPARTMENTS

	Received		Settled Step I*		Settled Step II**	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Manufacturing						
Reactor - Unit	16	56	15	25	5	10
Separations - Unit	13	38	11	22	4	9
Nonunit	0	3	0	1	0	2
Metal Preparation - Unit	4	10	1	5	3	4
Transportation - Unit	4	10	2	8	3	4
Electrical Utilities - Unit	1	4	0	1	2	2
Stores - Unit	1	2	0	0	1	1
Employee and Public Relations						
Community - Unit	0	3	0	0	1	2
Aux. Ops. & Pl. Pro. - Unit	2	5	0	3	1	2

*Grievances brought to Step II prior to January 1, 1955, but never processed by the union are, for the purpose of this report, considered settled at Step I.

**Grievances which the union formally indicated their intention to submit to arbitration but have taken no further action since January 1, 1955, are, for the purpose of this report, considered settled at Step II.

UNION RELATIONS

BY DEPARTMENTS (Cont'd.)

	Received		Settled Step I*		Settled Step II**	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Radiological Sciences - Unit	0	1	0	0	0	0
Engineering - Nonunit	0	1	0	0	0	1
Financial - Nonunit	0	1	0	1	0	0

*Grievances brought to Step II prior to January 1, 1955, but never processed by the union are, for the purpose of this report, considered settled at Step I.

**Grievances which the union formally indicated their intention to submit to arbitration but have taken no further action since January 1, 1955, are, for the purpose of this report, considered settled at Step II.

BY SUBJECTS

	Manufacturing		Emp. & Pub. Relations		Radiological Sciences		Engineering		Financial	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Unit										
Recognition	0	1	0	0	0	0				
Discrimination	0	1	0	0	0	0				
Jurisdiction	24	52	2	6	0	0				
Health-Safety-Sanitation	2	4	0	0	0	0				
Hours of Work	1	11	0	0	0	0				
Overtime Rates	6	16	0	0	0	0				
Vacations	0	1	0	0	0	0				
Seniority	0	3	0	0	0	0				
Wage Rates	4	6	0	1	0	0				
Miscellaneous	2	25	0	1	0	1				
Nonunit										
Continuity of Service	0	1	0	0	0	0	0	0	0	0
Overtime Rates	0	0	0	0	0	0	0	0	0	1
Wage Rates	0	2	0	0	0	0	0	0	0	0
Miscellaneous	0	0	0	0	0	0	0	1	0	0

Construction Liaison

Demands for hazardous and/or onerous pay for work performed in radiation or contamination zones are again being made by construction plumbers and electricians. Contractor, AEC, and GE resistance to these demands is very firm. The matter is significant because of the continuing and determined efforts on the part of both construction and operating unions to gain premium pay for this type work.

The union agreement between the project construction contractors and the Office Workers Union expires on May 31. By that time it is expected that the force of construction office employees will only number between 25 and 50. Negotiations nevertheless are continuing with this Union and the business representative has stated that an organizer is being sent in to build up the union membership. There is, of course, no source of office employees outside of the General Electric Company on which they can expend their efforts.

Employee & Public Relations

SALARY & WAGE ADMINISTRATION

1. The study of non-exempt jobs is progressing on schedule. To date approximately 700 different non-exempt jobs have been analyzed. It is expected that during the next week the testing phase of the study will be completed.

2. Work continued on the 1955 Northwest Area Wage Survey. A representative of Salary & Wage Administration is presently making plant visitations to survey participants, and all of the questionnaires have been received with the exception of three.

3. The results of a survey related to scientific personnel were analyzed and documented. A summary was also forwarded to interested department and section managers.

4. The Nomenclature Task Force met six times during the month. Tentative definitions of component designations and principal supervisory titles have been developed. The Task Force, however, is not optimistic toward elimination of the difficulties which arise from mandatory component designations. A number of recommendations currently under consideration will probably be firmed and released during the next month.

5. Exempt personnel files are being revised as time permits. Papers in each folder are being filed chronologically by type of action and fastened permanently to the folder.

6. Initial rough draft of report on first-line supervisory differential for the Manufacturing Department has been prepared. This report should be finished by the end of the month. Data has been received from the Financial and Employee & Public Relations Departments. A report of these findings should be available by the middle of April.

Employee and Public Relations Department
Education and Training Section

The report of the Education and Training Section is submitted as follows:

ROTATIONAL TRAINING PROGRAM

Present Assignments

The technical graduates on the Rotational Training Program are assigned to departments as follows:

Department	Last Month	This Month
Engineering		
Pile Technology	5	3
Separations Technology	5	6
Design	5	5
Project	1	2
Manufacturing		
Metal Preparation	3	3
Separations	0	0
Reactor	9	6
Radiological Sciences		
Biology	0	0
Records and Standards	0	0
Bio-Physics	3	3
Financial		
Procedures and Computing	1	0
Employee and Public Relations		
Personnel Practices	1	1
Total	33	29

Permanent Placements

There were six (6) placements off the Program, as follows:

Pile Technology	3
Reactor	2
Procedures and Computing	1

Seven (7) placements are expected during April.

Additions

Two (2) new graduates reported on the Program during March. Seven (7) additions are expected during April. One of these is a returning serviceman who went into active service two years ago due to ROTC commitments in college. Eight (8) new graduates have now reported on the Program since the first of the year.

In anticipation of approximately 100 new graduates to report in June, a housing survey was made in Pasco-Kennewick, since many of the married graduates will probably desire living in furnished apartments prior to purchasing furniture. Indications are that better housing will be available than during the past two years. There will be ample dormitory space for single men and an effort will be made to group the new Tech Graduates.

Selective Service

For the first time in 19 months, no trainees entered the armed forces due to Selective Service. During these 19 months 51 men were lost, of which number 43 were former members of the Program, seven (7) were direct hires, and one (1) was a member of the Program when drafted.

Slightly over 70 percent elected to be drafted rather than to enlist.

The losses by sections and the numbers vulnerable to Selective Service at the present time as as follows:

Department and Section	No. Lost To Date
Engineering	
Pile Technology	8
Separations Technology	6
Design	3
Project	7
Advanced Engineering	1
Manufacturing	
Metal Preparation	3
Reactor	8
Separations	8
Radiological Sciences	
Records and Standards	2
Biology	1
Bio-Physics	1
Employee and Public Relations	
Education and Training	1
Financial	
Procedures and Computing	2
Total	51

(17 of those vulnerable are now in 1-A classification and subject to immediate call).

Personal letters are being written at appropriate times to all of the technical trainees who are on military leave. Many of the recipients have expressed sincere appreciation for the interest shown in their welfare and a large percentage are expected to return, and these letters help to maintain an active tie.

Information Booklet

A booklet giving information on Program procedures and the 84 rotational assignments available on the Program is being prepared. It is expected that this type of booklet will be most useful in orienting new graduates.

Technician Training Program

A proposal outlining the advantages of establishing a program at HAPO for training promising high school graduates as technicians has been proposed to appropriate line managers. Involved are two years of rotational assignments each of six months' duration, paralleled by out-of-hours studies in science, mathematics and pre-engineering. Favorable reaction has been received from all sections reporting, with three sections yet to report.

Summer Programs

Three (3) university professors have been interviewed for summer assignments, as follows:

Professor Babb, University of Washington, Chemical Engineering
Professor Durnford, Montana State College, Electrical Engineering
Professor Engesser, Oregon State College, Industrial Engineering.

Professor Babb has accepted an offer in Separations Technology for the summer.

Four college juniors from Washington State College were interviewed, and two were made offers by Personnel Practices Section for summer employment. A total of four juniors has been employed for this Program. Eleven juniors are required to fill the requisition.

SCHOOL OF NUCLEAR ENGINEERING

School Enrollment for Spring Semester

Because of the large Spring enrollment the courses in Electronic Data Processing and in Quality Control have each been divided into two sections, so that there are 31 courses currently running.

Listed below are the Spring courses and the paid up enrollment

GRADUATE

Advanced Math	11
Complex Variables	15
Math Statistics II	8
Analogs and Analog Computers	7
Operations Research	17
Modern Physics II	10
Pile Physics I	5
Electricity and Magnetism	9
Physical Chemistry II	7
Colloid Chemistry	7
Heat-Power Cycles	6
Diff. Processes II	6
Elec. Trans. Prob. II	9
Reactor Design	11
Nuclear Metallurgy	45
Radiobiology	12
	185

COLLEGE-LEVEL

Intermediate Algebra	18
Plane Trigonometry	11
Analytic Geometry	9
General Chemistry	12
Elements of Measurement	12
Automatic Control	8
Mechanics-Statics	5
El. of Phys. Metallurgy	8
Inspection Sampling	7
Prin. of Qual. Control	19
El. Accounting II	8
Eng. Communications	16
Business Law II	14
Electronic Data Proc. (two sections)	35
	182

Total Number of students 367

This is the largest Spring enrollment in the history of the school. Only one other term in the first year of the School of Nuclear Engineering had a larger enrollment.

University Affiliations for graduate students are as follows for the Spring 1954 and Spring 1955 Semesters:

	Spring 1954	Spring 1955	% Increase 1955 over 1954
University of Idaho	42	64	
Oregon State College	13	14	
University of Washington	9	10	
Washington State College	4	14	
Totals	68	102	50 %
Total Enrollment in Graduate-level Courses	105	185	77 %
Total Paid Enrollment, Graduate and College-level	226	367	63 %

Visits

On March 9 and 10, 1955, five University of Idaho faculty members visited Richland to register and counsel their students. The faculty members were:

Dr. L. C. Cady, Dean of the Graduate School
Dr. W. H. Cone, Head, Physical Sciences Department
Dr. M. L. Jackson, Head, Chemical Engineering Department
Prof. J. H. Johnson, Professor of Electrical Engineering
Dr. O. B. Weeks, Member of the Graduate Council

Similar visits are scheduled soon with representatives of the Oregon State College and of the State College of Washington.

Special Requests

The Inspection Group asked the school to give a course in Quality Control so that their inspectors could make more effective use of these principles in their work. Because of the large enrollment, the inspectors are now in a special course tailored to their specific needs.

Messrs. Hunt and Lawson of the Purchasing and Stores Section have asked for a course in Blueprint Reading which will be of specific benefit to the buyers and materials control people. The school has arranged with Mr. G. H. Hill a course designed to fit this particular need, and the first meeting was held March 29, 1955 with 34 in attendance.

Approvals

Oregon State College, by action of the Graduate Council has approved the current Spring graduate courses for credit.

A number of college-level courses have been approved through the Extension Division by the University of Washington.

Employee and Public Relations Department
Education and Training Section

TRAINING

Programs Presented

A Customer Relations program was conducted during the month for 68 community firemen in order to improve their technique in handling the various situations which will come up during their inspection of the homes in Richland. This program was presented at the request of Pat Quane, Fire Chief, and he feels that it has been beneficial.

Effective Human Relations was conducted Wednesday, March 3, with eleven supervisors participating. The program was conducted by S. E. Linter, and was the first presentation of this program this year. Some changes have been made in the program, making use of the "Island Technique" of group discussion.

Meeting with Training Correspondents John J. McCarthy, Consultant - Education and Training, New York Office, visited us on Tuesday, Wednesday and Thursday, March 1, 2 and 3. On Thursday afternoon all training correspondence met in the conference room and were given a brief summary of all training programs. Mr. McCarthy explained the philosophy of training.

On Friday, March 4, the new program Report Writing was previewed. Some suggestions for minor changes were made, and the program will be presented in its entirety on Friday, April 1.

Two members of the Training Group are regular enrollees in the Work Simplification Program being conducted in 200-W Area.

Labor-Management Relations was presented to nine exempt personnel on Monday, February 28, This is a clause-by-clause explanation of our local union agreement, and also features a talk by the Manager of Union Relations.

PMS Group No. 79 started Monday, the 7th, and finished on Wednesday, the 16th. There were eleven supervisors attending, and the program was presented by R. B. Shoen. This is the shortest time in which this program has ever been presented. The program normally runs for 40 hours. We will continue to revise this program and anticipate that it can be shortened still further with a resultant saving of participants' time.

A special meeting on Conference Leading was conducted in 100-B Area on Tuesday the 16th and Wednesday the 17th, at the request of D. P. Schively, Reactor Section. The program was conducted by S. E. Linter and seven supervisors attended.

Job Instruction Training was conducted in the 300 area during the week of March 21, with a trial group of six supervisors. R. B. Shoen conducted the meetings. Questionnaires from this program indicate very good acceptance, and a survey will be made within the next couple of weeks to determine whether or not this program should be conducted further in the Metal Preparation Section.

Employee and Public Relations Department
Education and Training Section

Economic Facts of Everyday Living was offered for the first time this year on Tuesday, March 24. Eleven exempt personnal attended. The program was presented by V. J. Byron and D. W. McLenegan, and further study will be made to determine whether or not the program should be lengthened. This program formerly took two days (16 hours), was shortened to one day, and at the present time it is felt that one full day will probably provide time to amply cover this subject.

A regularly scheduled Conference Leading program was held Tuesday the 22d, for 17 exempt personnel. The group was divided into two parts with S. E. Linter and V. J. Byron, acting as conference leaders. This continues to be a popular and successful program.

At the request of Lee Knights, Separations Section, V. J. Byron presented the G. E. 9-Point Better Job Program to 22 exempt and non-exempt employees on Friday, the 25th. This was in connection with an orientation program being conducted for new employees of the Analytical Unit.

On Wednesday, March 9, V. J. Byron conducted the Accident Prevention Program in 200-W Area. There were 17 supervisors attending. This program makes liberal use of visual aids and is intended to help the supervisor in conducting interesting safety meetings. The Area Safety Engineer participates in this program, and covers the various types and methods of conducting safety programs.

On Tuesday morning, March 17, D. G. Dayton and V. J. Byron met with M. F. Rice, Manager - Transportation, to discuss Pre-Supervisory Training and Customer Relations Training for employees in the Transportation Section. Program outlines will be submitted to Mr. Rice for his approval, and the actual meetings will be held at the new transportation facilities.

The Training Program Booklet is expected to be in the hands of supervisors early in April. The script has been prepared, and distribution will depend on the speed with which it can be printed.

Although a Visual Aids Booklet has been prepared, no action has been taken toward having it printed. It now appears as though two booklets would be desirable, i. e., one for secretaries and one for supervisors. As soon as time permits publication of these booklets will be undertaken.

Plans have been completed for starting a group in Job Methods Instruction. This will be presented before a trial group in the Reactor Section and will begin April 5. This program in no way infringes on the work of our plant engineering people, and gives essentially the same principles as Work Simplification, in a shorter period of time. If the first group proves to be successful, it is hoped that this program can be given throughout the Reactor Section as well as to office personnel in various sections.

Further revisions were made on the script for the Stenographic-Secretarial Program and it is anticipated that it will soon be ready for presentation. At the present time it is planned to offer this program through supervision, just as our other programs are handled.

Employee and Public Relations Department
Education and Training Section

A Personal Development schedule was prepared and this will be discussed with correspondents in various sections so that individual training records may be kept on all exempt participants.

During the month program participation records of 131 employees were furnished to appropriate supervisors.

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
MARCH 1955

General

Personnel Changes

Seven additions and eleven deletions resulted in a decrease to 245.

Employee Relations

Employee attendance at 45 meetings was 295.

Visits

Dr. Bernard Bucove, chief of local health services and Misses Hazel Furman, Peterson and Julia Anderson were visitors from the State Health Department. Mr. Spencer Crookes, University of Washington, Department of Community Development was also a visitor.

Industrial Medicine

Two industrial physicians were terminated—one due to retirement and one to enter private practice.
Medical examinations increased from 820 to 918 while dispensary treatments increased from 5148 to 6428.
Sickness absenteeism was 1.82% vs 1.66% for February while total absenteeism was 2.48% vs 2.30%. The year to date total absenteeism of 2.40% compares with 2.63% for 1954. Two more claims of hearing loss alleged to be due to industrial noise were reviewed by the Department of Labor. This brings the total to four cases which have been reviewed by the Appeal Board. No decisions have been made.

Safety & Fire Prevention

Statistics	Operations	Community	Total
Major Injuries	0	0	0
Sub-major Injuries	1	0	1
Minor	539	28	567

The minor injury rate was even higher than the high rate for February due to many eye injuries arising out of the heavy winds and possibly also to more conscientious reporting of injuries.
One minor plant fire was reported.
Substandard safety and fire conditions in the paint spraying operation in the Central Transportation Facility are being remedied.

Kadlec Hospital

The average daily adult census decreased sharply from 76.3 to 60.1 as compared with 78.0 a year ago. This is 18% lower than any other March during the period 1948 to date. Because of the low census, the pediatrics and medical nursing services were combined. Visitor control and noise due to closeness of the children to the adults are major problems caused by this economy move. The low census resulted in a year to date overrun of about $13,000 in the hospital budget. Present indications are that the census will be lower than budget figures in April.

HEALTH & SAFETY SECTION

MARCH 1955

General

Public Health

Dr. E. Warren, local psychiatrist, well qualified in Public Health was secured to act as part time public health officer until the unit is consolidated with the Benton-Franklin Counties Health Unit. A proposal by Mr. David Shaw to the Bi-County Health Unit for consolidation was given favorable consideration and a committee was appointed to work out and propose details for the merger, which it is hoped may be effected shortly after the arrival of the new public health chief for the Bi-County Unit next June.

Mosquito control activities have been transferred to Public Works, with functional guidance from the Sanitarians in preparation for the change to the Bi-County Unit.

Costs-February

	January	February	Feb. Budget
Industrial Medicine	$44,385	$42,496	$47,852
Public Health (Oper.)	9,600	9,252	10,324
Kadlec Hospital (Net)	10,886	14,921	16,715
Hospital Expense Credits	1,537	1,374	2,000
Safety and Fire Prevention	13,173	12,850	20,412
Total Health & Safety	$79,581	$80,893	$97,303

The net cost of operating the Health and Safety Section before charges were assessed to various departments was $80,893, about $1,000 more than the January costs and $16,000 below the budget. Major contribution to the underrun was $7,000 for Safety prizes budgeted and not won and $5,000 from Industrial Medical underrun.

HEALTH & SAFETY SECTION

MARCH 1955

Industrial Medical Services

The total number of examinations increased from 820 to 918. General Electric employees sustained no major injuries and one sub-major. Contractor employees sustained no major injuries and one sub-major. The total number of dispensary visits increased from 5148 to 6428. Medical services for Blaw-Knox construction personnel were begun in the 200E area during the month. Remodeled dispensary facilities in the 300 area were completed and services begun in the new location April 4. There were 999 patient visits in the 300 area during the month and 1619 in the 200W area.

Two physicians left the industrial staff as of March 31st. Dr. Seely left to go into private practice, and Dr. Miller was retired. Only one replacement is anticipated soon.

On March 15 and 16, two Department of Labor hearings before the Appeal Board were held. These cases alleged hearing loss due to exposure to noise. Our position was that in these cases, there was not sufficient evidence to establish the allegation.

A study of the proposed decontamination facilities in the 100H and 200W areas was completed and the problem of whether or not to have one of these facilities in the 300 area is yet to be decided.

Procedures for closer follow-up of job injured employees being treated by private physicians are being worked out with the insurance and time offices. The objective is to effect return to work as soon as possible by contact with the private physician and the injured employee.

The Health Activities Committee met on March 17th, and the topic on tuberculosis was presented. Material on this subject was prepared for distribution to all employees.

Net costs for February reflected a decrease from January costs of $4107 due to lowered salaries and related continuity of service and an increase in expense credits. During the month of February, there were only twenty-eight working days as compared with thirty-one in January. Services rendered the Atomic Energy Commission in connection with Minor Construction employees increased nearly $2000 during the month.

Costs - Operations

	January	February	Increase (Decrease)
Salaries	$33,672	$31,245	$(2,427)
Continuity of Service	3,030	2,812	(218)
Laundry	174	186	12
Utilities, Transportation, Maintenance	3,953	3,930	(23)
Supplies and Other	4,547	5,124	577
Total Gross Costs	45,376	43,297	(2,079)
Less: Revenue	991	801	(190)
Expense Credits	8,784	11,002	2,218
New Cost of Operation	$35,601	$31,494	$(4,107)

At the end of eight months, actual expenses are approximately $12,000 (4%) under budget. It is expected that this favorable condition will prevail for the balance of the fiscal year.

HEALTH & SAFETY SECTION

MARCH 1955

Industrial Medical Services (Continued)	February	March	Year to Date
Physical Examinations			
Operations			
Pre-employment	109	213	407
Rehire	17	19	55
Annual	116	74	485
Interim	43	18	252
A.E.C.	23	29	76
Re-examination and recheck	113	200	484
Termination	62	71	206
Sub-total	483	624	1965
Contractors			
Annual	29	35	82
Pre-employment	253	142	552
Recheck	43	68	157
Termination and Transfer	12	49	70
Sub-total	337	294	861
Total Physical Examinations	820	918	2826
Laboratory Examinations			
Clinical Laboratory			
Government	92	100	287
Pre-employment, Termination, Transfer	2811	3062	7986
Annual	667	430	2674
Recheck (Area)	231	143	1360
First Aid	11	6	37
Total	3812	3741	12344
X-Ray			
Government	18	15	48
Pre-employment, Termination, Transfer	430	432	1200
Annual	187	123	833
First Aid	65	94	244
Total	700	664	2325
Electrocardiographs	86	88	279
Physical Therapy Cases Referred	236	242	753

HEALTH & SAFETY SECTION

MARCH 1955

Industrial Medical Services (Continued)	February	March	Year to Date
First Aid Treatments			
Operations			
New Occupational Cases	508	638	1500
Occupational Case Retreatments	1482	1841	4568
Non-occupational Treatments	2626	3045	8192
Sub-total	4616	5524	14260
Construction			
New Occupational Cases	93	170	342
Occupational Case Retreatments	298	577	1091
Non-occupational Treatments	141	157	387
Sub-total	532	904	1820
Total First Aid Treatments	5148	6428	16080
Major Injuries			
General Electric	0	0	2
Contractors	0	0	0
Total	0	0	2
Sub-Major Injuries			
General Electric	3	1	5
Contractors	0	1	1
Total	3	2	6
Nurses' Visits			
Calls made	2	5	7
Employee Personal Illness	1	3	4
No. absent due to illness in family	0	1	1
No. not at home when call was made	1	1	2

HEALTH & SAFETY SECTION

MARCH 1955

Kadlec Hospital

The average daily adult census decreased substantially from the previous month from 76.3 to 60.1, as compared with 78.0 a year ago. This is the lowest figure for March for many years. It is significant to note that although the census dropped about 21% from February to March, there was actually an increase in the number of admissions due largely to the longer month, 493 for February and 514 for March. The average length of patient stay also decreased approximately 12% (4.1 for February and 3.6 for March). A comparison of the March census for the past several years is of interest:

March 1948 - 73.2
" 1949 - 87.1 (includes a few patients in North Richland hospital)
" 1950 - 76.6
" 1951 - 97.7
" 1952 - 90.5
" 1953 -101.3
" 1954 - 78.0
" 1955 - 60.1

The current census of 60.1 represents an occupancy percentage of 55.1, broken down as follows: Mixed Service (Medical, Surgical, Pedicatrics) 56.7; Obstetrical Service 48.6. A further breakdown of the Mixed Service shows an occupancy percentage of 40.3 on Medical, 73.8 on Surgical, and 60.0 on Pediatrics.

The minimum and maximum daily census ranged as follows:

	Minimum	Maximum
Mixed Service	34	64
Obstetrical Service	6	15
Total Adult	44	74

The average daily newborn census decreased from 11.7 to 9.5, as compared with 11.6 a year ago.

As a part of the continuing program of reducing expenses to compensate for the loss of revenue resulting from the lowered census, the Pediatric service was consolidated with the Medical service on March 25. This enabled us to provide good nursing service with four less nurses. The move was thoroughly reviewed with the doctors concerned with their opinions and suggestions being solicited. The hospital personnel affected were also kept informed of the need for this change and its progress. One week's experience with this consolidation has brought forth a great deal of opposition and resistance from the Pediatricians, and the problems involved will be watched very closely for possible adjustments which may become necessary.

Hospital Unit (Continued)

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	4.10
Obstetrical	5.25
Newborn	3.46

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of February was 1.93. When newborn infants are included, the ratio is 1.72.

The net expense for the operation of Kadlec Hospital for February was $14,921, as compared with $10,886 for January. Summary is as follows:

Kadlec Hospital net expense $14,921

This is an increase of about $4,000 over the previous month, but approximately $1,800 under the budget for February. The increase is due to the fact that revenue decreased by $6,746. Primarily from the shorter month, gross costs decreased by $2,874, and expense credits decreased $163. This budget underrun reduced the amount the hospital has exceeded its budget on a year-to-date basis to approximately $1,500. This compares with an overrun at the end of January of $3,300, at the end of December, 1954 of $8,000, and at the end of November, 1954 of $14,500. However, with the very substantially lowered census for March as reported above, this overrun will show a great increase at the end of March.

On March 9, Mr. O. E. Bakko represented the hospital at a breakfast meeting of the local Ministerial Association at which Dr. A. G. Corrado, Chief of Staff at Kadlec Hospital was also present. Purpose was to become better acquainted and also to discuss any problems or questions of mutual interest to the ministers, the physicians and the hospital. It was a very gratifying meeting in that the relationship between the groups represented is very good.

Two meetings of the Tri-City Hospital Council with Mr. O. E. Bakko as chairman have been held this month with joint plans for publicizing National Hospital Week, May 8-14 being made. Kadlec Hospital has also held its own meetings with specific reference to plans for our Open House on May 11. The Kadlec Auxiliary is again this year providing a tremendous amount of assistance in this planning.

Hospital Unit (Continued)

An air conditioning problem of major importance has been studied this month. The most recently constructed addition to the obstetrical wing of the hospital has experienced poor control of temperature as well as dirt being transmitted through the system. At the present time, a work order has been issued for several changes to be made in the unit and it is expected that this will solve or at least greatly relieve the problem.

The following is a summary of employee relations meetings held in the Health and Safety Section during the month of March:

	Meetings	Attendance
Hospital	34	214
Industrial Medicine	3	13
Public Health	5	45
Safety & Fire Prevention	1	11
General	2	12
Total	45	295

Hospital Unit (Continued)	February	March	Year to Date
Kadlec Hospital			
Average Daily Adult Census	76.3	60.1	70.0
Medical	18.1	14.9	18.9
Surgical	28.6	23.6	26.0
Pediatrics	19.2	11.4	14.7
Mixed	65.9	49.9	59.6
Obstetrical	10.4	10.2	10.4
Average Daily Newborn Census	11.7	9.5	10.3
Maximum Daily Census:			
Mixed Services	83	64	83
Obstetrical	19	15	19
Total Adult Census	95	74	95
Minimum Daily Census:			
Mixed Services	45	34	34
Obstetrical Service	3	6	3
Total Adult Census	50	44	44
Admissions: Adult	493	514	1574
Discharges: Adult	526	521	1570
Medical	115	127	378
Surgical	230	229	678
Pediatrics	106	84	281
Mixed	451	440	1337
Obstetrical	75	77	229
Newborn	70	67	208
Patient Days: Adult	2136	1864	6295
Medical	507	463	1702
Surgical	800	733	2339
Pediatrics	539	352	1322
Mixed	1846	1548	5363
Obstetrical	290	316	932
Newborn	327	293	926
Average Length of Stay: Adults	4.1	3.6	4.0
Medical	4.4	3.6	4.5
Surgical	3.5	3.2	3.4
Pediatrics	5.1	4.2	4.7
Mixed	4.5	3.5	4.0
Obstetrical	3.9	4.1	4.1
Newborn	4.7	4.4	4.5
Occupancy Percentage: Adults	70.0	55.1	64.2
Medical	48.9	40.3	51.1
Surgical	89.4	73.8	81.3
Pediatrics	101.1	60.0	77.4
Mixed	74.8	56.7	67.7
Obstetrical	49.5	48.6	49.5
Newborn	45.0	36.5	39.6

(Occupancy Percentage based on 109 adult beds and 26 bassinets.)

Hospital Unit (Continued)	February	March	Year to Date
Kadlec Hospital (Continued)			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.06	4.10	
Obstetrics	5.59	5.25	
Newborn	3.08	3.46	
Avg. No. Employees per Patient (excluding newborn)			
Operations: Major	64	71	208
Minor	86	98	258
E.E.N.T.	61	54	177
Dental	0	2	3
Births: Live	65	65	200
Still	2	1	5
Deaths	6	3	12
Hospital Net Death Rate	.34%	.17%	.28%
Net Autopsy Rate	16.6	0	25.0
Discharged Against Advice	1	0	1
One Day Cases	162	163	480
Admission Sources:			
Richland	80.5	79.2	79.4
North Richland	6.9	8.9	8.3
Other	12.6	11.9	12.4
Admissions by Employment:			
General Electric	75.3	74.7	74.1
Government	2.8	3.9	2.4
Facility	6.9	3.9	5.5
Contractors	8.1	8.6	10.5
Schools	.6	2.1	1.1
Others	6.3	6.8	6.4
Hospital Outpatients:			
First Aid	467	424	1412
Clinical Laboratory	166	182	506
Bacteriological Laboratory	61	44	186
X-Ray	138	164	461
Physical Therapy	313	335	989
Physical Therapy Treatments			
Outpatient Treatments	315	371	1021
Hospital	69	88	243
Total	384	459	1264
Pharmacy			
No. of Prescriptions Filled	2613	2522	8189
No. of Store Orders Filled	503	516	1553

HEALTH & SAFETY SECTION

MARCH 1955

Hospital Unit (Continued)	February	March	Year to Date
Kadlec Hospital (Continued)			
Clinical Laboratory Examinations			
Outpatient Examinations	469	395	1308
Hospital	3775	3491	11646
Public Health	1	0	1
Total	4245	3886	12955
X-Ray Examinations			
Outpatient Examinations	153	164	517
Hospital	253	212	710
Public Health	7	6	32
Total	413	382	1259
Electrocardiographs			
Outpatient Examinations	2	0	4
Hospital	24	19	80
Total	26	19	84
Bacteriological Laboratory			
Treated Water Samples	176	201	568
Milk Samples (Inc.Cream & Ice Cream)	30	38	106
Other Bacteriological Tests	603	496	1711
Total	809	735	2385
Patient Meals			
Regulars	2907	2882	9158
Children under 8	1254	744	2941
Specials	888	572	2608
Softs	578	646	1932
Tonsil and Adenoid	96	75	258
Liquids	160	136	429
Surgical Liquids	72	92	256
Total	5955	5147	17582
Cafeteria Meals			
Noon	1646	1794	5228
Night	290	353	934
Total	1936	2147	6162

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HEALTH & SAFETY SECTION

MARCH 1955

Public Health Unit

The department and community suffered a great loss during the month owing to the resignation of its Chief, Dr. Ralph Sachs.

The total number of communicable diseases again showed a seasonal increase of about 10% over February, largely due to mumps. This, as usual, increased the home nursing visits, office calls and time spent on school activities.

There was a decided increase in preventive inoculations and vaccinations.

A quarterly Orthopedic Clinic was held in which 21 patients were seen with Dr. C. Don Platner attending.

It should be noted that, as a result of the closing of the North Richland branch concommitant with the emigration, there has been a sharp decline in Public Health activities there. This has permitted a great increase of services in Richland proper.

The number of cases seen in Social Service has increased as have the number of hours of service given.

Of the 352 contacts made by the social service counselors this month, 230 were focused on problems in family relationships. This included marital conflict and conflict between parents and their children.

Personality and behavior problems were the focus of 101 contacts. There were 55 direct contacts with children, 28 with adolescents and 18 with adults.

In addition 19 contacts were made in regard to problems stemming from physical or mental illness.

Two contacts were made regarding economic need.

Restaurants are still in the process of being graded. Results so far indicate there will be ten Grade A and nine Grade B restaurants. Establishment which showed a Grade C has sold out and the new owner has made many improvements and should qualify for a Grade B card. One food handler's training course was held for personnel in a new restaurant which was put into operation.

Plans were inspected for a new Drive-In restaurant. Due to possible contamination, the plumbing plans were disapproved.

A thirty day improvement notice was sent to a local bakery due to numerous insanitary conditions found when inspection was made. A letter was sent to the State Department of Agriculture regarding this bakery requesting their assistance since bakeries are licensed by them.

Bacteriological analysis of twenty-one pasteurized milk samples were found to be satisfactory.

Public Health Unit (Continued)

Due to bad weather and the breaking in of a new driver, mosquito control burning has not progressed very well. Approximately 300 acres of land have been burned so far and two miles of ditches cleaned and burned. Army Engineers are working on the area south of CAP airport and are providing access roads and better drainage to the troubled areas.

Water and sewage samples were found to be satisfactory from the bacteriological standpoint.

At the monthly meeting of the Board of Health, recommendations concerning the control of scavengers at the dump and new rules and regulations for the handling and collection of garbage and refuse were discussed. These were submitted to the City Council but were returned for further study.

Word also reached the Department of the proposal to merge it with the Benton-Franklin District Health Department.

Visitors at the Department during the month were: Hazel Furman, Dr. Bernard Bucove, Julia Anderson and Miss Peterson from the State Health Department. Also Spencer Crookes from the University of Washington, Department of Community Development.

HEALTH & SAFETY SECTION

MARCH 1955

Public Health (Continued)	February	March	Year to Date
Education			
Pamphlets distributed	11,000	15,020	37,017
News Releases	0	15	15
Staff Meetings	1	0	2
Classes	14	39	61
Attendance	160	588	807
Lectures & Talks	16	8	44
Attendance	947	518	2067
Films Shown	7	30	53
Attendance	750	860	2197
Community Conferences & Meetings	10	11	41
Radio Broadcasts	8	8	16
Immunizations			
Diphtheria	8	119	178
Diphtheria Booster	64	51	640
Diptussis	0	0	15
Tetanus	0	0	1
Tetanus Booster	3	0	4
Pertussis	0	0	1
Pertussis Booster	3	0	4
Smallpox	293	488	1334
Smallpox Revaccination	0	0	0
Tuberculin Test	8	0	10
Immune Globulin	25	19	49
Other	0	0	1
Social Service			
Cases carried over	94	98	301
Cases Admitted	13	19	44
Cases closed	9	13	49
Remaining case load	98	104	296
Activities:			
Home Visits	2	1	5
Office Interviews	311	351	992
Conferences	56	50	179
Meetings	13	21	46
Sanitation			
Inspections made	106	124	333
Conferences held	33	31	81

HEALTH & SAFETY SECTION

MARCH 1955

Public Health (Continued)	February	March	Year to Date
Communicable Diseases			
Chickenpox	40	26	124
German Measles	17	14	35
Impetigo	0	0	3
Influenza (U.R.I.)	0	0	4
Infectious Mononucleosis	6	2	9
Infectious Hepatitis	5	3	10
Measles	7	4	13
Mumps	55	110	192
Pinkeye	2	0	2
Pneumonia	0	1	1
Ringworm	1	5	9
Roseola	5	1	7
Scarlet Fever	28	20	66
Tuberculosis	1	0	1
Whooping Cough	1	0	5
Total	168	186	481
Total No. Nursing Field Visits	533	553	1514
Total No. Nursing Office Visits	43	50	158

COMMUNITY SECTION

MARCH 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	26
Fire Unit	66	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	10*
Public Works & Recreation Unit	7	38	7	41
	130	284	130	290

	Exempt	Nonexempt
Additions to Payroll	3	8
Transfers In	0	4
Removals from Payroll	0	2
Transfers Out	3	4

Net Increase 6

* Includes two half-time employees.

MAINTENANCE AND RENOVATION UNIT

March, 1955

		Exempt	Nonexempt
Employees -	Beginning of month	9	142
	New hires	0	3
	Transfers out	0	2
	Leave of absence - illness	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	84	8	66	18
B	145	15	106	39
C	9	7	8	1
D	0			
E	6	0	3	3
F	31	7	26	5
G	0			
H	51	9	36	15
K	2	2	2	0
L	1	1	1	0
M	1	0	1	0
Q	3	0	3	0
R	1	0	1	0
S	1	0	1	0
T	3	0	3	0
U	18	0	15	3
V	44	0	36	8
Y	95	9	85	10
Z	6	0	6	0
1BP	65	13	51	14
2BP	452	116	351	101
3BP	314	61	266	48
Tract	17	0	9	8
1BR Apt.	11	2	9	2
2BR Apt.	0			
W-13 Apt.	1	0	0	1
TOTAL	1361	250	1085	276

7 Units added

Est. MH B. F.	36,997	Act. MH B. F.	37,016
Est. MH This Mo.	10,343	Actual MH This Mo.	10,248
Total Est. MH	47,340	Total Actual MH	47,264

PLUMBING SHOP

FOREMAN - F. L. ELSENSOHN

JOB DESCRIPTION	NO. COMPLETED
Electric water heaters replaced	32
Laundry trays replaced	35
Shower stalls replaced	6
Miscellaneous plumbing work orders completed	16
Cleared major sewer stoppages caused by trees	81
Time spent on plumbing service orders	99 Hours.
Plumbing for floor and sink linoleum replacement	78
Work orders completed on steam	5
Dormitory radiators completely overhauled	5

Made routine steam inspection once each week in Government owned facilities, dormitories and apartments.

Dug cleanouts and laid sewer line in preparation for use of busses as change busses for exterior paint program.

Excavated for sewer lines for cleaning out of roots and backfilled.

Landscaped where sewers were dug, prefabs removed, and hauled away old blacktop.

Disposed of all salvageable material.

Assisted Public Works in excavation and cleaning out main sewer stoppages.

Installed new pump at 2903 Burlin Road.

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	364
B. Received during the month	2263
C. Completed during the month	2405
D. On hand at the end of the month	222

E. A total of 150.3 hours were expended on work orders.

F. Backlog of incomplete service orders by craft:

Electrical	98
Plumbing	107
Carpentry	17
Total	222

RENOVATION AND LABOR CREW

FOREMAN - B. C. BAIN

The following services were performed during the month:

Vacant houses renovated	46
Trash pickups	37
Minor carpentry repairs to housing units	40
Minor carpentry repairs to dormitories	11
Renovation houses sprayed for insect control	4
Renovation minor paint jobs	27
Renovation complete paint jobs	5

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	234
Routine furnace inspections	320

Routine inspection and lubrication of Ranch house furnaces has been completed. Routine inspection and lubrication of furnaces in Precut houses has been started on Abbot and Adams Streets.

All coolers in dormitories have been repadded, lubricated, and minor repairs made to same for summer operation.

B. Sheetmetal Crew:

Shower stalls installed	7
Replaced smoke pipes	9
Installed gutters	17
Installed Ranch house bathroom window flashings	60
Installed Ranch house window braces	48
Fabricated shower stalls	24
Prefab metal door keepers	96

C. Labor Crew:

Tree removal orders	89
Picked up trees removed by tenant	13
Top soil orders	4
Picked up broken blacktop and trash	14

LINOLEUM AND CARPENTER SHOP

FOREMAN - R. M. MARTIN

Repaired bath wall tile	1
Replaced bath floor linoleum	6
Repaired bath floor linoleum	2
Replaced living room linoleum	3
Replaced dining room linoleum	1
Replaced kitchen floor linoleum	35
Repaired kitchen floor linoleum	6
Replaced hall linoleum	2
Replaced steps linoleum	24
Replaced sink top linoleum	85
Repaired sink top linoleum	5
Replaced work bench linoleum	13
Jack and shim	4
Repaired porches	3
Replaced sinks	9
Sash balances	1
Chempoints	182
Paint touch ups	84
Exterior door repairs	2
Interior carpentry - houses	198
Drilled weepholes	69
Sidewalk forms	1
Repaired floor boards	10
Repaired roofs	220
Ranch house screens	23
Repaired basement stairs	1
Repaired basement wall	2
Replaced floor linoleum - commercial facilities	1

COMMUNITY SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
MARCH 1955

ORGANIZATION

	Exempt	Non-Exempt
Employees - Beginning of Month	16	31
Transfers In	0	0
Transfers Out	0	0
New Hires	0	0
Terminations	0	0
Total - End of Month	16	31

GENERAL

A meeting of the Police Athletic League was held on March 8, at which time projects were discussed for the coming year. Newly elected officers for this term are: President, T. J. McGuire; Vice President, K. C. Jones; Secretary, Carol Goggin; Treasurer, W. W. Kerr; and Trustees, H. W. Strock, H. V. Meigs, and J. L. Barron.

During the month of March, the Richland Police Department, in cooperation with the Richland Safety Council, conducted a "Jaywalker" program, which was originated to stimulate pedestrian safety throughout the city. Only one "Jaywalker" was identified during the campaign.

The Police Department has been assisting the Junior Chamber of Commerce in planning the Jaycee's annual Teen-age Road-E-O to be held in April and May. Contestants may be any teen-ager less than 20 years of age and who has not received a moving traffic violation in the past six months. The first part of the elimination will be a written 50 question test to be given the latter part of the month. The test of actual driving skill will be conducted on a special course to be laid out on Wellsian Way on May 1.

TRAFFIC RICHLAND	1955 FEB.	1955 MAR.	1954 FEB.	1954 MAR.	1955 TOTAL TO DATE	1954 TOTAL SAME PERIOD
REPORTABLE ACCIDENTS	17	14	25	14	65	71
PROPERTY DAMAGE ACCIDENTS	14	14	22	10	58	61
INJURY ACCIDENTS	3	0	3	4	7	10
TOTAL PERSONS INJURED	3	0	3	4	9	10
FATAL ACCIDENTS	0	0	0	0	0	0
ACCIDENTS-DAYLIGHT HOURS	12	11	16	11	40	47
DARKNESS	5	3	9	3	25	24
ACCIDENTS-BUSINESS DIST.	3	3	7	3	11	18
RESIDENTIAL "	10	8	13	9	44	42
OTHER "	4	3	5	2	10	11
ACCIDENTS INVESTIGATED	10	8	11	9	39	36
CRIMINAL COMPLAINTS FILED	5	5	6	5	15	20
VIOLATIONS CONTRIBUTING TO ACCIDENTS:						
NEGLIGENT DRIVING	2	1	7	3	5	13
FAIL.TO YIELD RIGHT OF WAY	4	1	7	3	13	14
FOLLOWING TOO CLOSELY	1	4	4	3	8	15
DRUNK DRIVING	1	0	0	0	2	0
PEDESTRIAN VIOLATION	1	0	0	0	1	0
INATTENTION TO DRIVING	0	2	2	0	2	2
RECKLESS DRIVING	0	0	1	1	0	2
SPEEDING	0	0	1	0	1	1
UNSAFE SPEED	4	0	3	0	18	19
IMPROPER PARKING	0	0	0	0	0	3
IMPROPER BACKING	2	0	0	3	5	0
DISREGARDING STOP SIGN	0	2	0	0	2	0
HIT AND RUN	0	0	0	0	1	0
IMPROPER PASSING	0	1	0	0	1	0
IMPROPER TURN	1	1	0	0	3	1
FAILURE TO SIGNAL	0	1	0	0	1	0
WIDE RIGHT TURN	0	0	0	0	0	0
BICYCLE VIOLATION	0	0	0	1	0	1
DEFECTIVE EQUIPMENT	0	0	0	0	0	0
WRONG SIDE OF ROAD	1	0	0	0	1	0
ANIMAL IN ROAD	0	1	0	0	1	0
NORTH RICHLAND						
REPORTABLE ACCIDENTS	6	9	7	7	27	24
PROPERTY DAMAGE ACCIDENTS	5	8	6	6	25	21
INJURY ACCIDENTS	1	1	1	1	2	3

RICHLAND	1955 FEBRUARY	1955 MARCH	1955 AVE.PER ACCIDENT FEBRUARY	1955 AVE.PER ACCIDENT MARCH	1954 AVE.PER ACCIDENT FEBRUARY	1954 AVE.PER ACCIDENT MARCH
ACCIDENT PROPERTY DAMAGE	$5,888.08	$2,015.03	$346.36	$143.93	$222.66	$232.50

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 12
Number of men fired over the Army-L course 12

Qualifications on the Army-L course as follows:
Expert 5 41 2/3% Sharpshooter 3 25 %
Marksman 2 16 2/3% Unqualified 2 16 2/3%

ACTIVITIES	February		March	
	Richland	North Richland	Richland	North Richland
Bank escorts and details	2	4	1	4
Bicycles impounded	0	0	0	0
Bicycle violations, other	0	0	0	0
Bicycles registered	33	0	31	0
Children lost or found	13	2	20	1
Complaints investigated	26	2	31	1
Deaths reported	0	0	1	0
Dog, cat, loose stock complaints	3	0	1	0
Dogs, cats, reported lost or found	7	1	3	0
Doors, windows found open in facilities	25	12	40	13
Emergency messages delivered	7	44	8	29
Fires investigated	11	1	18	4
Guns registered	13	0	14	0
Law enforcement agencies assisted	4	0	5	0
Letters of inquiry	213	0	257	0
Miscellaneous escorts	2	1	9	2
Persons injured by dogs	3	0	1	0
Plant departments assisted	22	0	35	2
Prisoners processed through Jail	12	12	7	4
Private individuals assisted	8	3	12	3
Property lost or found	16	1	18	0
Records inquiries	70	0	65	0
Reports processed through Records	265	94	229	56
Street lights out reported to Electrical	197	15	230	20
Traffic safety meetings (March attendance 495)	11	0	11	0
Total	963	192	1047	139

MONTHLY REPORT
RICHLAND POLICE DEPARTMENT
(RICHLAND - NORTH RICHLAND)
MARCH 1955

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART I								
1. Criminal Homicide								
a. Murder & Non-Neg. Mans.								
b. Mans. by Negligence								
2. Rape								
3. Robbery								
4. Aggravated Assault								
5. Burg.-Break. & Entry	3	-	-	-	-	-	-	-
6. Larceny Over $50.00	5	-	1	-	1	-	1	-
Under $50.00	22	1	1	-	4	-	1	1**
7. Auto Theft	-	-	-	-	-	-	-	-
TOTAL PART I CASES	30	1	2	-	5	-	2	1
PART II								
8. Other Assaults	1	-	-	-	-	-	1	-
9. Forgery & Counterfeit	4	1	-	-	-	-	2	-
10. Embezzlement & Fraud	2	-	-	-	-	-	-	-
11. Stolen Prop:Buy:Receive	-	-	-	-	-	-	-	-
12. Weapons:Carry:Possessing	-	-	-	-	-	-	-	-
13. Protitution	-	-	-	-	-	-	-	-
14. Sex Offenses	-	-	-	-	-	-	-	-
15. Offenses Ag. Fam. & Child	-	-	-	-	-	-	-	-
16. Narcotics	-	-	-	-	-	-	-	-
17. Liquor Laws	-	1	-	-	-	-	-	1
18. Drunkenness	4	-	-	-	-	-	4	-
19. Disorderly Conduct	-	-	-	-	-	-	-	-
20. Vagrancy	-	-	-	-	-	-	-	-
21. Gambling	-	-	-	-	-	-	-	-
22. Drunk Driving	1	1	-	-	-	-	1	1
23. Viol. Road & Driving Laws:								
Fail. to Stop & Identify	4	-	-	-	2	-	1	-
Speeding	31	6	-	-	9	1	22	5
Stop Sign	22	10	-	-	3	1	19	9
Reckless Driving	4	1	-	-	-	-	4	1

	OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
		Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
	Right of Way	6	2	-	-	2	-	4	2
	Negligent Driving	10	6	-	-	-	-	10	6
	Defective Equipment	11	9	-	-	5	6	6	3
	Illegal Passing	-	4	-	-	-	-	-	4
24.	Parking	30	8	-	-	15	5	15	3
25.	All Other Traffic Violations	21	8	-	-	8	1	13	7
26.	All Other Offenses:								
	Malicious Mischief	2	-	-	-	2	-	-	-
	Vandalism	6	3	-	-	3	-	-	2
	Public Nuisance	1	-	-	-	-	-	1	-
	Prowler	1	-	-	-	1	-	-	-
	Molesting	2	-	1	-	1	-	-	-
	Obscene Phone Calls	1	-	-	-	-	-	-	-
27.	Suspicion	-	-	-	-	-	-	-	-
TOTAL PART II CASES		164	60	1	-	51	14	103	44
PART III									
28.	Missing Persons	1	-	-	-	1	-	-	-
	Lost Persons	9	2	-	-	9	2	-	-
	Lost Animals	6	-	-	-	5	-	-	-
	Lost Property	24	4	-	-	21	1	-	-
29.	Found Persons	-	-	-	-	-	-	-	-
	Found Property	33	-	-	-	36	3	-	-
	Found Animals	1	-	-	-	-	-	-	-
TOTAL PART III CASES		74	6	-	-	72	6	-	-

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART IV								
30. Fat. M.V. Traff. Accid.								
31. Pers. Inj. M.V. Traff. Accid.	-	1						
32. Prop. Dam. M.V. Accid.	14	8						
33. Other Traffic Accid.								
34. Public Accidents)								
35. Home Accidents)	No Accurate Statistics Kept							
36. Occupational Accidents)								
37. Firearms Accidents								
38. Dog Bites	1							
39. Suicides	1	-						
40. Suicide Attempts								
41. Sud. Death & Bod. Found	1	-						
42. Sick Cared For								
43. Mental Cases								
TOTAL PART IV CASES	17	9						
COMPOSITE TOTALS								
PART I,II,III,IV CASES	285	76	3	-	128	20	105	45

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Cases listed under "Cleared Other" are those cleared by various means other than arrest, such as: orders from prosecutor, juvenile probation officer or other situations in which a mutual agreement is obtained. They are definitely "cleared" cases and differ from the arrest column only in that there was no arrest. ** One Petit Larceny cleared arrest for previous month.

Property reported stolen Richland	$2,096.43
Property reported stolen No. Rich.	$ 125.00
Property recovered Richland	$1,627.61
Property recovered No. Richland	$ 110.00

MONTHLY REPORT — RICHLAND POLICE DEPARTMENT — JUVENILES INVOLVED — MARCH

OFFENSES	NO. CASES	JUVENILES	SEX	11	12	13	14	15	16	17
RICHLAND										
Larceny	1	2	M					1	1	
Vandalism	1	3	M			2	1			
Mischief	3	6	M			3	1			2
		2	F				1	1		
Juvenile Delinquent	1	1	F						1	
Injury to Animals	1	2	M				1			1
TOTALS	7	16				5	4	2	2	3
NORTH RICHLAND										
Vandalism	1	4	M	2	2					
TOTALS	1	4		2	2					

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RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
MARCH 1955

	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	9	6	3							$40.00	$38.50	$
INVALID VEHICLE LICENSE	4	3			1				2		16.50	2.50 (1)
NO CERT. OF REGISTRATION	2	2									8.00	
NO DRIVERS LICENSE	12	9	3							17.50	68.00	15.00 (3)
NEGLIGENT DRIVING	10	7	3							75.00	134.70	10.00 (1)
NEG DRVG, LIQUOR INVOLVED	4	3	1							50.00	107.50	25.00 (1)
RECKLESS DRIVING	3	1		2							52.50	
DRUNK DRIVING	3	2		1				2	1		205.00	
PERM. CHILD TO DRIVE W/O LIC	1				1							
DRVG WHILE LIC REVOKED	1											
SPEEDING	24	12	12							145.00	148.00	12.50 (2)
ILLEGAL PARKING	13	2	3							10.50	6.00	
STOP SIGN	25	13	10	1					2	130.00	92.00	7.50 (1)
ILLEGAL TURN	3	2	1							10.00	10.00	
FAIL. TO YIELD RIGHT OF WAY	7	3	4							87.50	40.00	
FAIL. TO DIM LIGHTS	1	1									7.50	
HIT AND RUN	1	1									32.50	
FAIL TO OBSERVE SCHOOL PATROL	1				1				1			
PUBLIC NUISANCE	1		1							50.00		
PUBLIC INTOXICATION	6	3	3			1			1	55.00	30.00	
THIRD DEGREE ASSAULT	1	1				1						
FILIATION	1											
TOTALS	133	71	44	4	3	2		2	7	$670.50	$996.20	$72.50 (9)

1 FILIATION - BOUND OVER TO SUPERIOR COURT
1 THIRD DEGREE ASSAULT - 10 DAYS WITH RIGHT TO SUSPEND PART - APPEALED VERDICT & POSTED $250 BOND
1 DRVG WHILE LIC REVOKED - BOUND OVER TO SUPERIOR COURT
1 RECKLESS DRVG - DRVG PRIVILEGES SUSPENDED 4 MONTHS
1 STOP SIGN - DID NOT APPEAR
8 ILLEGAL PARKING - DID NOT APPEAR
1 DRUNK DRVG - AMENDED TO RECKLESS DRVG, LIC REV 90 DAYS
1 DRUNK DRVG - AMENDED TO RECKLESS DRVG, LIC REV 30 DAYS
1 NEGLIGENT DRVG - LIC HELD BY COURT FOR 48 DAYS

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RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
MARCH 1955

	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							$10.00	$	$
Invalid Vehicle License	10	5	2	2					1	20.00	32.50	
No Cert. of Registration	1	1									5.00	
No Drivers License	8	7	1							7.50	29.00	
Inattention to Driving	1	1									5.00	
Negligent Driving	4	1	2		1					50.00	10.50	
Neg Driving, Liquor Involved	1	1									42.50	
Reckless Driving	1				1							
Reck Drvg, Liquor Involved	1	1									52.50	
Drunk Driving	2				2			1			102.50	
Speeding	7	1	5	1		1				62.50		
Illegal Passing	4	2	1	1						10.00	8.00	
Illegal Parking	5	2	2						2	7.00	11.00	
Stop Sign	12	6	3	2	1				1	30.00	30.50	
Fail. to Yield Right of Way	3	3									70.50	
Drvg while License Revoked	1											
Drvg with 4 in front seat	1	1									5.00	
Public Intoxication	1	1									102.50	
Vagrancy	1				1							
Totals	65	33	17	6	6	1		1	4	$197.00	$507.00	

1 Illegal Parking - Did Not Appear
1 Invalid Vehicle License - Did Not Appear
1 Drunk Driving - Dism. by complainant
1 Reckless Driving - Dism. by complainant
1 Reck Drvg, Liq Inv - Drvg Priv susp 4 months

1 Fail to Observe Stop Sign - To attend traffic court each Tuesday for one month
1 Drvg while Lic Revoked - Bound over to Superior Court
1 Drunk Drvg - Amended to Reck Drvg, Liq Inv - Lic Rev 90 days

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT
COMMUNITY SECTION
March, 1955

PERSONNEL - COMMERCIAL & RESIDENTIAL PROPERTY UNIT:

	March Exempt	Non-Exempt
Beginning of Month	8	25
End of Month	8	26
Net Change	0	+1

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	Commercial		Noncommercial		Total	
	Richland	North Richland	Richland	North Richland	Richland	North Richland
February	1,636	94	120	1	1,756	95
March	1,651	81	120	0	1,771	81
Net Change	+15	-13	0	-1	+15	-14

SUMMARY OF ROUTINE ITEMS PROCESSED:

	Commercial		Non-Commercial		Total		
	Richland	North Richland	Richland	North Richland	Richland	North Richland	Total
Work Orders	37	16	1	0	38	16	54
Back Charges	0	0	0	0	0	0	0
FY Work Orders	928	354	39	0	967	354	1321
FY Back Charges	40	1	4	0	44	1	45

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Lease:

a. Kelly J. Miller and Charles H. Hyrkes - a partnership doing business under the name "Style-Rite Painting and Decorating Co." in connection with the operation of a paint and glass store in the Light Industrial Area.

2. Supplemental Agreements:

a. Safeway Stores, Inc. - to provide for a revised description of the leased premises.

3. Business Development:

   a. Invitations to Bid were mailed to 25 prospective Lessees in connection with established trailer court facilities on two plots of land. Site "A", containing approximately 15 acres, is located at the intersection of the By-Pass Highway and Stevens Drive. Site "B", containing approximately 14½ acres, is located at the southeast corner of Spengler Road and Stevens Drive. Proposals will be opened and read at 2:00 p.m. April 12.

B. Noncommercial:

1. Supplemental Agreement:

   a. Community Chest - to provide for a revised rental and separate payment for utilities and services in connection with the occupancy of the building located at 108 Falley Street.

GENERAL:

A. Commercial:

1. The lease award of Robley L. Johnson was rescinded in connection with the proposed operation of a photography shop in the Government-owned Building located at 89 Lee Boulevard.

2. Carl Geer doing business as "Geer's Used Furniture" terminated his sublease agreement with the Automatic Laundry Co. in the Uptown Business District.

3. The sublease agreement by and between Carl E. Peterson and L. D. Sowell was assigned to Murphy Motors, Inc. who opened for business an Oldsmobile and Chevrolet automobile agency.

4. The Uptown Thrifty Drugstore opened for business after being closed for remodeling and alteration work necessitated by a recent fire.

5. J. R. Parcell commenced construction of structures for the operation of a service station and drive-in restaurant at the southwest corner of Goethals Drive and Williams Boulevard.

6. The Tide Water Associated Oil Co. commenced construction of a service station at Goethals Drive and Lee Boulevard and also at Newton Street and George Washington Way.

7. L. G. Cook commenced construction of a commercial building at Van Giesen Street and Wright Avenue.

8. Parker A. Hanson commenced construction of a commercial building at Van Giesen Street and Wright Avenue.

9. Calvin Randolph and W. M. Miller opened for business a plumbing, heating and electrical business in the space formerly occupied by Dean's Heating in the E. C. Maillard Building at 885 Stevens Drive.

10. John T. Day opened for business a law office in the Richland Development Company Building in the Uptown Business District.

11. Della Kendricks terminated the sublease agreement for the operation of a cafe in the Recreation Hall.

12. Blake E. Miller opened for business an insurance office in the Richland Development Company Building.

13. Troy Ward opened for business a construction and repair business in the E. C. Maillard Building in the Light Industrial Area.

14. The following North Richland Commercial Facilities discontinued operations in accordance with the following schedule:

Facility	Date Closed
(a) Beecher's Phillips 66	February 28, 1955
(b) Herman's Department Store	March 24, 1955
(c) Naimy's Barber Shop	March 12, 1955
(d) North Richland Tavern	March 31, 1955
(e) Snack Bar	February 28, 1955

15. The Baptist Church held its final service in the North Richland Building on February 27, 1955.

16. Two pasture permits were terminated.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland.

Tavern	Print Shop
Trailer Court Facilities	Service Station
Food Store	

COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

March, 1955

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

A. Commercial:

	FEBRUARY			MARCH		
	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	8	45
b. Number of Sublessees Businesses	18	0	18	17	0	17
c. Total Businesses in Government-owned Buildings	55	10	65	54	8	62
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	3	48
b. Number of Businesses operated by Sublessees	115	1	116	117	0	117
c. Total Businesses in Privately-owned Buildings	160	6	166	162	3	165
4. Privately-owned Buildings under Construction	3	0	3	8	0	8
5. Total Number of Businesses in Operation	215	16	231	216	11	227

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SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

B. Noncommercial:

	FEBRUARY			MARCH		
	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	1	11
b. Under Construction	6	0	6	6	0	6
Total	16	2	18	16	1	17
3. Church Plots and Buildings in Private Ownership	3		3	3		3
4. Pasture Land Permits	105		105	103		103

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COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of February 28, 1955	Orders issued 2-28 to 3-31	Total orders Incomplete as of March 31, 1955
Service orders	567	2506	509
Work orders	881	809	1050
Service charges		218	

Principal work order loads

	Incomplete as of February 28, 1955	Incomplete as of March 31, 1955
Laundry tub replacement	25	11
Tileboard bathroom	4	32
Kitchen floor linoleum	60	102
Kitchen cabinet linoleum	153	130
Shower stall	10	23

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157 alteration permits were issued, as compared to 100 issued in February.

Install fence	33	Remove utility closet	6
Install TV antenna	28	Install electrical outlets	6
Install automatic washer	20	Install automatic dryer	23
Basement excavation	6	Install basement partition	3
Convert to oil	4	Install kitchen cabinets	1
Install back door	4	Install tile	1
Install driveway	2	Install air conditioner	4
Remove laundry trays	1	Raise threshold	1
Install patio	3	Install dishwasher	1
Change water heater	1	Remove kitchen cabinet	2
Install soft water system	1	Install electric heat	1
Install sidewalk	2	Remove heat register	1
Remove partition	1	Reverse range	1

1142 inspections were made, as compared to 910 in February.

Alteration permits	35	Basement	1
Bathroom	18	Ceiling	4
Doors	19	Fill	4
Floors	15	Laundry trays	12
Linoleum	129	Lot lines	140
Paint	155	Porch	2
Range & refer recall	14	Steps & walks	10
Sink	4	Toilet seat	7
Trees	40	Walls	13
Windows	3	Yard	6
Renovation rechecks	47	Dormitories	210
Miscellaneous	14	Cancellations	86
Renovations	76	Shows (new tenants)	78

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

Merchandise Issued	Total Amount
Shades	621
Reflectors	16
Ice trays	5
Hydrator glasses	3
Drip trays TA	11
Meat tenders	6
Furniture delivered	35
Furniture recalled	26
Range parts	4
Refer parts	1
Grass seed	5
Space heaters	2

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS -- MONTH OF MARCH

	DELIVERY		RECALLED	
	REFERS	RANGES	REFERS	RANGES
1Br.	1	0	1	0
2Br.	1	0	2	2
3Br.	1	1	5	2
A	1	0	0	1
B	4	4	3	4
F	1	1	1	2
H	0	0	0	1
U	1	0	0	1
V	0	1	1	2
Y	1	0	0	1
Z	0	0	0	0
Total	11	7	13	16

IN WAREHOUSE:

10 TA 7' refers
1 SO 82 7' refer
1 GE 8' refer
1 GM 6' refer

14 SC ranges
8 GE ranges
1 Hot Point range
1 GM range

RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING
HOUSES OCCUPIED BY FAMILY GROUPS

	Conven	A&J	T	Pre Cut	Ranch	Pre Fab	Dorm Apt.	A&J Apt.	2BR Apt.	4th Hsg.	Tract	Total
G.E. Employees	2229	256	10	394	859	1124	9	53	60	205	36	5235
Comm. Fac.	93	18		26	55	51		6	4	9	2	264
AEC	65	29		19	49	16		3	4	11	3	199
Other Gov't	12	2			3	3						20
Post Office	6				2	8				1	3	20
Schools	65			6	11	45			1	1		129
Comm. Activities	11			2	6	5					1	25
Med. Facilities	4	17			3	2				3		29
Kaiser Eng.	3	6			5	1						15
J. A. Jones	2	3			2							7
Blaw-Knox	1	2		1	1							5
Minor Const.					1	1						2
Not Certified	2			1	1	1		1			1	7
Total	2493	333	10	449	998	1257	9	63	69	230	46	5957
Ready to Rent	1			1	1	7	1	1				12
In Renovation	6				1	12			1			20
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	2491	+21	-19	2493	+2
A&J Type	333	+1	-1	333	
"T" Type	10			10	
Precut Type	448	+6	-5	449	+1
Ranch Type	999	+8	-9	998	-1
Prefab Type	1251	+45	-39	1257	+6
Dorm Apts.	10	+1	-2	9	-1
A&J Apts.	64	+6	-7	63	-1
2BR Apts.	69	+1	-1	69	
Fourth Housing	229	+3	-2	230	+1
Tracts	46			46	
Total	5950	+92	-85	5957	+7

COMMERCIAL & RESIDENTIAL PROPERTY UNIT
RESIDENTIAL LEASES

MARCH 1955

DORMITORY REPORT

Dormitories:

	Beds available	Vacant beds	Occupied beds
Men	477	45	432
Women	381*	89**	292*
Total	858*	134**	724*

*This includes 2 beds used for Dorm offices
**This includes 13 beds vacant in Dorm M 13

Waiting Lists

	Single Rooms	Double Rooms
Men	1	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	16	Houses allocated to new tenants	60
R. O. F.	2	Exchanged houses	16
Discharge	0	Moves (within Richland)	25
Transfers	7	Turnovers (divorce,death,schools)	4
Retirement	4	Wherry house move to GE house	3
Move off project	21	Total leases signed	108
Divorce	2	Total cancellations	105
Death	1	Houses assigned "As Is"	33
Move to Wherry house	2	Houses sent to "Renovation"	45
Military Service	2	Applications pending	423
TOTAL	58		

COMMUNITY SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT

March 1955

Organization and Personnel	Exempt	Non-Exempt
Employees beginning of Month	66	0
Transfers In	0	0
Transfers Out	3	0
Terminations	0	0
New Hires	3	0
End of Month	66	0

Fire Protection		Richland	North Richland
Fire Loss (Estimated):	Government	$300.00	0.00
	Personal	8.00	5.00
	March Total	$308.00	$ 5.00
	Year's Total	793.85	730.00
Response to Fire Alarms		33	15
Investigation of Minor Fires & Incidents		3	0
Ambulance Responses		25	0
Inside Schools or Drills		35	15
Outside Drills		13	9
Safety Meetings		7	4
Security Meetings		5	1
Fire Alarm Boxes Tested		218	120

Fire Marshal's Activities

Three juvenile groups, including 15 Girl Scouts with 2 leaders, 8 nursery children with 2 teachers and 18 Camp Fire Girls with 2 leaders were conducted on tours of the Central Fire Station. On another occasion the Captain at this Station gave first aid instructions to 7 Girl Scouts and their leaders. The Station Captain also examined 3 Boy Scouts for their Firemanship Merit Badge.

Fire Prevention

Residential hazard inspections by Fire Company personnel were begun on March 21. In spite of inclement weather, which caused postponement of the inspections on several occasions, a total of 148 houses were called on. Of these, 92 were inspected and 76 were not at home, quarantined or

Fire Prevention - continued

not inspected because of day sleepers. In almost all instances, minor hazards were encountered but no serious ones were detected. Inspectors also reported excellent reception at each home.

In addition to residential inspections, there were 182 Richland and 65 North Richland hazard inspections made of public, commercial and project buildings. A hundred and eighty-one fire extinguishers were inspected, 2 installed and 4 removed. Twenty-nine standpipes and 7 hose boxes were inspected. Inspection tests were also made of two auxiliary fire alarm systems.

Follow-up investigations were made of five minor fires or incidents, including a service station gasoline spill, a service station gasoline pump fire, two burned out fluorescent light fixture ballasts, and a chair ignited by welding. Corrective steps were obtained by personal contact in all cases except the gasoline spill. This case resulted in a letter to the gasoline distributor whose driver was responsible for the spill during filling of underground storage tanks.

The Spring Clean-up Campaign, launched on March 21, was the subject of several meetings and conferences attended by the Fire Marshal's staff. Clean-up projects received considerable assistance from this office, including press and radio publicity, arranging for special equipment and erection of campaign posters. Fire apparatus participated in the March 19 Clean-up Parade.

Detailed information on previous fire prevention projects in Richland was forwarded at their request to the National Fire Protection Association for use in national campaign literature.

The annual report of Richland's Fire Prevention Activities was forwarded to Washington, D. C., for judging in the United States Chamber of Commerce contest for 1954.

Publicity was arranged and provided the local press on the residential inspection program launched March 21, and preliminary instructions given to Fire Company personnel. The Assistant Fire Marshal was detailed to accompany personnel making their initial inspections.

Evacuation procedures for all Richland schools were reviewed and approved.

Plans for sprinkler and alarm system changes in the Columbia High School and Chief Joseph Junion High School were reviewed and changes recommended.

Chief Quane addressed an Electrical Engineers Safety Meeting of 36 employees and a 300 Area Group of 40 employees on "Home Fire Safety" and the current inspection program. Captain Ray Hatfield addressed approximately 70 members of the John Ball P.T.A., on Fire Safety in Trailer Houses.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
MARCH 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	2
Anchors set and guys installed	1
Street lights repaired and steel mast arms installed	1
Street lights relamped - mercury vapor	10
Street lights relamped - 6000L and 4000L, 1100 Area	196
Street lights relamped - 6000L and 4000L, 700 Area	3
Flood lights relamped, 1100 Area	10
Flood lights relamped, 700 Area	0
Stack lights relamped, 700 Area	0
Primary line footage added	400
Primary line footage removed	0
Transformer Kva added	658
Transformer Kva removed	438
Net transformer Kva installed	220
New services installed - residential	0
New services installed - commercial	0
Temporary services installed and removed	4
Scheduled outages - primary	0
Unscheduled outages - primary	2
Scheduled outages - secondary	15
Unscheduled outages - secondary	3
Standby and escort	1
High voltage tree trimming	11
Low voltage tree trimming	43

TRAFFIC SIGNALS

Relamping	0
Operational failures	1
Installations	0
Removals	0

RICHLAND ELECTRICAL UNIT

Routine maintenance checks	45
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	0
Electrical motors checked and serviced - water	98
Electrical motors checked and serviced - sewage	87

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	7
Outside circuit checks	5
Inside faults repaired	0
Outside faults repaired	4
New circuits placed in operation	0
New boxes placed in operation (Col. High School Add.)	1

SUBSTATIONS

Main feeder and tie breaker checks - BB1S1	4
" " " " " " - BB1S2	4
Secondary and pad located stations - checked jumpers, cutouts, grounds and general condition	25

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	23
Meters tested - customer's requests	8
New meters shop tested	0
Faulty meters replaced or repaired	8
Damaged meters and covers	1
Residential read-ins	185
Residential read-outs	206
Residential disconnects	6
Residential reconnects	6
Meters resealed	11
Radio interference checks	4
Overloaded meters changed out	2
Routine meter tests	22

Consumption and Revenue:

	No. of Meters	KWH	Revenue
Residential - Schedule 1	6983	11,062,306	$100,234.78
Commercial - Schedule 2	399	3,463,723	28,048.06
TOTAL		14,526,029	$128,282.84

RICHLAND ELECTRICAL UNIT

COMMENTS

STREET LIGHTING;

Street light at Goethals and Endress broken by vandals.
Accomplished usual routine relamping on system and washed globes and reflectors on 500 and 1400 circuits and in 700 Area - will be completed next month.
Repaired broken jumper on 1400 circuit at Goethals and Taylor and replaced faulty fuse to station control box.
Installed new mercury vapor light at pedestrian crossing at Knight and Flagler to provide more light - removed old light.

TRAFFIC SIGNAL SYSTEM:

Wind blew signal at Swift and Stevens out of position. Required readjustment.
Re-synchronized traffic light at Symons and GW Way with light at Williams and GW Way.
Installed strain clamps on all control cables on traffic light installations to better secure cable against movement.
Performed usual routine system checking and inspection.

Railroad signal - Routine weekly inspection and operational test of signal and associated battery banks.

FIRE PROTECTION SYSTEM:

Tightened slack aerial fire alarm circuit front of 762 Building.
Located and repaired full ground condition on #5 alarm circuit in auxiliary circuit at Jefferson School.
Extended alarm circuit from Long and Swift to serve new building addition at Columbia High School.
At request of Fire Department, call-out time was used to effect repairs to open circuit on #6 circuit. Trouble was traced to broken wire at Swift and irrigation ditch.
Cleared ground from #3 circuit in old 1131 transportation yard.
Performed usual routine system checking and inspection.
Repaired wire pulled out of insulator at Wilson and Jadwin.
Installed repeater alarm bell outside Central Fire Station.
Removed ground to fire alarm circuit #3 by replacing broken insulator.

WATER SYSTEM:

Disconnected 440 volt pump motors at A & J wells on domestic system for pump maintenance.
Overhauled 75 HP domestic well A - replaced one bearing.
Overhauled one HP motor on pipe threading machine for Public Works Unit.
Made temporary disconnect to 1182 pumphouse for Public Works Unit.
Replaced heat coil to #14 well, domestic water system.
Repaired broken secondary jumper to well A, North Richland field.
Repaired defective heater at ditch tender's residence at Horn Rapids Dam.
Relocated flood light switch at 1182 pumphouse.

RICHLAND ELECTRICAL UNIT

(Water System Cont'd.)

Disconnected motors to J well, 3000 Area, and 1100-8 well, Duke Field.
Disconnected motor to L well, 3000 Area, for pump maintenance.

SEWAGE TREATMENT AND DISPOSAL SYSTEM:

Repaired defective control circuit on volumn heater and annunciator switch at sewer treatment plant.
Replaced broken light socket in sewer lift station at Swift and GW Way.
Repaired lighting circuit at #1 chlorine house at sewer treatment plant.

OUTSIDE LINES AND STATIONS:

Transformer change-outs: Rear of 1410 Farrell Lane, replaced 37.5 Kva with 50 Kva; rear of 1409 Haupt, replaced 25 Kva with 37.5 Kva; rear of 637 Cottonwood, replaced 25 Kva with 37.5 Kva; rear of 1504 Birch, added 25 Kva transformer and assumed load from overloaded existing transformer; rear of 211 Bernard, replaced 50 Kva with 75 Kva; rear of 2414 Olympia, replaced 25 Kva with 50 Kva; rear of 649 Cedar, added 37.5 Kva and assumed load from existing overloaded transformer; rear of 707 Birch, replaced 25 Kva with 37.5 Kva; rear of 1217 Cottonwood, replaced 25 Kva with 37.5 Kva; rear of 406 Birch, replaced 37.5 with 50 Kva; rear of 1511 Roberdeau, replaced 25 Kva with 37.5 - resulting in a net addition of 220 Kva being added to the Electrical System.

The addition of this transformer capacity was the result of a present campaign of load checking by the use of recording ammeters, and the application by tenants of residential electrical heating, mostly in the newer houses using coal and oil; in the ranch type houses there are at present about 160 tenants using electric heating.

Unusual trouble repairs - mostly due to recent winds:

TV antenna at 1006 Willard blew down breaking and short circuiting electric service.

Repaired broken primary transformer wire in rear of 411 Rossell.

Service wire broken at pole in rear of 512 Cottonwood.

Repaired broken wire on primary circuit for Excess Yard siren tower.

Service wire pulled off house at 1602 Johnston.

Removed tree limb from service wires to house in rear of 1109 Marshall.

Disconnected wires to two old buildings blown over by wind in 1131 Area.

Repaired broken wire to transformer cutout at Burlin Camp.

Replaced meter cover broken by flying board which tenant left leaning against house at 76 Hodges Court.

RICHLAND ELECTRICAL UNIT

(Comments Cont'd.)

Repaired loose cable at 1171 Central Transportation Yard.

Miscellaneous operations:

Performed shop overhaul and oil test service to 19 transformers being presently removed from service and relocated.

Disconnected and reconnected six residential customers for non-payment of electrical billing.

Repaired broken transformer jumper in rear of 522 Smith on 3-22-55.

Repaired insulator pulled off house service at 329 Craighill.

Removed tree which blew over into house service at 2006 Torbett.

Installed new mercury vapor light to replace existing light in order to increase lighting at pedestrian crossing at Knight and Flagler.

Repaired broken neutral wire to house service at 521 Newcomer.

Provided escort from 300 Area barricade to Van Giesen and Bypass.

Set 15 new poles along Thayer below Lee and stubbed four poles between Duane and Thayer.

Installed temporary service and meter for Davis Construction Company at Newton and GW Way.

Rewired Station D1-S25 to assume load in upper end of Uptown alley recently released by Launderland. Revised distribution in that area to better advantage by using this station for general use.

PLANNED OUTAGES:

Fifteen planned outages were scheduled and executed to permit replacement of 15 lighting transformers at various residential locations due to installation of electric heating.

CALL-OUT:

Seven call-outs were necessary during month as follows:

Broken secondary sleeve pulled out, 1511 Stevens. 2 men.
Broken transformer riser during wind, 411 Rossell. 2 men.
Broken fire alarm wire and grounded board. 4 men at different time same night.
Broken street light jumper and faulty fuse, 1400 circuit. 2 men.
Blown primary cutout fuse 14 X 128. 2 men.
Defective street light fuse and patrol circuit, 200 circuit. 1 man.

COMMUNITY OPERATIONS SUB-SECTION
ENGINEERING UNIT
MONTHLY REPORT
MARCH 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 MARCH:

1. E. H. Manolopoulos - Private Garage - 107 Casey
2. McGee Fine Foods - Plumbing Alteration - 1319 Geo. Washington Way
3. Tide Water Associated Oil - Service Station - Newton & Geo. Wash. Way
4. Tide Water Associated Oil - Service Station - Lee Blvd. & Goethals Drive
5. Thrifty Drug (Uptown) - Concrete Block Addition - 1314 Jadwin
6. 5 sign permits

NEW MUNICIPAL CONSTRUCTION STARTED IN MARCH:

Water Service to Commercial Users (7 locations)

NEW PRIVATE CONSTRUCTION STARTED IN MARCH:

1. E. H. Manolopoulos - Private Garage - 107 Casey.
2. McGee Fine Foods - Plumbing Alteration - 1319 Geo. Washington Way.
3. Tide Water Associated Oil - Service Station - Newton & Geo. Wash. Way.
4. Tide Water Associated Oil - Service Station - Lee Blvd. & Goethals Drive.
5. Thrifty Drug (Uptown) - Concrete Block Addition - 1314 Jadwin.

PRIVATE CONSTRUCTION COMPLETED, OR ON WHICH FINAL INSPECTION MADE IN MARCH:

Richland Fuel and Lumber Co. - Storage Building

ENGINEERING JOBS COMPLETED IN MARCH:

G-01005 - Sewer & Water Lines, Richland Heights Baptist Church

G-01013 - Sewer Extension to Commercial Site, Wright & Van Giesen

G-01014 - Utility Extension to Knight & Stevens

C-11143 - Plat and Legal Description on Church of Jesus Christ of Latter Day Saints

C-11148 - Legal Description NW Corner Lee Blvd. & Goethals Drive - (Tide Water Associated Oil)

ENGINEERING JOBS COMPLETED IN MARCH (Cont.)

C-70524 - Pauls, Inc. (Legal Description)

C-70698 - Legal Description Plot Land on Lee Blvd. - (Chas. D. McGuinness)

C-70699 - Legal Description SE Intersection of Lee & Wellsian Way - (Colin Bleiler)

C-89516 - Legal Description Newton & Geo. Washington Way - (Tide Water Associated Oil Co. #3)

C-89584 - Legal Description Plot Van Giesen & Wright - Plot #1 - (Hubert H. Moore)

C-89585 - Legal Description Plot on Van Giesen - Plot #2 - (L. G. Cook Investment Bldg.)

C-89586 - Legal Description Plot on Van Giesen - Plot #3 - (Parker Hanson Investment Bldg.)

STATUS OF ENGINEERING UNIT PROJECTS:

G-01008 - 6" Water Line, Williams & Goethals - 99% complete. Cleanup to be completed by contractor.

G-01009 - Knight Street Improvement - Design complete. Specifications to complete.

G-01010 - Extension Torbett West of Perkins Avenue - Design complete. Specifications to complete.

G-01012 - Boise Street Extension - Design complete. Specifications to complete.

G-01015 - Water Service to Commercial Users (7 locations) - 20% complete. Work progressing according to schedule.

G-02171 - Automatic Bar Screens Sewage Lift Station - Being rebid. Bid opening to be April 6, 1955.

G-02176 - Comfort Station, Sewage Lift Station - Chlorination Station, Riverside Park - In hands of A.E.C. Contract Section for advertising for bid.

G-03570 - Replace Raw Water Line #5 to Lee Boulevard - 99% complete. Final cleanup to be made.

STATUS OF ACTIVE ENGINEERING SERVICE REQUESTS

I-90914 - Utility Lines, Legal Descriptions and Diagrams for Churches - Utility location sketches 95% complete.

I-91014 - Retirement of Separate Irrigation System - Design in progress. 55% complete.

I-91024 - Retirement of Irrigation Canal - Storm sewer design 55% complete.

STATUS OF WORK ORDERS:

C-0554 - Expansion of Riverside Park North of Lee Blvd. - Project submitted for approval.

C-0559 - Park Area North of Lee Blvd. - Project submitted for approval.

C-0591 - Street Improvement (FY 1954) Van Giesen Street from Geo. Wash. Way, East to Hunt Avenue - Project submitted for approval.

C-1839 - Survey Coal Stockpile - 90% complete.

C-11457 - Plat and Legal Description, American Red Cross - 90% complete.

C-11459 - All Saints Episcopal Church (Plat #19 Recheck) - 90% complete.

C-11460 - Plat and Legal Description Christian Science Society - 50% complete.

C-11461 - Revise Legal Description of 11 Churches - 10% complete.

C-11462 - Richland Post Office (Plat and Legal Description) - 5% complete.

C-70591 - Legal Description Plot West of By's Burgers - 95% complete.

C-70667 - Murphy Motors, Inc. (Legal Description) - 95% complete.

C-81020 - "As Builts" - Phase III - 31% 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-89598 - Legal Description for Ferry Landing Site - 90% complete.

BUILDINGS UNDER CONSTRUCTION:

First Baptist Church (Richmond and Raleigh Streets) - Construction 92% complete. No progress this month.

Assembly of God Church - 99% complete. No progress this month.

Alteration Permits - an open active file.

Television Antennae - an open active file. No permits being issued.

Plans, Specs., Inspections, Church of Nazarene Addition - 94% complete. Work progressing slowly. Building now occupied.

Plans, Specs., Inspections, Christ of King Parish (Catholic) - 87% complete. Work progressing slowly. Portion of school occupied.

Plans, Specs., Inspections, Thorsness Service Station and Drive In, SE corner of Goethals and Williams - 95% complete. Open for business.

Plans, Specs., Inspections, Uptown Thrifty Drug Store Rehabilitation - Construction 99% complete. Final inspection to be made. Open for business.

COMMUNITY OPERATIONS SUB-SECTION
PUBLIC WORKS & RECREATION UNIT
MONTHLY REPORT
MARCH 1955

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees Beginning of Month	7	38
Transfers Out	0	1
Transfers In	0	4
New Employees	0	1
Terminations	0	1
Total End of Month	7	41

ROADS AND STREETS

The level of water in the drainage ditch originating on Wellsian Way and flowing to the Corps of Engineers' Pump Station near Gowen Avenue had risen considerably and inspection revealed four beaver dams downstream from Goethals and a plug at the outfall of the culvert under Goethals Drive apparently caused by construction in the immediate vicinity. The beaver dams and other debris have been removed and the state game protector has trapped the beavers. The ends of the culverts at Goethals, Stevens, Swift and Mansfield have been cleared by use of a drag-line rig.

Gutters in the 1000 block on Sanford were graded and stabilized with 3/4" minus material to improve drainage of this block.

Traffic channelizing buttons were installed at the Stevens Drive By-Pass Highway intersection.

The Uptown parking lot was swept and cleaned early on the morning of March 22, 1955 in connection with Clean-Up Week.

Approximately 500 c.y. of topsoil were loaded and hauled at request of Housing to lots where pre-fab houses had been removed.

Routine seasonal maintenance of streets, drainage systems and street marker signs was continued.

SANITATION

Collection of garbage and trash was continued according to schedule, and total weight of waste material collected and disposed of during the month was 1326 tons.

PARKS AND PUBLIC GROUNDS

The performance of maintenance work at the Richland Cemetery which this unit had been relieved of on February 28, 1955, was re-assigned to this unit by the AEC until June 30, 1955.

PUBLIC WORKS AND RECREATION UNIT

Parks and Public Grounds (Continued)

Application of commercial type fertilizer to all lawn grass areas has been completed.

All parks irrigation systems using domestic water have been activated and checked for operation.

The shelterbelts have been re-rilled and irrigation supply valves have been opened.

Tennis nets were placed at all courts on March 10, 1955.

A concentrated effort to clean up all park areas was made during Clean-Up Week beginning March 21, 1955.

Distribution of hoses and sprinklers to parks and inner block areas (as requested by Housing) is now in process.

Routine maintenance of parks buildings, equipment, and grounds was continued.

RECREATION

The film Americana was shown to Boy Scout groups and their parents in the Social Hall on Thursday, March 17.

The annual Kite Flying Tournament was held at Columbia Playfield Saturday afternoon, March 19, at 1:30 P.M.

The annual V.F.W. talent show was presented on Sunday, March 20 in the Community House with 325 people present.

Three hundred (300) attended the Orthopedic Guild "Tasty Tea" at the Community House Social Hall on Thursday, March 31.

The Adult Table Tennis, Singles and Doubles tournament was held at the Community House on March 29, 30 and 31st with 39 entries competing for first and second place trophies awarded by this unit.

The Indoor Fall and Winter Youth program terminated on March 31.

PUBLIC WORKS AND RECREATION UNIT

ATTENDANCE STATISTICS - March 1955

	No. of Sessions	Youth	Adults	Sub-Total
A. Community House				
Adult Table Tennis League	3		185	185
Arts & Crafts Class	9	86	11	97
Ballroom Dancing	5	137	54	191
Elementary Movies	4	583	53	636
Elementary Square Dancing	4	644	55	699
Fencing	3		16	16
Games Room (Open Play)	26	1 309	262	1 571
Junior Square Dancing	4	329	63	392
Minnesingers	5	357	14	371
Tumbling	4	32	6	38
Rec-A-Teers	4		244	244
Cub Scout Baseball Meeting	1		10	10
Cub Scout Softball Meeting	1		14	14
Gentrics	1		50	50
Hi-Spot	8	2 698	27	2 725
Junior Stamp Club	1	15	21	36
International Folk Dancers	2	3	25	28
Little League Meeting	3		31	31
Little League Association Meeting	1		7	7
Pony League Meeting	2		52	52
Richland Rod & Gun Club	1	38	111	149
Jr. Sportsmen	1	40	1	41
National Little League Meeting	2		41	41
Richland Youth Council	2	18	20	38
American Red Cross	1		157	157
Campfire Girls	2	375	60	435
City Council	2		45	45
Girl Scouts	2	29	20	49
Lake Shore League	1		5	5
Orthopedic Guild	2		340	340
Richland Women's Club	1		85	85
Sewing	19		281	281
Social Security	2		76	76
Sports Officials' Association	1		20	20
Rainbow Girls	3	90	8	98
Umpires Association	3		57	57
YWCA	3		32	32
Y Supper Club	6		108	108
Total Community House	145	6 783	2 667	9 450

PUBLIC WORKS AND RECREATION UNIT

Attendance Statistics - March 1955 (Continued)

	No. of Sessions	Youth	Adults	Sub Total
B. Parks and Play Grounds				
School Activities - Columbia	12	4 200	25	4 225
Total Parks and Play Grounds	12	4 200	25	4 225
C. Summary				
Community House and Parks and Play Grounds total for March 1955	157	10 983	2 692	13 675
Calendar Year to Date				39 065

COMMUNITY OPERATIONS SUB-SECTION
WATER AND SEWERAGE UTILITIES UNIT
MONTHLY REPORT
MARCH 1955

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	5	18
Transfers Out	0	1
Transfers In	0	0
New Employees	0	1
Terminations	0	0
Total End of Month	5	18

DOMESTIC WATER

Normal operations were continued throughout the month. Water consumption has increased slightly as some lawn sprinkling and use of water for irrigation purposes has commenced.

Construction work on the Richland well collection header was completed and the line was sterilized and put into service during the month. Three leaks developed in the new well header line and were repaired by the contractor. One leak presently exists in the connecting piping to No. 4 Well. The contractor is committed to repair the leak very soon.

3000 Area A Well pump overhaul work has been completed and the well returned to service. A leak developed in the 3000 J Well pump shaft seal and the pump was pulled for repairs. This pump was found upon examination to be severely worn from pumping sand. Repair parts are on order and repairs are awaiting delivery of these parts. 1100-8 Well pump was pulled for routine overhaul. Condition of this pump was found to be very good. Some maintenance work is presently being done on pump shafting. 3000 L Well pump was pulled at the request of the AEC Engineering Unit and sent to Fairbanks Morse Laboratory for a capacity test.

The Columbia Field percolation basin was cleaned by removing four to six inches of material from the entire surface of the area. This was done in an effort to increase percolation rate in this area. Water was turned into the Columbia Field percolation basin after cleaning and also into the north half of 3000 Area percolation basin during the month.

Water meters were installed at the following locations during the month:

Campbells Foods #2
Associated Stations
Associated Stations
Johnny's Minute Man Statiin
Parker A Hansen
L. G. Cook
Symons & Goethals
George Washington Way & Newton
Goethals and Lee
Goethals & Williams
Van Giesen & Wright
Van Giesen & Wright

WATER AND SEWERAGE UTILITIES UNIT

DOMESTIC WATER DATA

	Well Production	Av. Da. Prod.	Total Consumpt.	Av. Da. Cons.
Richland	22,170,000	715,100	126,567,400	4,082,800
North Richland	144,190,000	4,651,200	37,514,000	1,210,100
Columbia Field	51,465,400	1,660,100		
300 Area			55,039,000	1,775,400
TOTALS	217,825,400	7,026,400	219,120,400	7,068,300

Maximum daily production, 10, 136,000, occurred on March 27, 1955.
Maximum daily consumption, 9,686,000, occurred on March 27, 1955.

SEWERAGE SYSTEM

Normal operations were continued throughout the month. Approximately 90,000 gallons of sludge was pumped to the drying beds.

The rotating arm on the No. 1 plant bio-filter became sluggish and was shut down for inspection and repairs. The rotating arm bearing was found to be severely worn and in need of replacement. A new bearing is on emergency order and should be delivered within a day or two.

The annual routine sewer flushing program was completed during the month.

SEWAGE DATA

Plant No. 1	Total Flow	27,170,000	Average Daily Flow	876,000
Plant No. 2	Total Flow	60,876,000	Average Daily Flow	1,963,000
TOTAL		88,046,000		2,839,000

IRRIGATION CANAL

All irrigation pumping stations have been checked over, minor maintenance work completed, and are ready for service for the coming irrigation season.

The irrigation canal cleaning has been completed throughout. Some maintenance work is presently in progress at the fish screens at the head of the canal. The canal was shut down on March 29 to facilitate an inspection of the wood stave penstock that carrys water to the 3000 Area. This inspection was made on the inside of the pipe April 1, by the AEC Engineering Unit in conjunction with this unit. The outside of the pipe will be inspected in the near future and a report will be made of the findings.

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COMMUNITY OPERATIONS SUB-SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
March 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	0
End of Month	4	9

GENERAL

Circulation

Books	20,106	
Magazines	598	
Pamphlets	72	
Records	1,163	
Inter-Library Loans	34	
Grand Total	21,973	

Current Book Stock

Books added this month	514	
Books withdrawn this month	27	
Grand Total	34,466	

Registration

Adult	152	
Juvenile	63	
Grand Total	215	
Total Registered Borrowers	19,042	
Children's Story Hour Attendance	678	(570 Pre-School, 108 El.)
Meetings in North Hall	18	

Ggj-1

Community Operations
Library Unit

The five session "Finance Forum" jointly sponsored by the Richland Public Library and the American Association of University Women was attended by 625 persons. The library is grateful to the business men who participated in the discussions and to Mr. P. D. Lee, G. E. Financial Department, who moderated the panel discussions, for their excellent cooperation in making this program a success.

Mr. Oman Sions joined the Richland Public Library staff this month as Janitor.

An exhibit of art work by those Columbia High School seniors who won art scholarships last year has been on exhibit in North Hall this month. The display was sponsored by the Allied Arts Association.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT - MARCH 1955

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	Beginning of Month	End of Month	Increase	Decrease
Staff	2	2		
Administration Area Maintenance	104	104 (a)		
Security and Patrol	480	479		1 (b)
Fire Protection	137	136		1 (c)
Office Auxiliaries	117	119	2 (d)	
Telephone	78	79	1 (e)	
TOTALS	918	919	3	2

Net Increase: 1

(a) - Administration Area Maintenance

1 - New Hire
1 - Termination

(b) - Security and Patrol

6 - New Hires
1 - Reactivated
1 - Transferred in
4 - Transferred out
2 - Deactivated
3 - Terminations

(c) - Fire Protection

1 - Transferred out

(d) - Office Auxiliaries

12 -New Hires
11 -Transferred out
1 - Deactivated
1 - Termination

(e) - Telephone

1 - New Hire

FIRE PROTECTION UNIT

Fire Responses

Construction	2	Loss	$ 35.00
HAPO	3	Loss	10.00
TOTALS	5		$ 45.00

Fire Extinguishers

Inspected	1,877
Installed	22
Tested	864
Delivered to new locations	20
Seals broken	36
Serviced	418
Weighed	519

Gas Masks

Inspected	74
Serviced	12

Safety and Security Meetings

Number of Security Meetings	13
Number attending meetings	88
Number of Safety Meetings	26
Number attending meetings	180

Drills Held During March

Outside drills held	98
Inside drills held	129

36,960 feet of fire hose and 1,771 feet of ladders were used for drill purposes during March.

Twelve Informative Meetings were held with seven members attending each of the meetings; exempt and non-exempt.

Thirteen Round Table Meetings were held with seven members attending each meeting; non-exempt.

Fire Protection Unit officers held one class on each of the following subjects: Chemox Masks, Extinguishers, and Artificial Respiration. Twenty-seven people of various departments attended.

OFFICE AUXILIARIES SUB-SECTION

Plant Mail Unit

Internal mail count remained relatively stable as did outgoing postal mail.

Teletype traffic increased and special assignments were unusually heavy during the past period. Special assignments included the preparation and mailing to all members of the Good Neighbor Fund, which included six pieces of inserts plus gummed labels to be applied to the outside of the envelopes; and another mailing to all employees, also with gummed labels and three inserts. The latter was bulky and heavy. There were twenty-five Organization and Policy Guides and thirty-two separate mailings which included the Public Health Bulletins, Monogram, GE Review, etc.

Addressograph work remained normal and no backlog of work exists.

Types and Pieces of Mail Handled	February	March
Internal	4,579,596	4,432,996
Postal	81,412	82,578
Special	2,202	2,007
Registered	10,455	10,057
	4,673,665	4,527,638
Total Postage Used	$3,042.89	$2,876.35
Total teletypes handled	2,943	3,592
Total store orders handled	339	344

	February		March	
Addressograph	Number of Runs	Total Copies	Number of Runs	Total Copies
Plate name list	116	169,289	114	165,361
Housing list	17	36,971	16	34,983
Payroll list	12	49,267	13	49,359
Total new plates	2,843		3,141	
Total corrected plates	3,655		2,931	
	6,498		6,072	

Printing Unit

Effective this month, liquidation rates were lowered 5%. This was the second 5% reduction in 17 months and the new rate is at 55% of commercial prices.

During the month, two Top Secret duplicating jobs were completed in Printing for the AEC.

The General Manager's Annual Report to AEC, "1954 at Hanford" was completed and delivered to Classified Files.

Printing Unit (Contin.)

Among the large orders printed this month were:

100,000 copies, form J-3401-DS, Report of Contaminated Personal Effects
100,000 Purchase Order Terms and Consitions for AEC
240,000 copies, form G-281-DS, While You Were Out
50,000 copies, form A-1125-DS, Telephone Statements
562,496 copies, G-88-DS, Don't Say It, Write It

Work Completed	February	March
Orders Received	389	378
Orders Completed	382	404
Average orders on hand	85.8	75.8
Copies printed	1,097,345	1,920,538
Negatives masked	723	563
Negatives processed	886	593
Photo copy prepared	341	312
Litho plates processed	903	714

Stenographic Unit

Eight stenographers and three stenographer-typists were assigned by Employment to the Stenographic Unit in March, and nine permanent transfers were effected to other plant units from the Stenographic Unit. Twenty temporary loan assignments were also made to other units. Eighty-eight requests for stenographic service were performed in the pool with charges made to forty-nine cost codes.

Work requested and performed was unusually heavy throughout the month. Large or rush assignments included miscellaneous work for Radiological Standards Unit, 68.5 hours; transcription of tape recordings for Radiological Sciences Administration, 292 hours; duplimat masters for Chemical Development Unit, 156.5 hours; monthly reports for Manufacturing Cost, 107 hours; duplimat masters for AEC accounting procedure manual, 63 hours; assistance to Mail Unit in preparation of Good Neighbor Fund mailing and plantwide employee mailing; duplimat masters of History Project C-361 for Project Section; and a 45-hour assignment from Public Relations for draft typing of papers on Peaceful Uses for Atomic Energy.

Breakdown of Hours	February	March
Holiday and vacation time	48	0
Meeting time	6.5	7
Absentee time	12	0
Machine Transcription	260.5	292
Letters	58.5	50
Dittos, duplimats and xerography	445.5	494
Miscellaneous	289	301
Training	144	254
Unassigned time	37	116.5
Total	1,301	1,514.5
Employees on loan to other units	812	932
Grand Total	2,113	2,446.5

Duplicating Unit

On Saturday, March 13th, the Duplicating Unit assumed responsibility for the operation of Embossograph equipment formerly assigned to Graphics Unit. The machine and all supplies utilized in connection with the process were transferred to the 760 Building duplicating office, and an operator is being given training in performing this work.

Tests were made on a new chemical known as Van-X, marketed for use in removing fingerprints, erasure smudges, and other marks from offset paper masters. Tests made indicate that the use of the chemical will effect a substantial labor saving as well as improve quality on copy run from paper masters which require considerable proofreading and handling before they are forwarded to duplicating. A supply of the chemical has been requisitioned, and will be used in each duplicating office.

A total of over one million copies were reproduced in all duplicating offices this month. The number of impressions (1,018,554) is the highest reported at any time during this fiscal year and reflects a gradual and continuing increase in workloads for the past three months.

	February	March
Orders Received	3,710	3,466
Orders Completed	3,683	3,491
Orders on Hand	201	200
Offset Plates	15,904	17,312
Offset Copies	943,609	1,018,554
Verifax Masters	3,030	2,721
Verifax Copies	11,575	8,486
Ditto Masters	285	353
Ditto Copies	4,846	5,706
Xerox Plates	1,560	1,579
Ozalid Masters	27	26
Ozalid Copies	84	236
Number of copies duplicated		1,032,982

Office Equipment Unit

Office Furniture

The expendable office furniture inventory account 93 was valued at $15,858 on February 28, 1955, or an average of 2.9 months supply on hand.

A total of 91 service orders were issued for minor repairs and maintenance of office furniture and locks.

There was a total of 930 debit and credit store orders iddued and processed during the month, or an average of 44 orders per working day.

Office Furniture (Contin)

The following is a detail of number of pieces of furniture handled during the month:

Item	Issued	Received	Salvage
Blackboard	7	0	0
Bookcase	3	6	1
Chair	179	157	113
Cabinet	98	84	29
Card File	0	12	1
Costumer	0	5	5
Desk	54	57	5
Table	59	42	10
Daveno	2	1	16
Miscellaneous	205	33	20
	607	397	202

Installation of special modification kits on fireproof file cabinets is approximately 90% completed.

Several pieces of miscellaneous drafting tables, machines and desks were excessed during the month which are in excess of our need.

Office Machines

Total number of office machines in service and stock as of the month's end was 4,718 or a net inventory gain of 33 machines. Twenty-two machines were excessed, 51 time attendance clocks were picked up for physical control and maintenance and four machines were added by new purchases.

Construction contractors' office machines are being screened and those machines manufactured after 1948 are being transferred back to operations. Construction contractors' inventory remained at 671 machines on the 20th of March.

Office Machine Repair Unit

Seventy-five conversions from two to three conductor electrical caps were made this month in a continuing effort to so equip all machines located in areas where three hole electric boxes are installed. Machines located in areas where two conductor outlets are installed will not be converted at this time.

Two new Remington carbon ribbon Micro elite typewriters were received and checked out for proper operation by representative of the Remington Rand Company.

One new IBM executive typewriter was received and checked out by a representative of the local IBM agency.

Two additional attendance time recorders were installed in the front wing of the 760 Building to relieve a congested condition.

One steam flow meter was installed at the Mart.

Repair tickets were processed as follows:	February	March
	591	557

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

CA-606 Additional Office Space - Central Stores Warehouse: This proposal is being recalled by Supervisor, Appropriations, as a result of the Commission's assumption that new central office space can be provided in the 700 Area by July 1, 1957.

CA-626 Roads, Walks and Storm Sewers - 700 Area: Understand this proposal has been reviewed twice by HOO Review Board. Indication is that approval action is being temporarily withheld pending decision on location of possible new Administration Building.

At request of AEC, data was prepared for their use in connection with proposed acquisition of new office building under lease-purchase plan.

Preliminary study of office and warehouse space requirements was prepared and submitted, in response to the Commission's request dated January 18, 1955.

Letter to Commission, requesting release of Dormitories W-17 and W-21 for temporary office use to accommodate 101 Building occupants, was signed by Department Manager.

Nineteen office moves were made during March.

Four Hauserman partition installations were made in the 700 Area. Partitions were provided for two installations in 300 Area and one in 100 Area.

Shipment of 669 lineal feet of Hauserman was received and placed in stock on March 24.

Graphics personnel were moved from 713 to 717-A Building. Space vacated by them was occupied by Procedures and Computing personnel, who were required to abandon other floor space in the building to make room for installation of IBM-702 Machine.

Graphics model shop was moved from construction area space in 713 to 723 Building.

Space in 703 Building, formerly occupied by special study group, was assigned to AEC to accommodate additions to their Operations Division.

Work Review approval was obtained to relocate 700 Area Maintenance Shops in 716 Building. Relocation of this equipment is now under way, and is expected to be completed within two months. Following this relocation, it is planned to move Community Public Works shops to 722 Building and to dispose of 722 series hutments.

Representatives of this Sub-Section participated in acceptance inspection of 702-B, Plant Telephone Exchange Building.

Digging permit was issued for sewer and water line extensions in connection with Project CA-612, "Alterations to 713 Building for Electronic Data Processing Machine".

Additional temporary storage was provided for refrigeration equipment to be used in connection with Project CA-612.

Administration Area Maintenance (Contin.)

Repairs were made to 700 Area parking lots.

Arrangements were made with Transportation Section for fertilizing and maintaining 700 Area lawns.

General Maintenance

Excelsior cooler pads are being replaced with bronze rotor attachments in the second, third and fourth wings of 703 Building. Replacements were made in the first wing early last year.

Hauserman enclosure was erected for foreman's office in Real Estate Section of 722 Building.

Accounts Receivable offices in 703 Building were rearranged.

Additional experimental asphalt floor tile installations were made. It is believed that this type of floor repair will prove economical, as a substitute for the present practice of "peeling and sealing" wood office floors.

Maintenance refuse was removed from 703 and 705 Building attics. Catwalks were repaired and extended as required.

Office building window screens were repaired and replaced as required.

Roof repairs were made on 713-A, 760 and 703 Buildings.

Temporary repairs were made to roof of locomotive shops at 1171 Transportation Building.

North Section of 1131 Area fence was removed for use in Stores Excess Yard, on orders from AEC Property Division.

Forms were made for concrete to provide an unloading pad at 747 Building and an access pit at Central Stores Warehouse.

Miscellaneous office furniture was repaired and refinished.

Twenty-five new metal desks and cabinets were assembled for Office Equipment Unit.

Interior cycle painting program work included the repainting of twenty-three offices and one restroom.

Sign painting work included sketching and painting of one 10' x 22' billboard, numbering of 500 metal boxes for Bio-Assay, and painting of a number of small signs and name plates.

Exposed steam lines in the 703 Basement were insulated with "Fibre-glas" to reduce heat radiation.

Steam-generated hot water tank in 716 Building, formerly used for car washing, was excessed and replaced with conventional electric hot water tank.

General Maintenance (Contin.)

Push nipples were replaced in twelve radiators. Two radiators were relocated.

Six carrying boxes were fabricated for mail room.

Seasonal repadding of air conditioners in 700 Area is 90% complete. Approximately 75% of cooler overflow pans have been cleaned and repaired.

Electrical work included monthly inspections, installing fluorescent lights in Buildings 760, 701-B and 713, installing security lights in 1171 Building, installing and revising miscellaneous circuits and additional service outlets, installing buzzer system and miscellaneous routine electrical repairs.

Locksmith work involved routine lock and vault repair and combination changes. It was necessary to rebuild two vault door mechanisms.

Building Services

Another janitor was assigned to Transportation Section, to provide more complete coverage.

Study of building service work in the 700 Area is being continued, with a view to obtaining higher quality and more consistent performance.

Steam Operation

Nos. 2, 3, and 4 boilers were in service at the beginning of the month, with No. 1 in reserve.

Decreasing heating load permitted withdrawal from service of No. 3 boiler on March 18. At the same time, a leaking tube in this unit was detected.

A substantial increase in heating load necessitated placing No. 1 boiler in service on March 24.

At the close of the month, Nos. 1, 2 and 4 boilers were in service, with No. 3 awaiting a tube replacement.

The quantity of steam generated at the 784 Plant was 20.2% greater than for the same period of the previous year.

Recording and integrating steam flow meter, formerly used in 723 Laundry, was placed in service at The Mart on March 25. Meter was thoroughly cleaned, overhauled, and calibrated before reinstallation.

Purging of remaining electric motor bearings at Buildings 784 and 784-A was completed during the month.

The annual physical inventory of steam coal at 784 plant was taken on March 25.

Steam Operation (Contin)

Oil pump suction lines were cleaned several times at Central Stores Heating Plant. Later, lines at storage tank were uncovered and suction line to tank blown out with steam. An access pit will be constructed to permit servicing and cleaning the oil suction, return and tank vent lines where they enter the 12,000 gallon fuel oil storage tank.

Coal consumed: 1,954.70 net tons.

Steam generated:	27,834.9 M. Lbs.
Steam leaving plant:	24,300.2 M. Lbs.
Steam delivered:	21,919.4 M. Lbs.
Total water softened:	3,539,200 gallons
Total soft water sent to Kadlec Hospital:	79,790 gallons
Total osft water sent to 784 Heating Plant:	3,459,410 gallons

TELEPHONE SUB-SECTION

Progress by the Stromberg-Carlson Company installing equipment in the 700 Area exchange is progressing satisfactorily and unless some unexpected difficulty developes in their testing work, the new exchange will be ready for service on the presently planned date of June 3.

An installation foreman from the Automatic Electric Company arrived on the 28th of March to start installation of equipment in the 100-K area dial exchange.

A new plant telephone directory was distributed during the first week of March.

During March there was a decrease of 29 telephones for major construction activities.

A total of nine telephone servicemen attended one of the two two-week Stromberg-Carlson Company conducted training courses in the maintenance of XY type switching equipment.

Plant Telephone Operations

At the request of the Atomic Energy Commission, two branch cables in North Richland were disconnected from the North Richland cable distribution system in order that they might be reused by the U. S. Army.

In the 300 Area, a cable rearrangement was made to make cable pairs available to serve the 3706 Building.

In conjunction with cable tie-in work being done for the new 700 Area exchange, two new 52-quad cables were electrically balanced and several distribution cables were spliced in Manhole No. 6.

Four loading coil units in the T1 trunk cable were changed from sleeve installation to pole mounted installation.

Assembled, wired and installed equipment to provide intercommunicating service to three telephones in the 705 Building.

Plant Telephone Operations (Contin.)

Arranged for the erection of signs to indicate clearance of the T5 trunk cable over an area road being used by the Army for moving heavy equipment and high loads.

Installed a 16-pair cable terminal in White Bluffs to provide additional facilities to serve Minor Construction and relocated A.E.C. field construction offices.

At the Purex Plant construction site, a 16-pair cable was installed to provide service connection to construction field offices after the construction switchboard is removed from service.

Completed all assigned work involved in taking inventory of telephone plant in service in connection with the establishment of Telephone Plant Accounts in accordance with Federal Communications Commission Uniform System of Accounts for Telephone Companies.

The PBX switchboard serving construction activities at the Purex Plant construction site was discontinued on March 31. Telephone service for remainder of the construction job will be served by 16 dial lines.

Prepared a list of new number assignments for 100-K, 100-B and 100-C area telephones. The new numbers are to be effective when the new dial exchange being installed in the 100-K area is placed into service.

Completed usage studies on a total of 76 plant telephone lines.

Commercial Telephone Operations

Located and repaired bullet damage to the Yakima River crossing section of the Richland-Kennewick trunk cable.

Installed six signs for marking Columbia River crossings of three submarine cables.

Furnished the Community Engineer with information on underground telephone plant for inclusion in community plat records.

Removed three local service terminals from the Richland-Kennewick trunk cable.

Completed the recross connection of all Richland exchange telephone lines that are due to be transferred to the new 700 Area exchanges. This recross connection was necessary to prepare the lines for quick transfer on the night of cutover.

Installed a new cable terminal at Lee and Wellsian Way.

Designed and ordered materials for a grading panel to be installed in the Richland exchange.

Prepared job specification for modifying intercept lines and trunks in the Richland exchange so that more service can be accommodated.

Prepared additional maintenance data pertaining to gas pressurized cable.

Radio System Operations

Radio operating tests were made from atop Rattlesnake Mountain on March 2 to determine effectiveness of radio communications coverage of planned evacuation routes from Richland. The tests were conducted between a radio equipped car atop the mountain and three other radio equipped cars, one of which traveled the area between Richland and the Patterson Ferry; a second traveled the highway between Richland and Sunnyside; and a third car covered the route from Richland through the barricaded area to the Yakima barricade and to Sunnyside. Approximately 40 two-way tests were conducted and all successfully with the exception of a few that were made while the car on the Richland-Patterson Ferry route was on the river bank near the ferry and in some of the canyons in the Horse Heaven Hills area.

Installed two intercommunicating systems in the 717-A Building, an 11-station system for the Photography Unit and an 8-station system for the Graphics Unit.

Installed and operated portable public address and sound recording equipment for the Audio-Visual Unit on March 9, March 23 and March 30.

Recorded Science Forum programs on March 2, 9, 16, 23 and 30.

Installed and operated portable public address equipment in the Carmichael School Auditorium on March 23 for a Supervisors meeting.

Two radio station outages occurred during the month of March. KKE624, Station #13 (Army Post No. 210) was out of service on March 8 from 5:00 AM to 9:20 AM due to tube failure. The same station was again out of service on March 9 from midnight to 3:45 AM due to a defective relay rectifier.

Field-serviced 52 mobile transmitter receiver sets.

Shop-serviced 20 mobile receivers and 25 mobile transmitters.

Field-serviced nine fixed-station receivers and shop-serviced two similar receivers and two fixed-station transmitters.

Overhauled one public address system and serviced 6 intercommunicating systems.

Removed three mobile transmitter-receiver sets and reinstalled them in other vehicles.

Shop-serviced 14 pack type receiver-transmitter sets.

Statistical Data

	At 20th of March	Change from Previous Month	Change From Year Ago
Residential Subscribers	6001	- 10	∕ 138
Business Subscribers	484	∕ 2	- 13
Paystation Telephones	68	- 3	∕ 1
Official Subscribers:			
Richland Exchange	987	- 1	- 2
North Richland Exchange	216	- 20	- 1
Process Area Exchanges	1747	- 5	- 67
		- 37	∕ 56

Telephone Sub-Section - Statistical Data (Contin.)

New Service Requests Received During the Month:

For Residential Service	77
For Business Service	0
TOTAL	77

Backlog of Service Requests:

For New Residential Telephones	285
For New Business Telephones	0
For Residential Outside Moves	15
For Business Outside Moves	0
TOTAL	300

Service Orders Processed:

In Connection with Residential and Business Service	617
In Connection with Plant Service	341
TOTAL	958

Facilities - Installed, In Service and Available:

	Exchange Lines			Party Lines
	Installed	In Service	Available	Available
Richland	4065	3988	77	338
North Richland	600	394	206	121
Process Areas	2050	1632	418	---
	6715	6014	701	459

Radio Stations:

	At 20th of March	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 March 1: 329
(104 of the above 329 documents are chargeable to E. I. du Pont de Nemours & Co.)

Number of classified documents and prints reported as unaccounted for during March: 5

Number of classified documents and prints either recovered or downgraded in classification during March: 1

Number of classified documents and prints remaining unaccounted for as of April 1, 1955: 333
(104 of the above 333 documents are chargeable to E. I. du Pont de Nemours & Co.)

The Non-Technical Document Review Board held five meetings during the month and reviewed a total of 221 documents. Of this number

4 were upgraded to "Confidential",
54 had their classification retained,
127 were downgraded to "Official Use Only",
9 were declassified, and
27 were not within the scope of the Board.

Security Education

Three security items appeared in the GE NEWS during the month.

There were 415 security meetings held and attended by 5,932 HAPO employees. A representative of the Plant Protection Services Unit showed one of the security films at some of these meetings as indicated below:

Film Title	Number of Meetings	Average Attendance Per Meeting	Total Attendance
Turn Left Across the Bridge	6	24	144
Words Are Weapons	3	31	93
The Calculated Risk	1	14	14
The Tallest Shadow	2	28	56
The Defense Rests	1	35	35
Signal 99	2	35	70
The Man on the Left	2	40	80
The Case of the Smokeless Chimney	3	22	66

GE Security Bulletin No. 92, entitled "The Man on the Job", was issued March 16.

650 copies of the poster with the slogan "Secure Your Area Against Sabotage - Identify Visitors" were posted in the plant areas during March.

Security mobiles were hung in the 100-D, 100-F, 200-W, and 300 Areas during this reporting period with the slogans "Give Your Country a Sporting Chance" and "Remember Security". The mobiles have a miniature baseball and bat on them.

Security Education (Contin)

Organization and Policy Guide No. 15.3 entitled "Classified and/or Radioactive Material Pass" was revised and issued March 23.

Organization and Policy Guide 15.1.3 was revised and issued on March 23, entitled "Security Clearances and Identification".

One hundred and forty-two employees of the General Electric Company received a "Q" security orientation talk from either a representative of the Plant Protection Services Unit or a Patrol Supervisor during the month of March. Sixty-two employees received an "L" security orientation talk during the same period.

Statistical Report of Security Patrol Activities

	100-B	100-D	100-F	100-H	100-K	200-E	200-W	300
Pat Searches	105	96	41	96	99	0	0	0
Escorts	19	7	14	45	174	5	14	21
Ambulance Runs	2	0	3	2	0	0	4	7
Passes Issued:								
One day temporary	39	14	13	4	2	3	61	19
Travel	0	0	0	0	0	0	0	122
Red Tag	124	55	44	18	81	40	378	52
Telephonic	0	0	0	0	0	0	0	0
Supervisors' Post Contacts	457	255	211	87	453	258	540	391

Other Patrol Activities (Computed by Hours)								300 & 700
Security File Check	180	315.5	230	437	371	272	336	2,442
Building Check	393	88.5	347	1,042.5	371	272	336	792

Arrest Report

Violations	Number of Violations	Cont. Cases from Feb.	Cases Cleared	Pending	Fined
Illegal Parking	20	0	16	4	16
No Driver's License	0	1	0	1	0
Speeding	1	1	1	1	1
TOTALS	21	2	17	6	17

Citation Tickets Issued:	21
Warning Tickets issued:	54
Verbal Warnings	0

Patrol Training Activities

723 Patrolmen received classroom instruction during the month. Nearly every man received two periods of classroom instruction during March, accounting for the large number of men in attendance.

217 Patrolmen attended Firearms training during the same period.

Patrol Post Changes

The Cruiser Car post, 200-W Area, was discontinued March 1.

General

The annual inventory of "Secret" Research and Development Reports, conducted in accordance with General Manager Bulletin GM-SEC-5, was completed March 17, 1955.

Six hundred and sixteen audits and inspections of General Electric employees, who are custodians of classified documents and prints, have been made since September 1, 1954, through March 29, 1955.

Security Administration

Daily Badge Log Entries	3,044
"Q" Clearances	142
"L" Clearances	62
Formal "P" Clearances issued	38
"P" Approval Clearances issued	55
Category Access granted	41
Category Access withdrawn	47
Category Access revised	41
Number of photographs for "A" badges	750
Number of photographs for "B" badges	175
Number of persons rephotographed	19

Total of 750 "A" badges assembled and distributed to the areas.
Total of 591 Photo Identification Passes were laminated and issued.
Total of 530 "A" badges received from the areas.
Total of 152 "A" badges received from areas for repair.

Top Secret Clearances

Clearances for 48 employees were cancelled
47 employees were granted clearance by the Commission
58 clearances were requested by General Electric.

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DECLASSIFIED

HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITS FOR PERIOD ENDING MARCH 31, 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							
G. W. Giddings Research Laboratory General Electric Company Schenectady, New York	Reconciliation meeting on Salary Study	W. I. Patnode	3-14-55	3-17-55		X	700-703
L. W. Steele Research Laboratory General Electric Company Schenectady, New York	Reconciliation meeting on Salary Study	W. I. Patnode	3-14-55	3-17-55		X	700-703
L. L. Ferguson Salary Administration Services General Electric Company New York, New York	Reconciliation meeting on Salary Study	W. I. Patnode	3-14-55	3-17-55		X	700-703
ENGINEERING DEPARTMENT - ADVANCE ENGINEERING							
I. Visits to other Installations							
P. F. Gast to: Oak Ridge National Lab. Oak Ridge, Tennessee	Lecture at the School of Reactor Technology	Dr. Vonderlage	3-21-55	3-22-55	X		
W. K. Woods to: U. S. Atomic Energy Comm. Washington, D. C.	Discuss Geneva Conference	U. M. Staebler	3-8-55	3-9-55	X		
W. K. Woods to: U. S. Atomic Energy Comm. Washington, D. C.	Discuss Geneva Conference	U. M. Staebler	3-28-55	4-1-55	X		

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DECLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION							
I. Visits to other Installations							
A. B. Greninger to: Knolls Atomic Power Lab. Schenectady, New York	Discuss Development Program	F. K. McCune K. R. Van Tassel	3-16-55	3-18-55	X		
ENGINEERING DEPARTMENT - DESIGN SECTION							
I. Visits to other Installations							
W. L. Pearl to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Attend carbon steel meeting	D. M. Wroughton	3-30-55	3-30-55	X		
W. L. Pearl to: GE Atomic Power Study General Electric Company Schenectady, New York	Discuss reactor design and development work	B. R. Prentice	3-31-55	4-1-55	X		
W. L. Pearl to: Knolls Atomic Power Lab. Schenectady, New York	Discuss reactor design and development work	V. D. Nixon	3-31-55	4-1-55	X		
II. Visitors to this Works							
H. G. Henry North American Aviation Downey, California	Discuss reactor construction, maintenance, shop support and fuel element fabrication	H. P. Shaw	3-14-55	3-16-55	X		700-762 Bldg.
R. L. Olson North American Aviation Downey, California	Discuss reactor construction, maintenance, shop support and fuel element fabrication	H. P. Shaw	3-14-55	3-16-55	X		700-762 Bldg.
ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS							
I. Visitors to this Works							

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
I. Visitors to this Works							
H. O. Aaron E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Calcination and process problems	R. G. Geier	3-14-55	3-14-55	X	300-L XXX	
D. S. Arnold National Lead Company Fernald, Ohio	Discuss uranium and thorium technology	F. W. Woodfield R. E. Tomlinson R. G. Geier	3-21-55	3-22-55	X	200-E 201-C 200-W Redox, 221-T 300-L XXX	
W. M. Cashin Knolls Atomic Power Lab. Schenectady, New York	Regarding KAPL assistance to HAPO	J. J. Cadwell V. R. Cooper A. G. Blasewitz	3-3-55	3-4-55	X	100-D XXX 202-A 200-W Redox 300-L 303	
R. J. Christl E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Process consultation	R. G. Geier	3-14-55	3-17-55	X	202-A 200-W 221-U, Redox 300-L XXX; 700	
K. Copenhagen U. of California Rad. Lab. Livermore, California	Discuss fabrication and HAPO assistance to Whitney Project	J. J. Cadwell	3-21-55	3-22-55	X	200-W 234-5 300-L XXX	
D. H. Cornell Knolls Atomic Power Lab. Schenectady, New York	KAPL-120 loop modification	G. E. Wade	3-17-55	3-18-55	X	100-H 105 100-K 105-KW 700	
P. C. Daly Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss LSR in-pile feasibility study	J. A. Berberet	3-16-55	3-18-55	X	100-D 105 100-H 105 100-K 105-KE 300-L XXX; 700	
J. O. Davis National Lead Company Fernald, Ohio	Discuss uranium and thorium technology	F. W. Woodfield R. E. Tomlinson R. G. Geier	3-21-55	3-22-55	X	200-E 201-C 200-W Redox, 221-T 300-L XXX	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. M. Davis North American Aviation Downey, California	Survey existing design construction and operation of remote metallurgical equipment handling	L. D. Turner	3-14-55	3-15-55	X		300-L XXX
W. D. Decker U. of California Rad. Lab. Livermore, California	Discuss fabrication and HAPO assistance to Whitney Project	J. J. Cadwell	3-21-55	3-22-55	X		200-W 234-5 300-L XXX
A. N. Holden Knolls Atomic Power Lab. Schenectady, New York	Regarding KAPL assistance to HAPO	J. J. Cadwell V. R. Cooper A. G. Blasewitz	3-3-55	3-4-55	X		100-D XXX 202-A 200-W Redox 300-L 303
D. M. Lang Carbide and Carbon Oak Ridge, Tennessee	Discuss UO_3 problems and Purex	O. F. Hill E. R. Irish	3-10-55	3-11-55	X		200-E XXX 200-W 221-U, Redox 300-L XXX; 700
R. Leed U. S. Atomic Energy Comm. Oak Ridge Operations Office Oak Ridge, Tennessee	Discuss UO_3 problems and Purex	O. F. Hill E. R. Irish	3-10-55	3-11-55	X		200-W 221-U, Redox 300-L XXX; 700
G. Mackey E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Process Consultation	R. G. Geier	3-14-55	3-17-55	X		202-A 200-W 221-U, Redox 300-L XXX; 700
R. V. Maier Carbide and Carbon Paducah, Kentucky	Observe uranium recovery and discuss UO_3 problems	F. W. Woodfield O. F. Hill	3-10-55	3-11-55	X		200-W Redox, 221-U 300-L XXX; 700
R. I. Martens E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss Purex problems and laboratory performance	F. W. Woodfield O. F. Hill E. R. Irish	3-16-55	3-18-55	X		200-E 201-C; 202-A 200-W 234-5, Redox, 221-U 300-L XXX
E. F. Miller, Jr. U. S. Atomic Energy Comm. Washington, D. C.	Process Consultation	F. W. Woodfield	3-24-55	3-24-55	X		300-L XXX

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
R. B. Oliver Oak Ridge National Laboratory Oak Ridge, Tennessee	Study various methods and types of equipment use for non-destructive testing	E. C. Wood	3-30-55	3-30-55	X		300-L 303
R. S. Pratt Bridgeport Brass Company Bridgeport, Connecticut	Discuss fuel technology	E. A. Eschbach	3-31-55	4-1-55	X		100-B 105-B, 105-C 300-L 303 700
W. J. Ramsey U. of California Rad. Lab. Livermore, California	Discuss fabrication and HAPO assistance to Whitney Project	J. J. Cadwell	3-21-55	3-22-55	X		200-W 234-5 300-L XXX
B. Rubin U. of California Rad. Lab. Livermore, California	Discuss fabrication and HAPO assistance to	J. J. Cadwell	3-21-55	3-22-55	X		200-W 234-5 300-L XXX
E. B. Sheldon E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss mechanical equipment and process used for oxide production and Purex process	F. W. Woodfield O. F. Hill R. E. Tomlinson	3-18-55	3-18-55	X		200-E 201-C
T. M. Snyder Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL assistance to Hanford and instrumentation	W. J. Ozeroff V. R. Cooper A. G. Blasewitz F. W. Woodfield	3-2-55	3-4-55	X		100-D XXX 200-E XXX 200-W Redox 300-L 303; 700
A. D. Tevebaugh Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL assistance to Hanford and instru-	V. R. Cooper A. G. Blasewitz F. W. Woodfield	3-2-55	3-4-55	X		100-D XXX 200-E XXX 200-W Redox 300-L 303; 700
P. R. Van Strum Carbide and Carbon Oak Ridge, Tennessee	Discuss UO problems and Purex	O. F. Hill E. R. Irish F. W. Woodfield	3-10-55	3-11-55	X		200-E XXX 200-W 221-U, Redox 300-L XXX; 700
D. M. Wilsey Knolls Atomic Power Lab. Schenectady, New York	Regarding KAPL-120 in-pile loop modification	J. A. Berberet	3-2-55	3-8-55	X		100-B 105-B, 105-C 100-D XXX; 100-H 105 100-F XXX; 100-K KW 300-L 303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
II. Visits to other Installations							
J. A. Ayres to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on corrosion problems	A. D. Tevebaugh	3-21-55 3-23-55	3-22-55 3-24-55	X X		
J. A. Ayres to: Argonne National Lab. Lemont, Illinois	Consultation on corrosion problems	J. E. Draley	3-25-55	3-26-55	X		
J. A. Berberet to: Aircraft Nuclear Propulsion Evandale, Ohio	Discuss present and future HAPO irradiations for offsite laboratories	W. Long D. L. Francis	3-30-55	3-31-55	X		
J. A. Berberet to: Knolls Atomic Power Lab. Schenectady, New York	Discuss present and future HAPO irradiations for offsite laboratories	T. J. E. Glasson	4-1-55	4-2-55	X		
J. A. Berberet to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss present and future HAPO irradiations for offsite laboratories	D. M. Wroughton P. Daly	4-4-55	4-4-55	X		
J. A. Berberet to: U. S. Atomic Energy Comm. Washington, D. C.	Discuss present and future HAPO irradiations for offsite laboratories	S. G. English G. M. Kavanagh	4-5-55	4-5-55	X		
J. A. Berberet to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss present and future HAPO irradiations for offsite laboratories	J. A. Gillette	4-6-55	4-7-55	X		
S. H. Bush to: Knolls Atomic Power Lab. Schenectady, New York	Conference on fission product mobility	C. E. Weber	3-7-55	3-9-55	X		
S. H. Bush to: Mass. Inst. Technology Cambridge, Massachusetts	Consultation on production of zircaloy tubing	A. R. Kaufman	3-10-55	3-10-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
S. H. Bush to: Metals and Controls Corp. Attleboro, Massachusetts	Consultation on production of oralloy	A. R. Matheson	3-11-55	3-11-55	X		
J. J. Cadwell to: Knolls Atomic Power Lab. Schenectady, New York	Discuss development program	K. R. Van Tassel F. K. McCune	3-16-55	3-18-55	X		
V. R. Cooper to: Ames Laboratory Ames, Iowa	Discuss metallurgy assistance program to Hanford	F. H. Spedding	3-28-55	3-29-55	X		
V. R. Cooper to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Discuss uranium metal production and fabrication and Metal Development Advisory Committee Meeting	N. Berry	3-30-55	4-1-55	X		
J. L. Daniel to: Knolls Atomic Power Lab. Schenectady, New York	Discuss spectrochemical analyses	F. P. Landis	3-7-55	3-10-55	X		
J. L. Daniel to: Metals and Controls Corp. Attleboro, Massachusetts	Discuss operation and application of Echelle	A. R. Matheson R. J. Murphy	3-7-55	3-10-55	X		
J. L. Daniel to: Argonne National Lab. Lemont, Illinois	Discuss interferometer applications	M. Fred	3-7-55	3-11-55	X		
R. L. Dickeman to: Aircraft Nuclear Propulsion Evandale, Ohio	Discuss ANP Reactor Program	M. C. Leverett	3-30-55	4-1-55	X		
W. E. Fry to: Aircraft Nuclear Propulsion Evandale, Ohio	Discuss present and future HAPO irradiations for offsite laboratories	W. Long D. L. Francis	3-30-55	3-31-55	X		
W. E. Fry to: Knolls Atomic Power Lab. Schenectady, New York	Discuss present and future HAPO irradiations for offsite laboratories	T. J. E. Glasson	4-1-55	4-2-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
W. E. Fry to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss present and future HAPO irradiations for offsite laboratories	D. M. Wroughton P. Daly	4-4-55	4-4-55	X		
W. E. Fry to: U. S. Atomic Energy Comm. Washington, D. C.	Discuss present and future HAPO irradiations for offsite laboratories	S. G. English G. M. Kavanagh	4-5-55	4-5-55	X		
W. E. Fry to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss present and future HAPO irradiations for offsite laboratories	J. A. Gillette	4-6-55	4-7-55	X		
J. J. Gard, Jr. to: Argonne National Lab. Lemont, Illinois	Attend AEC information meeting on non-destructive testing methods	S. McLain	3-23-55	3-25-55	X		
O. H. Greager to: Mallinckrodt Chem. Wkrs. St. Louis, Missouri	Attend Metallurgy Dev. Advisory Committee Meeting	C. D. Harrington H. Thayer	3-30-55	4-1-55	X		
H. A. Johnson to: Heppenstall Company Pittsburgh, Pennsylvania	Observe dingot fabrication and sub-committee meeting on ingot quality	H. C. Grim	3-22-55	3-24-55	X		
H. A. Johnson to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Observe dingot fabrication and sub-committee meeting on ingot quality	W. M. Leaders	3-23-55	3-25-55	X		
W. T. Kattner to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Committee on Uranium Quality and Fabrication Meeting	W. M. Leaders	3-3-55	3-11-55	X		
W. T. Kattner to: National Lead Company Fernald, Ohio	Drilled slug program discussions	C. E. Polson	3-7-55	3-7-55	X		
R. J. Lobsinger to: Material Testing Reactor Phillips Petroleum Company Idaho Falls, Idaho	Discuss water technology program and observe loop installations	R. J. Nertney	3-10-55	3-11-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
A. M. Platt to: Oak Ridge National Lab. Oak Ridge, Tennessee	Technical discussion on Purex process	F. L. Culler A. D. Callahan	3-23-55	3-26-55	X		
R. B. Richards to: Argonne National Lab. Lemont, Illinois	Attend Reactor Handbook Editorial Committee Meeting	A. F. Owings	3-3-55	3-3-55	X		
J. W. Riches to: National Lead Company Fernald, Ohio	Committee on Uranium Quality and Fabrication Meeting	C. E. Polson	3-7-55	3-7-55	X		
J. W. Riches to: Mallinckrodt Chem. Wks.. St. Louis, Missouri	Committee on Uranium Quality and Fabrication	J. A. Fellows	3-8-55	3-11-55	X		
M. J. Sanderson to: Knolls Atomic Power Lab. Schenectady, New York	Conference on fission product mobility	C. E. Weber	3-7-55	3-9-55	X		
M. J. Sanderson to: Mass. Inst. Technology Cambridge, Massachusetts	Consultation on production of ziraloy tubing	A. R. Kaufman	3-10-55	3-10-55	X		
M. J. Sanderson to: Metals and Controls Corp. Attleboro, Massachusetts	Consultation on production of oralloy	A. R. Matheson	3-11-55	3-11-55	X		
J. M. Skarpelos to: Knolls Atomic Power Lab. Schenectady, New York	Discuss high temperature water technology and attend Carbon Steel Committee Meeting	R. F. Koenig	3-28-55	3-29-55	X		
J. M. Skarpelos to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss high temperature water technology and attend Carbon Steel Committee Meeting	D. M. Wroughton	3-30-55	4-1-55	X		
G. E. Wade to: Phillips Petroleum Co. Idaho Falls, Idaho	Study high pressure loops at the Material Test Reactor	R. J. Nertney	3-10-55	3-11-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
W. P. Wallace to: Carborundum Company Niagara Falls, New York	Zirconium alloy development and fabrication	N. C. Bartholomew	3-16-55	3-16-55	X		
W. P. Wallace to: Argonne National Lab. Lemont, Illinois	Zirconium alloy development and fabrication	J. Schumar	3-18-55	3-18-55	X		
W. P. Wallace to: Superior Tube Company Norristown, Pennsylvania	Zirconium alloy development and fabrication	H. W. Cooper	3-23-55	3-23-55	X		
W. P. Wallace to: Bridgeport Brass Co. Adrian, Michigan	Zirconium alloy development and fabrication	R. M. Treco	3-24-55	3-25-55	X		
E. C. Wood to: Knolls Atomic Power Lab. Schenectady, New York	Non destructive testing methods	A. N. Holden	3-21-55	3-22-55	X		
D. C. Worlton to: Aircraft Nuclear Propulsion Lockland, Ohio	Non destructive testing methods related to Hanford problems	P. E. Lowe	3-28-55	3-28-55	X		
D. C. Worlton to: National Lead Company Fernald, Ohio	Non destructive testing methods related to Hanford problems	J. P. Scheuer	3-29-55	3-29-55	X		
E. C. Wood to: Argonne National Lab. Lemont, Illinois	Attend AEC information meeting on non destructive testing methods	S. McLain	3-23-55	3-25-55	X		

LEGAL DEPARTMENT

I. Visits to other Installations

L. Lomen to: Knolls Atomic Power Lab. Schenectady, New York	Rendering legal services	W. F. Kennedy	3-21-55	4-8-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
OPERATIONS RESEARCH STUDY SECTION							
I. Visits to other Installations							
P. M. Thompson to: Rand Corporation Santa Monica, California	Discuss electronic computer application to linear programming problem	W. Orchard-Hays	3-18-55	3-31-55	X		
MANUFACTURING DEPARTMENT							
I. Visitors to this Works							
H. O. Aaron E. I. du Pont de Nemours & Co. Wilmington, Delaware	Observation and consultation on Separations process facilities	R. S. Bell C. A. Priode V. R. Chapman	3-14-55	3-18-55	X	202-A 200-W Redox, 221-U 300-L XXX; 700	
R. J. Christl E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Consultation on Separations process facilities	C. A. Priode	3-14-55	3-17-55	X	200-W Redox, 221-U	
G. Mackey E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Observation and consultation on Separations process facilities	R. S. Bell C. A. Priode V. R. Chapman C. T. Groswith	3-14-55 3-16-55	3-18-55 3-16-55	X	202-A 200-W Redox, 221-U 300-L XXX; 700 200-W 221-T	
E. B. Sheldon E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Observation and consultation on Separations process facilities	R. S. Bell C. A. Priode V. R. Chapman 3-18-55	3-14-55 3-18-55	3-18-55 3-18-55	X X	202-A 200-W Redox, 221-U 300-L XXX; 700 200-E 201-C	
L. P. Smith Phillips Petroleum Company Idaho Falls, Idaho	Discuss purchasing and warehousing facilities	R. J. Gandy	3-7-55	3-8-55		X	700
K. W. Yeates, Jr. Phillips Petroleum Company Idaho Falls, Idaho	Discuss purchasing and warehousing facilities	R. J. Gandy	3-7-55	3-8-55		X	700
II. Visits to other Installations							

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
S. M. Gill to: National Lead Company Fernald, Ohio	Discuss uranium quality control	C. H. Walden	3-2-55	3-4-55	X		
E. W. O'Rorke to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Attend Metal Quality Control Advisory Committee Meeting	W. M. Leaders	3-30-55	4-1-55	X		
E. W. O'Rorke to: E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss uranium quality control	T. C. Evans	4-3-55	4-5-55	X		

RADIOLOGICAL SCIENCES DEPARTMENT

I. Visitors to this Works

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
T. Y. Toribara University of Rochester Rochester, New York	Discuss analytical procedures (after Nevada tests) used at Hanford	H. A. Kornberg	3-8-55	3-11-55	X		100-F 108-F #

II. Visits to other Installations

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
G. E. Driver to: U. S. Atomic Energy Comm. Nevada Test Site Yucca Flats, Nevada	Assignment to Program 30	R. W. Johnson	2-17-55	4-18-55	X		
I. T. Myers to: Argonne National Lab. Lemont, Illinois	Discuss experimental techniques on energy required to produce an ion pair in gasses	W. P. Jesse	3-14-55	3-15-55	X		
I. T. Myers to: Mound Laboratory Columbus, Ohio	Discuss calorimetric radiation measurements	J. F. Eichelberger K. C. Jordan S. R. Orr	3-16-55	3-17-55	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	4-20-44	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
W. G. Spear to: Nevada Test Site U. S. Atomic Energy Comm. Yucca Flats, Nevada	Assignment to Program 30 work on weapons testing	R. W. Johnston	3-15-55	to end of spring testing	X		
E. C. Watson, Jr. to: Oak Ridge Inst. of Nuclear Studies Oak Ridge, Tennessee	Education and on-the-job training programs	W. W. Grigorieff	3-7-55	3-11-55	X		
E. C. Watson, Jr. to: Carbide and Carbon Oak Ridge, Tennessee	Education and on-the-job training programs	E. E. Anderson	3-7-55	3-11-55	X		

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RADIOLOGICAL SCIENCES DEPARTMENT

MARCH 1955

SUMMARY

Twenty-nine informal, nine Class I and one Class II radiation incidents were recorded. The one overexposure was not of major significance.

In pollution problems, ruthenium took second place to I^{131}. The monthly emission of 540 curies I^{131} was the highest for several years. About 500 square miles off the project had vegetation contamination in excess of permissible limits. The situation needs prompt correction.

In research and development, an invention to measure ground water flow direction should expedite the hydrological program and make considerable savings.

Significant advances were made in isolation of specific radioisotopes from reactor effluent water. Bone was established as the critical organ for ruthenium deposition under some conditions.

Criteria were established for minimum acceptable river flow at the time that flow can be manipulated during the construction of the Priest Rapids Dam.

RADIOLOGICAL SCIENCES DEPARTMENT

MARCH 1955

The month-end force of 404 included 38 supervisors, 90 engineers and scientists, 23 clerical and 253other personnel.

Number of Employees on Payroll

Beginning of Month	395
End of month	404
Net increase	9

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

Name	Title of Invention
J. R. Raymond and M. W. McConiga	An In-Well Technique for the Measurement of Ground Water Velocity
J. R. Raymond and L. C. Schwendiman	An In-Well Ground Water Flow Direction Indicator

There were 39 radiation incidents, including nine Class I and one Class II incidents. In the Class II incident, a man received about 18 rads to a spot on the hand, and 1.5 rads to a small area on the hip.

There was no significant change in the ruthenium particulate contamination picture. Of 1000 people surveyed, 10 had particulate contamination; none represented appreciable exposure. Of nearly 1200 vehicle surveys, contamination occurred in 75 cases. In the related research, conditions were found in which bone was unequivocally the organ of maximum deposition density. This will lead to changes in the permissible limits.

As forecast last month, emission of I^{131} from process stacks still further exceeded appropriate limits. The monthly total was 540 curies, the highest during recent years, and exceeding the annual total for 1954. A recent review of permissible limits indicates that 10 curies per week is a reasonable limit. The measured emission was therefore excessive by a factor of 10 or more. With it came widespread contamination of vegetation. Excluding the reservation, some 250 square miles were above limits for vegetation contamination by mid-month; at month end the affected area was estimated to be 500 square miles.

Obviously, the condition has reached intolerable proportions.

Disposal of reactor effluent to the river received considerable attention. The increase in rupture frequency in 1954 compared with 1953 has again raised the difficult question of how to determine the appropriate maximum release to the river. Until a rapid method of quantitative analyses for many fission products is developed, tests are restricted to spot samples and the use of $Sr^{91,92}$ results as indices of the whole fission spectrum in the river. Agreement between different approaches is reasonable rather than convincing. The data suggest that reactors loaded with enriched slugs contribute unduly to the total fission product burden in the river.

In another phase of the key problem of establishing ultimate limits on disposal to the river, considerable progress continued in the rapid separation of individual elements by ion exchange. As reported last month, Na^{24} is easily separated; equally easy treatment for Cs^{137} has been demonstrated for the carbonate form through anion exchange. In hydroxyl form, barium, strontium, and sodium are separated and these are easily separated from each other. Strontium and cesium isotopes are in most demand for commercial applications. They are among the most hazardous in waste disposal. If the laboratory procedures developed here would apply to process wastes when sealed up a most attractive dual objective would be achieved.

An immediate river problem is the stipulation of minimum river flow acceptable during manipulation of flow for the Priests Rapids Dam construction. With current assumptions on power level for the next few years and considering radiation hazards, temperature effects, and chemical toxicity, it appears that the limiting hazard factor will be gut irradiation from Pasco-Kennewick drinking water. This sets the minimum flow at 36,000 cfs. Timing of the flow reduction can be controlled to avoid the fall season during which salmon spawning would otherwise be affected.

The chemical toxicity limit for reactor effluent is believed to hinge on the dichromate content. The maximum allowable concentration of chromium in drinking water is listed as 0.1 ppm (Cr). At this location, retardation of growth of fish has been observed at 0.02 ppm (Cr) (or 0.06 ppm computed as sodium dichromate). It is now believed that 0.01 ppm (Cr) is a borderline safe limit. The chromate toxicity limit therefore becomes a feasible limiting factor on reactor water flow; specifically, it can be shown to be fruitless to consider methods of operation requiring substantially increased concentrations of chromate in reactor water, unless there is recirculation.

There has been little success to date in expediting the attack on problems of waste disposal to ground. Essentially hand to hand combat with each urgent problem component is being conducted, with the department not always on the winning side.

Radiological Sciences Department

Scavenged wastes continue to be troublesome as to Sr^{90} content in particular; many last minute modifications of disposal plans are required.

Some work was done on the delineation of a possible basalt barrier to ground water flow in the area north of the separations plant. Current indications are that such a barrier exists and now extends some 35 feet above the water table. Long range waste disposal may hinge on the integrity of this barrier, and whether cooling water additions to ground may fill the ground water pool

Radiological Sciences Department

prepared in November 1954 for discussion at a department meeting; due to scheduling difficulties at year end the meeting was not held. Renewed efforts will be made to improve job security and promotion possibilities for members of this group and all others.

H M Parker

Director
RADIOLOGICAL SCIENCES DEPARTMENT

Radiological Sciences Department

APPENDIX

1. Condensed Exposure Records

Type	Number of Readings	Potential High Results	Confirmed High Results
Pocket chambers - gamma	268,532	15	0
Pocket chambers - slow neutron	807	0	0
Film Badges - beta-gamma	45,408	7	0
Neutron film	488	0	0
Pu bioassay	948	58	0
F. P. bioassay	1,052	0	0
U bioassay	480	0	0
Alpha hand counts	55,568	1	0
Beta hand counts	62,716	12	0

Radiological Sciences Department

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	1.4×10^{-8}	--
Richland, N. Richland, Benton City Wells	alpha	$(<0.5 \text{ to } 1.4) \times 10^{-8}$	--
100 Areas	beta	$(<0.5 \text{ to } 8.5) \times 10^{-7}$	--
Pasco, Kennewick, McNary Dam	beta	$(<0.5 \text{ to } 4.2) \times 10^{-7}$	--
Backwash solids - Pasco Filter Plant	beta	1.5×10^{-2} /uc/g	-2
Backwash Liquids - Pasco Filter Plant	beta	7.1×10^{-7}	+2
Sand Filter - Pasco Filter Plant	beta	1.4×10^{-4} /uc/g	--
Anthracite Filter - Pasco Filter Plant	beta	1.6×10^{-4} /uc/g	--
Other Waters and Related Materials			
300 Area Wells #1,2,3	alpha	$(<0.5 \text{ to } 1.8) \times 10^{-8}$	-4
300 Area Well #4	alpha	1.1×10^{-7}	+2
Well #4 measured as uranium	U	6.9×10^{-8}	+4
Other Wells on the Reservation	beta	$(<0.5 \text{ to } 1.2) \times 10^{-7}$	-4
Columbia River - Hanford Ferry	beta	1.9×10^{-5}	--
Columbia River - below reactors	beta	1.3×10^{-5}	--
Columbia River - Patterson to McNary	beta	4.2×10^{-7}	--
Columbia River - shore mud	beta	$(1.6 \text{ to } 6.8) \times 10^{-5}$ /uc/g	-2
Raw Water - Operating areas	beta	$(<0.05 \text{ to } 2.6) \times 10^{-6}$	--
Reactor Effluent Retention	beta	3,200 to 26,000 /uc/sec/reactor $(4.5 \text{ to } 5.6) \times 10^{-3}$	--
Reactor Effluent Retention Basins to River	alpha	<0.03 /uc/sec/reactor $<5 \times 10^{-9}$	--
I-131 in Farm Wastes to River	I-131	19 /uc/day 5.6×10^{-7}	--
Iodine in Columbia River - Hanford	I-131	1.4×10^{-7}	--
300 Area Pond Inlet	alpha	3.7×10^{-6}	+3

Radiological Sciences Department

Sample Type and Location	Activity Type	Average Activity Density /uc/cc	Trend* Factor
Atmospheric Pollution			
Gross Alpha Emitters	alpha	(<4 to 6) x 10^{-15}	--
Gross Dose Rate - Separations Areas**	beta - gamma	0.5 to 5.2 mrad/day	--
Gross Dose Rate - Residential Areas***	beta - gamma	0.4 to 0.8 mrad/day	--
Active Particles - Separations Areas	beta	(2.8 to 8.3) x 10^{-13}	--
I-131 Separations Areas	I-131	(0.74 to 7.4) x 10^{-12}	+11
I-131 Separations Stacks	I-131	18.5 curies/day	+7
Ruthenium - Separations Stacks	$Ru^{103,106}$	$<$0.03 curie/day	-2
Active Particles - Wash., Idaho, Oregon, Mont.	-	0.001 to 0.036 ptle/m^3	+6
Active Particles - HAPO	-	0.002 to 0.29 ptle/m^3	+4
Tritium (as oxides) - Reactor Stacks	T	0.24 curie/day	--
Vegetation			
Environs of Separations Areas	I-131	(0.07 to 1.9) x 10^{-4} uc/g	--
Residential Areas	I-131	($<$3.0 to 4.0) x 10^{-6} uc/g	--
Eastern Washington and Oregon	I-131	($<$3.0 to 8.0) x 10^{-6} uc/g	+2
Non-volatile beta emitters- Wash. and Oregon	beta	(5.1 to 7.2) x 10^{-5} uc/g	--
Alpha Emitters - Separations Areas	alpha	(0.3 to 2.2) x 10^{-7} uc/g	-2
Alpha Emitters - 300 Area	alpha	1.1 x 10^{-7} uc/g	-20

* 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 Gross Dose Rate - Separations Areas should have been 0.6 to 5.2 mrad/day.

*** The value reported last month as the Gross Dose Rate - Residential Areas should have been 0.4 to 1.3 mrad/day.

[redacted] DECLASSIFIED

FINANCIAL DEPARTMENT MONTHLY REPORT
MARCH, 1955

The five-year "holding period" for bonds purchased in 1949 under the Employees Savings and Stock Bonus Plan ended on January 1, 1955. Approximately 1800 employees of Hanford Atomic Products Operation had bonds on deposit with the Company during this five-year period and the bonds which they purchased under the Plan in 1949 were delivered to them through supervision during the month of March. Stock certificates representing the 1949 stock bonus were mailed to participants from New York during the week beginning March 28. Checks representing accumulated income earned on the stock since 1949 were distributed to Hanford participants with the 1949 bonds.

Statements of 1954 earnings which may be excludable from gross income for income tax purposes were mailed by the Personnel Accounting Section to approximately 500 employees who had requested such information. The excludable amounts represent payments made to the employees during periods of absence due to illness or injury. A total of approximately $90,000 was determined to be excludable from gross income of all the employees to whom statements were given.

Preparation of the operations budget for the fiscal year 1957 and the revision of the budget for the fiscal year 1956 has continued through March and is scheduled for official transmittal to the Commission on April 21. Program changes have delayed completion of this data at an earlier date.

Standard billing prices on plutonium were decreased effective 3-1-55. The decrease was made possible through continued reductions in product unit cost and additional credit received for depleted uranium. Billing prices now in effect were transmitted to the Commission in document number HW-35933.

Due to the windup of Blaw-Knox's contract, the Atomic Energy Commission completed arrangements for the transfer of that contractor's stainless steel inventory to Minor Construction Stores. A detailed listing of materials in this inventory will be furnished to other AEC installations in an effort to dispose of them.

The amortization rate for minor construction small tools was decreased from 36% per annum to 17%. This rate will fully amortize minor construction small tools in 24 months.

At the request of Separations Section Power and Maintenance Superintendents the accounting procedures used by personnel in their results work were reviewed by the Cost Section and revisions which would assist them in eliminating duplication of effort were recommended. The revisions were accepted and will be placed into use April 1.

The SF Accountability Section reports that the potential recovery of pickle and slug recovery solutions by the UO_3 process, rather than by off-site recovery as C-6 oxide, has now been developed to the point of formal recommendation to the USAEC for approval. Local savings are estimated at $75,000 annually.

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Individual accounts for basic and special quota materials were established by the SF Accountability Section, covering the ten items listed by the USAEC. The detail of these accounts is anticipated to materially increase the work load due to the numerous provisions of GM-PRO-2 which applies to materials in this category. This is the first calendar year in which HAPO has been involved in a major Basic Special Materials program and is currently five times the magnitude of any previous year.

The SF Accountability Section engaged in a two-day conference with D. E. George and Dr. R. F. Lumb of the Washington, D. C. office of the Division of Source and Special Nuclear Materials, U. S. Atomic Energy Commission. Two main topics of interest related to the problems of tube-by-tube measurements and accounting in the reactor areas, and to the influence of dissolver heels and methods of calculation in the separations areas. The conferences were attended by representatives of Operations, Process, Analytical and Nuclear Physics.

Material released by the Metal Preparation Section and by the Technical Section and shipped off-site amounted to approximately twenty-one tons SF content, according to the SF Accountability Section. These shipments included the first oil immersed turnings shipped from this site and also included sludges and salt bath flux of normal uranium content.

The SF Accountability Section's report on planning, scheduling and integration of unit activities was completed as of March 31, this program having been coordinated to the 1955 exempt employee appraisal form and to the position descriptions. Up to the present time no revisions in the position descriptions have been required.

The Government Accounting Office review of SF Accountability records for the Metal Preparation Section, conducted with the assistance of representatives of the USAEC, was completed after an audit covering nine full working days.

The Manager - Budgets and Measurements attended a Measurements Conference in Schenectady on March 21 and 22, at which 15 General Electric components of the Defense Products Group were represented. The conference dealt with the development of the Company's measurements project.

The Budgets and Measurements Section issued a booklet entitled "Measurements Project," which includes a history of the Company project and sets forth the principal areas of coverage and the basic principles to be followed in its development. A second booklet, "Existing HAPO Measurements," will be issued in April.

The Contract Reimbursements group spent considerable time preparing revisions of Appendix B to the proposed Prime Contract with the AEC, in accordance with directions of a subcommittee of three Section Managers appointed by the Manager - Finance to bring this document into agreement with the changes in policy which have taken place since the instrument was originally negotiated with the Commission. These drafts have been reviewed by the subcommittee with Legal and Salary Administration representatives, and will be the basis for renegotiation of this Appendix with the Commission sometime in April.

Charges from HAPO to the Overhead Allowance in March amounted to $2,953, consisting of: travel and living expense variation, $1,609; conference expense, $1,214; unusual items, $86; telephone calls not related to work under the Contract, $38; and cost of operating Company-owned cars, $6.

As a result of transferring the reproduction of organization and policy guides, approximately six months ago, from facilities of Printing to those of the Duplicating shops, an annual out-of-pocket savings to HAPO of $4,500 to $5,000 has resulted. This is represented by the reduction of one employee in the Office Auxiliaries Sub-Section and a reduction in material costs.

Invoices recorded in Accounts Payable during the month of March, 1955 numbered 4852 and totaled $3,786,000. This represents the greatest number booked in any one month this fiscal year. Since both the number (2613) and amount ($2,517,000) of purchase orders received this month reflect a substantial increase over prior months, it is indicated that work volume in Accounts Payable will continue at a high level.

Cash discount earned this month was $8,500, and for the fiscal year to date the amount is $49,000.

Final modifications to contracts G-5 and G-12, covering procurement of graphite from National Carbon Company, were processed. A letter was written National Carbon requesting the refund of $47,605, representing the difference between the value of defective graphite paid for and unpaid invoices on hand. Total net payments under these two contracts were $7,500,000.

Budget reports were prepared for Net Cash Working Capital and Government Cost Transfers for Fiscal Years 1956 and 1957.

Work continued on the revision of the Cash Control Procedure Manual, which is expected to be completed by May 14.

The Procedures and Computing Section has developed an interpretive routine capable of assembling program instructions in connection with the electronic data processing (702) machine. This is an original contribution to automatic programming and has created considerable interest among other operators of computing installations. It is estimated that this system may reduce programming time in some applications by as much as 90%.

A programming group has been formed in the Procedures Analysis Unit to expedite the conversion of existing punched card procedures to the electronic data processing machine. The group is to be composed of two technical graduates and five business graduates or accounting employees. Most of the personnel have been recruited from other sections of the Financial Department or from other departments.

Orders have been placed for five type 884 typewriter-tape punches, somewhat similar to the Flexowriter. Four of the machines are to be used in connection with the conversion of property records to a new accounting system in the Plant Accounting Unit, while the other will serve as a pilot machine in work in the classified files. Additional machines are to be ordered for classified files if the original installation proves to be satisfactory.

All of the designated control custodians for special materials, in compliance with organization and policy guide 04.10, conducted a quarterly physical inventory of special materials as of February 28, and reported the results to the Inventory Accounting Unit by March 10. Reconciliation of the individual reports with accounting records disclosed only minor discrepancies which, upon investigation, were corrected and custodial records adjusted.

A comprehensive review of the Equipment Budget with field personnel was completed during the month. As a result of the review approximately $125,000 of questionable items were deleted after consultation with the activities concerned.

The third annual physical inventory of coal and fuel oil under the custody of Manufacturing and Employee and Public Relations Departments was completed on March 31. The results of the inventory will be issued in April.

The Hanford electrical sub-stations and lines were inventoried by the Plant Accounting Unit jointly with Electrical Utility Section and the Atomic Energy Commission. In connection with the inventory, the portion of the Taunton Line carried in G.E.'s books was transferred to the AEC.

Final approved lists of equipment to be held for future use upon the close-out of the Kaiser and Blaw-Know contracts have been received from the AEC. A decision has not yet been reached on the disposition of construction equipment in the White Bluffs Area. The General Electric Company has been requested to take over the maintenance of the power distribution lines, using G.E. maintenance personnel.

Project proposals and informal requests approved by Department Managers and the General Manager for transmission to the AEC during the month amounted to $3,809,500.

Thirty-one requests for appropriations totaling $87,071 were investigated and approved during the month.

One hundred seven requests for the disposition of property were investigated, processed and approved during the month.

Graphs and statistics were prepared by the Plant Accounting Unit in connection with the visit of Atomic Power Associates and Philadelphia Electric Company personnel during April.

A meeting was held during the month between Bonneville Power Administration and the Atomic Energy Commission. Plant Accounting personnel were requested to attend the meeting since the subject for discussion was pricing of equipment inthe 115-KV Transmission Line and related sub-stations which were transferred to the BPA as of December 31, 1954.

The Manager - Finance inaugurated in March a series of luncheons, to be held on alternate Mondays, with about 20 different exempt employees present at each, to discuss current developments and other matters of mutual interest.

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 $5,900,000 and $8,650,000, respectively, by the Atomic Energy Commission) for the months of March, and February, 1955, is shown below:

Disbursements	March	February
Payrolls (net)	$3 024 981	$2 934 986
Materials and Freight	1 717 418	1 460 701
Payroll Taxes	699 209	777 091
Payments to Subcontractors	514 009	543 445
Cost of Stock Bonus Plan for Year 1954	230 261	-0-
Group Insurance Premium	147 371	146 525
United States Savings Bonds	133 113	301 789
Pension Plan - Employees' Portion	99 061	100 844
Travel Advances to Employees	61 833	43 056
Employers Contribution to Pension Plan for 1954	-0-	1 942 936
All Other	152 112	104 690
Total	6 779 368	8 356 063
Receipts		
Rent	115 764	120 599
Electricity	99 063	76 416
Hospital	64 896	53 028
Telephone	55 734	52 288
Sundry Accounts Receivable	9 924	25 960
Bus Fares	9 280	7 925
Refund of Travel Advances to Employees	7 685	10 729
Sales to AEC Cost-type Contractors	2 601	8 323
Refunds from Vendors	586	2 668
Other	11 089	23 054
Total	376 622	380 990
Net Disbursements	$6 402 746	$7 975 073

Outstanding advances as of March 31, and February 28, 1955 were as follows:

	March	February
Cash in Bank - Contract Accounts	$1 715 868	$2 218 614
Cash in Bank - Salary Accounts	15 000	15 000
Total	$1 730 868	$2 233 614

AUDITING SECTION
MONTHLY REPORT - MARCH, 1955

Reports were issued for the completed audits listed below:

Excess, Salvage and Scrap
Accounts Receivable - Kadlec Hospital
Accounts Receivable - Telephone
General Electric Insurance Plan
General Electric Pension Plan
General Electric Employee Savings and Stock Bonus Plan
Coverage of 1954 Physical Inventories
Records and Procedures, SF Accountability - 100 Areas

At month-end, reports were being prepared for audits of:

Management of Capital Assets
Classified Files

Field work was continued on the following audits:

Weekly Payroll Preparation and Distribution
Procurement Activities

The following audits were started during the month:

Stores Activities
General Accounts
Overtime Lunches
Nucleonics Employees Good Neighbor Fund

A follow-up of compliance with recommendations in the report on the Audit of Employee Awards and Recognition Pins was completed during the month.

Five employee informations meetings of exempt employees were held during the month.

As of March 7, 1955, P. F. Dodds transferred from Auditing Section to Payroll Section.

BUDGETS AND MEASUREMENTS SECTION
MONTHLY REPORT - MARCH, 1955

General

The Section Manager attended a Measurements Conference in Schenectady on March 21 and 22, at which fifteen General Electric components of the Defense Products Group were represented. The conference was primarily concerned with an interchange of ideas among the components in the development of the General Electric Company's Measurements Project.

Measurements

During the month a booklet entitled "Measurements Project" was issued to Department Managers. Additional copies are available for distribution within each department as may be required. This booklet includes a history of the General Electric Measurements Project, and sets forth the prime areas of coverage and basic principles to be followed in its development.

Another booklet, presently in printing, entitled "Existing HAPO Measurements", will be ready for distribution in April.

Letters are being prepared to Financial Department Section Managers, in which certain basic financial and statistical data will be requested for the 1955 HAPO Measurements Project.

Budgets

Personnel estimates and explanation of changes during FY 1956 and FY 1957 were reviewed with the Manager - Finance. His subsequent review with the General Manager resulted in some revisions that are being incorporated in the submission to HOO-AEC.

Reviews were held with the Manager - Finance regarding the Community and Research and Development Programs. Additional meetings were scheduled for early April to review the budget presentation for Inventories, Equipment Not Included in Construction Projects and Net Cash Working Capital.

Detail is being provided informally to HOO-AEC Budget Division, as reviews are completed, with the official transmittal of the balance of the Hanford Atomic Products Operation Budget for FY 1957 and Revision of Budget for FY 1956 now scheduled for April 21, 1955.

Change No. 6 of the FY 1955 Financial Plan was received from HOO-AEC. A reconciliation of the changes was made and general agreement was indicated in our acknowledgment to the Commission dated April 1, 1955.

CONTRACT COST SECTION
MONTHLY REPORT - MARCH, 1955

A revised report of Metal Preparation SF Material activity was developed in conjunction with SF Accountability Section. The revised format will be used effective with March reports. It is expected that a substantial decrease in preparation time, volume of reporting and clerical effort will be realized in both SF Accountability and Product Cost Accounting.

Work on overtime lunch routines contined during the month. The accounting procedure for overtime lunches was completed and distributed. Audits of frozen lunches were made by Area Representatives.

Considerable time was spent by the Metal Preparation and Reactor Sections Representatives and other Cost Section personnel in reviewing and discussing cost procedures and reports with GAO personnel.

The Atomic Energy Commission authorized General Electric an additional $3 000 to defray expenses incurred in connection with the Special Equipment Held for Future Use program. This increase beings to $8 000 the total authorizations to General Electric.

Effective March 1, two non-exempt employees were promoted to the exempt roll and were transferred to the Procedures and Computing Section, together with one other exempt employee. One exempt employee returned from Military Service and was assigned to the General and Consolidations Cost Unit.

Employee and Public Relations Cost Unit

A series of unit cost reports covering Community Section activities is being developed and will be included in unit cost and financial statement binders when these are issued covering March business.

Analysis letters issued to all managers in the Personnel Management Group will in the future include line graphs showing cost-budget relationships and cost trends.

A change in the method of preparing "Request for Billing" for steam delivered to commercial facilities has greatly reduced the number of requests processed. Formerly, a separate request was prepared for each facility, whereas now only one request is prepared listing in detail all facilities and the amount each should be billed. The supervisor of Accounts Receivable has approved this change.

A detailed procedure for reporting and forecasting overtime hours worked by Employee and Public Relations Department was, as a service to the Department Manager, prepared and issued to all Section Managers by the Accountant, Employee and Public Relations Cost. This procedure was designed to meet the

new reporting requirements outlined in Organization and Policy Guide No. 18.7 recently issued by the Manager - Finance.

Engineering Cost Unit

During March, the various phases of the Engineering Department Operating Budget were reviewed and revisions made, including a reduction of fifty (50) people from Project Section. All revisions were completed and final phase of budget was delivered to Budgets and Measurements Section on April 1, 1955. At the present time, however, it appears that one or two additional minor revisions may be needed.

Considerable progress was made during March on the Plant and Equipment-Projects Budget. A special detailed analysis of all active and future projects was prepared along with a preliminary project summary for review by the Manager - Finance and General Manager. Additional analysis has been prepared and several major revisions are pending. As soon as final decision is reached on proposed revisions, the formal presentation will be prepared for transmittal to HOO-AEC. This is expected by April 15, 1955. An informal copy of the preliminary project summary, along with non-classified data sheets, was furnished to HOO-AEC on March 21, 1955. Classified document containing balance of data sheets had been previously forwarded on March 9, 1955.

FY 1955 Engineering Department Research and Development funds were redistributed including additional funds totaling $50 000 made available from the Special Study ($34 000) and the Radiological Sciences Department ($16 000). The following schedule shows the distribution of funds:

Section	Original Authorization	Reallocation of Design Funds	Special Study & Radiological Sciences Funds	New Authorization
Advance Engr.	$ 180 000	$ -0-	$ -0-	$ 180 000
Design	1 046 000	(100 000)	-0-	946 000
Pile Tech.	4 483 000	100 000	-0-	4 583 000
Sep. Tech.	2 519 000	-0-	50 000	2 569 000
Total	$8 228 000	-0-	$ 50 000	$8 278 000

The budgets for Pile Technology, Separations Technology and Design Sections will be adjusted to reflect the above adjustments and will be reported on March reports.

Information was furnished to Chemical Development Sub-Section, Separations Technology Section, relative to the cost of building the various HAPO tank farms.

General and Consolidations Cost Unit

The possibility of preparing an IBM report of overtime hours with standard

explanations was investigated. A request to the Procedures and Computing Section was refused at this time, and until a detailed investigation can be made to include other similar type requests, each department will have to accumulate their own data for reporting overtime.

A request from Engineering Cost Unit for a "Project Engineering Weekly Work Order Cost to Date Listing" was investigated. This request was granted but, owing to the heavy work load in the Computing Unit, this listing cannot be prepared until early May.

Assistance was given the Manufacturing Cost and Computing Units in preparing a Work Order Authorization Listing on IBM equipment. The possibility of preparing other authorization listings, such as store order, printing and duplicating, etc., appears feasible at some future date.

Twenty pages of the uniform cost code guide were revised this month. Emphasis is being placed upon uniformity, between the various departmental cost codes and account classifications whenever practical.

A detailed study of IBM utilization was made to determine if the base shift was showing the highest utilization. This seems to be followed very closely by the Computing Unit, and no recommendations were made.

At the request of the Manager - Biophysics Section, a detailed analysis (3 months) of Instrument Maintenance expense was made. The cost report does not detail the maintenance costs by types.

A report on Attendance at Professional and Trade Society Meetings was prepared for the Radiological Sciences Department, and reported attendance at meetings by individual and sections for fiscal year to date. General Books Unit has agreed to issue this report in the future.

Manufacturing Cost Unit

The new work order authorization list has been prepared by Computing Section and forwarded to Duplicating. This listing will be distributed in the early part of April. We have also arranged with Computing to set up a master cardex on individual authorizations allowing them to re-run a revised authorization list at any time sufficient names have been received to warrant such a revision.

At the request of the Appropriations Unit, the Separations Section Financial Representative performed an audit of four post acceptance reports on various Separations projects.

A study to determine the feasibility of machine posting to our ledger has been initiated. In conjunction with this a revised operating report form is being developed.

Accounting preparations have been completed to cover the consolidation of the Fabrication Shops Unit of the Metal Preparation Section with the Tech-

nical Shops Unit and for the establishment of the Production Area Maintenance Unit of the Metal Preparation Section to become effective April 1, 1955. These Organizational changes required the establishment of new codes, IME rates, budget funds and the transfer of work orders, stores tickets, purchase requisitions, etc. between Units and Departments.

It has been agreed to supply Plant Accounting information on equipment failures within the Separations Areas. This information will include which equipment failed each month and the reasons for failures. This information is to be used in a report on equipment operating experience.

GENERAL ACCOUNTING SECTION
MONTHLY REPORT--MARCH, 1955

ADMINISTRATIVE PLANNING

A total of 37 new or revised organization and policy guides were published during March, 1955. Of these, 28 were organization guides and 9 were instruction and policy guides.

The 9 instruction and policy guides issued were:

NO.	TITLE	ISSUED BY
01.1	System of Organization & Policy Guides	General Manager
04.11	Control of Materials and Supplies	General Manager
06.2	Allocation of Responsibilities for Processing Contracts	General Manager
18.7	Overtime	General Manager
15.3	Classified and/or Radioactive Material Pass	Manager - Employee and Public Relations
15.1.3	Security Clearances and Identifications (pages one and two)	Manager - Employee and Public Relations
13.3	Continuity of Service	Manager - Employee and Public Relations
04.12	Control of Equipment on Loan or Temporary Use Off-Site	Manager - Finance
16.2	Accidents Involving Government Vehicles (Combined with 16.9, Motor Vehicle Safety Responsibility Act of Washington)	Manager - Manufacturing

A total of 7 complete OPG binders were assembled and distributed to individuals newly placed on the OPG distribution list; 371 additional extra copies were also distributed.

At month's end, a total of 63 OPGs were in the process of being duplicated and distributed. In addition, 55 approved organization guides are awaiting production.

As a result of transferring the reproduction of organization and policy guides, approximately six months ago, from facilities of Printing to those of the Duplicating shops, an annual out-of-pocket savings to HAPO of $4,500 to $5,000 has resulted. This is represented by the reduction of one employee in the Office Auxiliaries Sub-Section and a reduction in material costs.

A summary of the content of chapters of the AEC Manual and other procedural information received from the Commission in March was prepared and forwarded to Department Managers and Financial Department Section Managers.

ACCOUNTS PAYABLE UNIT

Invoices recorded in Accounts Payable during the month of March, 1955 numbered 4852 and totaled $3,786,000. This represents the greatest number booked in any one month this fiscal year. Since both the number (2613) and amount ($2,517,000) of purchase orders received this month reflect a substantial increase over prior months, it is indicated that work volume in Accounts Payable will continue at a high level.

Cash discount earned this month was $8,500, and fiscal year to date the amount is $49,000.

Cash disbursements amounted to $3,620,000, and the amount of unpaid bills on hand at the month end was $775,000.

Final modifications to contracts G-5 and G-12, covering procurement of graphite from National Carbon Company, were processed. Letter was written National Carbon requesting refund of $47,605 representing difference between the value of defective graphite paid for and unpaid invoices on hand. Total net payments under these two contracts were $7,500,000.

Accounts Payable:	March	February
Balance at beginning of month	$ 584 044	$ 767 103
Vouchers entered	3 785 781	4 949 266
Accrual for inventories	45 841	20 726
Cash receipts	586	2 668
	4 416 252	5 739 763
Less:		
Vouchers paid	3 621 278	5 119 286
Reversal of accruals	20 726	36 433
	3 642 004	5 155 719
Balance at end of month	$ 774 248	$ 584 044
Other Statistics:		
Number of vouchers recorded	4 852	3 624
Number of checks issued	3 072	2 435
Number of freight bills paid	1 635	1 338
Amount of freight bills paid	$302 315	$258 482
Number of purchase orders received	2 613	1 994
Amount of purchase orders received	$2 516 588	$1 309 899
Amount of cash discount earned	$8 471	$5 685

ACCOUNTS RECEIVABLE UNIT

Gross accounts receivable balances, aggregating $304,000, decreased $21,000 in March, primarily due to reduction in electricity, which was exceptionally high last month.

Charges to accounts receivable during the quarter ended March 31, 1955 aggregated $1,926,000, an increase of $104,000 over charges booked for the quarter ended December 31, 1954 of $1,822,000. Total collections during the quarter amounted to $1,912,000, as compared to collections of $1,841,000 during the quarter ended December 31, 1954.

The age of all accounts at March 31, 1955 and comparisons to like figures at December 31, 1954 may be summarized as follows:

	Total Balance	Current	30 to 90 Days	Over 90 Days	Agency Accounts
March, 1955	($304 320	$184 080	$60 760	$42 677	$16 803
	(100%	61%	20%	14%	5%
December, 1954	(290 054	186 775	37 069	47 869	18 341
	(100%	64%	13%	17%	6%

During the month, accounts determined uncollectible amounting to $4,471 were transmitted to the Atomic Energy Commission and approved for write-off. Of the total, $2,839 represented uncollectible Kadlec Hospital accounts and $1,632 represented rental, tenant service and utility accounts.

Accounts at collection agencies at March 31, 1955 totaled 221 and amounted to $16,803. Type and amount of accounts may be segregated as follows:

Kadlec Hospital	$9 321
Telephone	2 488
Sundry	2 160
Rents	1 883
Electricity	951

Disconnect notices were mailed to 149 telephone subscribers during the month, and the service of 12 subscribers was suspended due to non-payment of bills. During the month 525 delinquent notices and 123 final notices were mailed to electricity customers. The service of 10 electricity customers was suspended due to non-payment of bills.

Other statistics pertaining to accounts receivable are summarized on the following page..

ACCOUNTS RECEIVABLE UNIT (Continued)

Account	Balance 2-28-55	Net Charges	Collections	Balance 3-31-55	Bills Issued in Mar.
Kadlec Hospital:					
Active	$108 087	$ 60 503	$ 71 740	$ 96 850	1 377
Collection Agencies (92 Accounts)	9 110	424	213	9 321	
Electricity	60 273	83 536	100 991	42 818	3 889
Telephone	38 487	53 719	57 005	35 201	6 863
Sundry:					
Active	26 248	11 212	10 069	27 391	414
Collection Agencies (129 Accounts)*	8 610	428	1 556	7 482	
AEC Cost-type Contractors	20 185	15 927	3 032	33 080	22
Rents	29 791	383 969	386 253	27 507	6 822
Equipment sales to Facilities (1 Account)	22 685		349	22 336	
Safety Shoes	1 399	2 605	2 186	1 818	361
Loans to Employees (3 Accounts)	534		18	516	
Sub-total	325 409	$612 323	$633 412	304 320	19 748
Reserve for Bad Debts	29 916			26 164	
General Ledger Balance	$295 493			$278 156	

*Includes all utility and rental accounts.

CONTRACT REIMBURSEMENTS

The Contract Reimbursements group spent considerable time preparing revisions of Appendix B to the proposed Prime Contract with the AEC, in accordance with directions of a subcommittee of three Section Managers appointed by the Manager - Finance to bring this document into agreement with the changes in policy which have taken place since the instrument was originally negotiated with the Commission. These drafts have been reviewed by the subcommittee with Legal and Salary Administration representatives, and will be the basis for renegotiation of this Appendix with the Commission sometime in April.

A current major project is the review of the proposed revised Prime Contract and pertinent background material and the preparation of information which may be used in information meetings at such a time as the contract should be signed.

The integration of amendments and endorsements to the group insurance policies (except life) with the policies themselves was completed. The finished product was a 61-page multilithed document.

CONTRACT REIMBURSEMENTS (Continued)

An examination was made of the methods and amounts of charges being made against HAPO and KAPL by the Services Divisions at Schenectady for Company training programs.

Charges from HAPO to the Overhead Allowance in March amounted to $2953, consisting of: travel and living expense variation, $1609; conference expense, $1214; unusual items, $86; telephone calls not related to work under the Contract, $38; and cost of operating Company-owned cars, $6.

Ten approval letters, written in accordance with O.P.G. 05.4 ("Work or Expenditures Which Require AEC Reimbursement Authorization or Letter Approval") were received from the Commission in March. These involved such subjects as summer employment of graduate students and university professors, subscriptions in associations and societies, and liability and workmen's compensation cases.

The Contract Reimbursements group handled 11 inquiries on reimbursement problems during the month, four of which originated from outside the Financial Department.

The February "Summary of Disbursements," which is being transmitted to the Commission through the Chief of its Finance Division, covered disbursements of $7,975,073, which are detailed as follows:

Payrolls and Payroll Deductions Disbursed	$4 047 305
Material (including payments on requirements contracts) and Freight	1 924 046
Subcontracts and agreements	78 653
Advances for Traveling and Living Expenses	43 056
Miscellaneous Payments	2 263 003
Gross disbursements	8 356 063
Less: Receipts	380 990
Net disbursements	$7 975 073

In preparing this report, a review was made of each of 219 items which comprised "Miscellaneous" to establish their propriety, while all other expenditures were analyzed, classified and summarized to disclose the nature of all the disbursements made by HAPO during the month.

GENERAL BOOKS UNIT

By the end of March, work was well under way to establish internal procedures relating to the revised policy covering reimbursements to off-site inspectors and expediters for travel and living expenses. In particular, records are being established to indicate each inspector's length of residence at an assigned location in order to determine proper reimbursement amounts. A special expense report form was designed for use by off-site inspectors.

GENERAL BOOKS UNIT (Continued)

Since the question was raised by a number of inspectors, a letter was written to Schenectady requesting information regarding the proper reporting of travel and living expense in inspectors' income tax returns in connection with the change in policy.

Budget reports were prepared for Net Cash Working Capital and Government Cost Transfers for Fiscal Year 1956 and 1957. Work continued on the revision of the Cash Control Procedure Manual, which is expected to be completed by May 14.

Two new General Ledger accounts were established during March as follows:

0493 Essential Materials Inventory Reserve
0494 General Supplies Inventory Reserve

General Ledger Accounts 0611 and 0612 were re-titled to read:

0611 Construction Equipment Held by A.E.C. Request
0612 Reserve for Depreciation - Construction Equipment Held by A.E.C. Request

Payrolls for March were journalized through April 3 for cost purposes; however, payroll deductions were journalized only through the week ending March 20. As a result of these entries, the balance of the Payrolls Accrued account at month end will include an accrual for two March weekly salary rolls to be paid in April.

In March, General Ledger personnel processed 37,604 store orders totaling $558,071 as compared with 35,365 store orders totaling $521,351 handled in February. At the request of the Inventory Accounting Unit, a recapitulation was made of 4,851 March accounts payable vouchers to determine the number of inventory items purchased and charged direct to costs rather than to inventory accounts.

Advances from A.E.C.	March	February
Balance at beginning of month	$2 233 614	$ 1 558 779
Advances received from A.E.C.	5 900 000	8 650 000
Other cash receipts	376 622	380 899
	8 510 236	10 589 678
Less disbursements	6 779 368	8 356 064
Balance at end of month	$1 730 868	$ 2 233 614
Advances requested for subsequent month	$7 150 000	$ 5 900 000

GENERAL BOOKS UNIT (Continued)

	March	February
Travel and Living Expenses		
Travel Advances to employees		
Balance at beginning of month	$ 38 651	$48 346
Advanced to employees	61 910	43 074
	100 561	91 420
Less:		
Travel, living, and conference expenses reported by employees	38 813	42 040
Cash refunded by employees	7 685	10 729
	46 498	52 769
Balance at end of month	$ 54 063	$38 651
Outstanding Travel Advances to Employees		
Current	$ 47 966	$35 144
Outstanding over 30 days	6 097	3 507
Total	$ 54 063	$38 651
Number of expense reports submitted by employees	215	217

Activity of the Works Cashier's Office has shown a steady increase during FY-1955. This is the result of increased residence occupancy, principally of the Wherry Act Housing units, which has increased the number of electricity and telephone billings. Also during FY-1955, the practice of requiring meter deposits on new electricity accounts was inaugurated. In spite of the increased work load, rearrangement of work assignments has resulted in the reduction of one cashier. The additional work has been handled principally through the utilization of other employees of the Unit during slack work-load periods. It is expected that cash registers, which are to be received about April 15, will enable the cashiers to perform the receipting of customers' bills and the making of change more accurately and efficiently and will save considerable time in summarizing and balancing the daily activity. Use of cash registers will permit strengthening of cash control procedures by the use of sub-registers and locked-in tapes to be removed from the machine by a cash control clerk having no responsibilities in the cashier's office.

Works Cashier's Office

	March	February
Receipts Issued		
Rent	1 246	1 215
Telephone	5 905	5 001
Electricity	4 023	3 161
All other	723	595
	11 897	9 972
Bus System Operations		
Cash collections: Village	$ 820	$ 732
Area	$ 7 860	$ 6 794
Tickets: Value of tickets sold	$ 600	$ 800
Number of tickets sold	12 000	16 000
Number of tickets collected	10 515	9 022
Cash Overages and (Shortages)		
Number	9	3
Amount	$ (8.89)	$ (.11)

PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT - MARCH, 1955

The five-year "holding period" for bonds purchased in 1949 under the Employees Savings and Stock Bonus Plan ended on January 1, 1955. Approximately 1800 employees of Hanford Atomic Products Operation had bonds on deposit with the Company during this five-year period and the bonds which they purchased under the Plan in 1949 were delivered to them through supervision during the month of March. Stock certificates representing the 1949 stock bonus were mailed to participants from New York during the week beginning March 28. Checks representing accumulated income earned on the stock since 1949 were distributed to Hanford participants with the 1949 bonds.

Statements of 1954 earnings which may be excludable from gross income for income tax purposes were mailed to approximately 500 employees who had requested such information. The excludable amounts represent payments made to the employees during periods of absence due to illness or injury. A total of approximately $90,000 was determined to be excludable from gross income of all the employees to whom statements were given.

Government Accounting Office auditors examined the December 1954 distribution of salaries of certain weekly paid and monthly paid employees of the Manufacturing Department.

Salary rates currently being paid to non-exempt employees were verified in March with salary rates as shown on the records of Wage Rates Unit. No discrepancies were discovered.

Two time recorders were installed in the 760 Building for use by non-exempt personnel of the Engineering Department. Forty-three time recorders are presently in use in the 300, 700, and 1100 Areas.

One annuity certificate was delivered in March to an employee who transferred to General Electric from the du Pont Company at Hanford on September 1, 1946. To date a total of 111 such certificates have been delivered.

A Safety Meeting was conducted on March 22, 1955 for employees of the Personnel Accounting Section. Round Table Meetings were held during the month for employees of all units in the Section.

STATISTICS

Personnel Accounting Section

Number of HAPO Employees	Total	Monthly Payroll	Weekly Payroll
Changes during month			
Employees on payroll at beginning of month	8 964	2 247	6 717
Additions and transfers in	222	14	208
Removals and transfers out	(85)	(17)	(68)
Transfers from weekly to monthly payroll	-	21	(21)
Transfers from monthly to weekly payroll	-	(8)	8
Employees on Payroll at end of month	9 101	2 257	6 844

	March		February	
Overtime Payments During Month	Number	Amount	Number	Amount
Weekly Paid Employees	6 736	$147 594 -a)	6 322	$136 548 -a)
Monthly Paid Employees	461	41 064	388	40 741
Total	7 197	$188 658	6 710	$177 289

Number of Changes in Salary Rates and Job Classifications	March	February
Temporary Changes	23	56
Retroactive Changes	79	22
Normal Changes	1 086	705
Total	1 188	783

Gross Payroll Paid During Month	March	February
Engineering	$ 782 972	$ 778 056
Manufacturing	2 426 553	2 325 199
Other	1 130 636	1 122 154
Total	$4 340 161 -a)	$4 225 409 -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	March	February	March	February
Pension Plan	8 000	7 968	98.3%	98.2%
Insurance Plan				
Personal coverage	9 043	8 907	99.4	99.4
Dependent coverage	6 392	6 325	-	-
U. S. Savings Bonds				
Stock Bonus Plan	4 584	4 562	50.4	50.9
Savings Plan	1 191	1 191	13.1	13.4
Both Plans	5 202	5 185	57.2	57.8

	March	February
Pension Plan		
Number retired	6	3
Number who became eligible for participation	56	49
Number who applied for participation	52	46
Number who elected not to participate	3	1
Replies not received	1	2
Insurance Plan - Number of Claim Payments		
Employee Life Insurance	2	0
Employee accident and health insurance	557	443
Dependent accident and health insurance	614	343
Total	1 173	786
Good Neighbor Fund		
Number participating	6 425	6 356
Percent of participation	70.6%	70.9%
Suggestion Awards		
Number of awards	75	72
Total amount of awards	$1 245	$2 045
Preferential Rates		
Number (eliminated) or added	(3)	0
Number currently in effect	557	560
Number of Military Allowance Payments	4	2
Number of Payroll Deductions - Other than Taxes		
Barracks rent	5	14
Dormitory rent	489	516
Good Neighbor Fund	11 310	11 220
Hospital	485	478
House rent	5 093	5 119
Insurance	9 151	9 010
Pension	25 400 -a)	25 300 -a)
Safety Shoes	476	525
Savings Bonds	16 148	16 156
Trailer space	26	145
Union dues	2 184	2 131
Other	166	170
Total	70 933	70 784

(a- Approximate number rounded to nearest hundred.

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - MARCH 1955

GENERAL

More than one half of the program steps required for weekly payroll preparation have been completed for the electronic data processing machine which will be installed this summer.

An interpretive routine has been developed and tested which is capable of assembling program instructions. This routine is being further developed to compile all types of subroutines. This method of programming is an original contribution to the art of automatic programming and has created considerable interest in other computing installations. It is estimated that this system may reduce programming time in some applications by as much as a factor of 10.

To staff the recently established programming group, three men have been transferred from other sections of the Financial Department. One was transferred from the Technical Graduate Rotational Training Program and a second will be transferred in April.

PROCEDURAL ANALYSIS

Forms Control reviewed 432 orders during March covering 1,538,795 forms; 12 orders, amountir to 16,750 forms were rejected; 101 new forms were designed.

"702" Program

Construction work on the 713 Building renovation for installation of the 702 began on March

A two week series of seminars in advanced programming techniques was presented to the Unit during the month.

Weekly Payroll programming status is as follows:

Systems work	85% complete
Logic charts	90% complete
Programming	65% complete
Testing	15% complete

Classified Files 702 conversion status is as follows:

Systems work	90% complete
Logic charts	10% complete

A "Pseudo Punch" routine was developed to permit the 702 to punch cards for preparing report on the 407 tabulator. This routine will make possible the printing of many reports from one wired 407 control panel. It will be used mainly for short listings.

Programming for the weekly payroll submitted vouchers and adjustments was completed on March 18, 1955. Preliminary 702 flow charts for the calculations pass were virtually completed, and approximately 25% of the programs written as of March 31.

Program theory is being studied and flow charting of logic has begun on the Purchase Order Analysis.

Employee & Public Relations Department

The master file of exempt salary administration was revised to include new titles, new titl code numbers, and a new title index from which a listing was prepared.

The office machine master cards were reproduced to up-date new maintenance rate changes.

All forms classified as "Secret" are being reviewed with Security and Classified Files to determine the point at which the forms actually become Secret. Each form is being marked "Secret After Fill-In" or "Secret Prior To Fill-In". "Secret" forms will be printed with brief instructions explaining security requirements for each individual form number. Forms Control has been instructed concerning the types of information which are classified. Forms bearing such information will be cleared with Security to assure adequate control prior to creation of the record. All new forms are being reviewed for compliance with this procedur Established forms will be reviewed as they are re-ordered.

The Hospital Study was reviewed with Hospital management during March. It will be prepared in final form and released in April.

Engineering Department

Punched card machine flow charts of Classified Files daily procedures were completed, inclu those required to use a special continuous routine form to be put in use next month. These

A study is being made for the Calibrations Unit of the Radiological Sciences Department to develop a procedure on records covering maintenance and calibration of approximately 1100 radiation monitoring instruments. Records are currently being kept using a kardex system.

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Counsel	3	Standard	Storage	Cartons
Employee and Public Relations Department	54	"	"	"
Engineering Department	59	"	"	"
Financial Department	279	"	"	"
Manufacturing Department	98	"	"	"
Radiological Sciences Department	9			
	502			

Four hundred and fifty-three cartons of records were destroyed.

It is estimated that 92.8% of the Records Service Center vault, exclusive of North Richland is occupied by records.

Record Retention and Disposal Schedule Numbers 204, "Synoptic Meteorology Records", consist of twenty-five individual records; 205, "Radiation Measurement Instrument Calibrations Reco consisting of sixteen individual records; 206 "Radiation Exposure Incident Investigation Re consisting of ten individual records; 208 "Radiological Earth Sciences Records" consisting eight individual records, totaling four schedules consisting of fifty-nine individual recor were submitted to the Atomic Energy Commission for approval. Records Retention and Disposa Authorization Number 207, "Commercial Facilities Records" consisting of nineteen individual records was developed and submitted to the Employee & Public Relations Department for inter approval. Records Retention and Disposal Authorization Number 209, "Community Water and Sewage Utilities Records" consisting of twenty-three individual records was developed for internal submission.

The Atomic Energy Commission approved the continuation of the microfilming program and auth zed the necessary work to bring the program up to date. The Contracts and Patents Supervi was requested to negotiate a contract with a commercial microfilming company to perform th work.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-35891-W.

During the month of March the following non-routine assignments were completed for customer

Atomic Energy Commission	1
Employee & Public Relations	13
Engineering	14
Financial	16
Manufacturing	1
Operations Research	2
Radiological Sciences	2
	49

Service charges for the month amounted to $51 280.98. Services, by customer, were as follo

Atomic Energy Commission	$ 528.50	1%
Employee & Public Relations	2 441.41	5
Engineering	11 747.37	23
Financial	32 762.24	64
Manufacturing	1 797.92	4
Operations Research	357.96	0 *
Radiological Sciences	1 645.58	3
	$51 280.98	100%

* Less than 1%.

PROPERTY ACCOUNTING SECTION
MONTHLY REPORT - MARCH 1955

PLANT ACCOUNTING UNIT

An inventory of firearms and binoculars was completed and reconciled during the month. Previously firearms were accounted for as Uncataloged Plant. Since these items were considered critical items from control and accountability standpoint, they were established as Cataloged Plant as a result of the inventory. A summary of firearms and binoculars now recorded in Plant Accounting records follows:

	Quantity	Recorded Cost
Binoculars	51	$ 6,750
Firearms		
Carbines	54	2,268
Machine Guns	93	22,098
Revolvers and Pistols	752	24,150
Rifles	14	588
Shot Guns	84	4,032
Tear Gas Guns	11	792
Total Firearms	1008	$53,928
Total Binoculars and Firearms	1059	$60,678

The Hanford electrical sub-stations and lines were inventoried jointly with Electrical Distribution and AEC. In connection with the inventory, the portion of the Taunton Line carried in General Electric's books was transferred to the AEC. The inventory will be identified in three phases: (1) equipment to remain on General Electric's books, (2) equipment to be transferred to the Army, and (3) equipment disposed of by Property Disposal Reports.

A joint inventory was made of equipment in the custody of AEC Security. It was noted that the majority of those items inventoried are already on General Electric's books and will not require a transfer of values from AEC. Final reconciliation will be completed in subsequent months.

A meeting was held during the month between Bonneville Power Administration and AEC. Plant Accounting was requested to attend this meeting since the subject for discussion was relative to pricing of equipment in the 115 KV transmission line and related sub-stations.

Commodity code classification and standardization of nomenclatures were started on laboratory equipment. In addition, meetings were held with P. P. Barr and A. C. Miller who are supplying the necessary information for the classification of motor vehicles, heavy equipment, and office equipment. Codes will be assigned to this equipment when information is received from the custodians.

PLANT ACCOUNTING UNIT (continued)

Graphs and statistics prepared in connection with the visit of Atomic Power Associates and Philadelphia Electric Company personnel during April include:

1. Gross Plant and Equipment Investment per employee at December 31, 1954. This chart depicts the relative position of HAPO compared to other industries.

2. Gross Plant and Equipment Investment at December 31, 1954. This chart compares HAPO gross investment to other utility or industrial companies.

3. A time series chart (December 31, 1947 through December 31, 1961) Reactor Areas Plant and Equipment per Megawatt of Heat-Producing Capability. Separate curves indicate the relative positions of 100 areas to each other.

4. Bar chart - Reactor Area Plant and Equipment Per Megawatt of Heat-Producing Capability at December 31, 1954. Separate curves and comparisons are indicated for each reactor.

Annual reports have been received from 41 of the 47 companies contacted. Reports are used in connection with measurement activities.

The Blaw-Knox Project (513-A) Unitization Report is progressing favorably despite Blaw-Knox personnel terminations and the time necessary to train the replacements. It appears that June 30, 1955 is a more realistic completion date even though earlier dates are still being urged.

The Kaiser Project (512-R&W) Unitization Report is still scheduled for completion on May 15, 1955. Total costs to be detailed in the report will include the items listed as follows:

1. Kaiser costs through February 28 plus estimates to complete the Kaiser scope of work. This includes the 1706 KER Facility foundation and a By-Pass Crib Ditch. The latter is estimated to cost $400,000. Kaiser's Cost and Budget Report at February 28 states "Estimated Cost at Completion Amount $120,025,122".

2. The AEC portion of the total project costs is estimated to be $5,319,457.

3. General Electric costs through February 28 amount to $22,566,869 plus an estimated $450,000 for the boron ball commitment.

Project Unitization Reports (total cost $448,433) distributed in March are listed as follows:

IR-165	Additional Parking Facilities - Kadlec Hospital	$ 13,514
CA-434	New Bio-Assay Laboratory - 747 Building, 700 Area	214,185
CG-556	X Level Flow Controlling and Recording Equipment	53,647
CG-563	Modification of 314 Building for Fuel Development	64,831
CG-585	Oxidizer Off-Gas Treatment, Redox	95,527
	Other Miscellaneous Projects	6,729

During the early part of the month the physical inventory of Kadlec Hospital, Area First Aid Stations and Public Health Building was summarized and turned

PLANT ACCOUNTING UNIT (continued)

over to Plant Accountability Sub-Unit for reconciliation of the cataloged items. At a later date this same inventory can be used in connection with other studies such as Standardization of Nomenclature Program, Capitalization Policy, and Depreciation Rates for Various Groupings of Assets.

The summaries of HAPO Telephone System inventory were completed during March, showing unit of measurement, 1953 installed cost, and estimated year of installation.

The various cost units submitted to us on March 9 their cost reports on Construction Work in Progress and Equipment Work in Progress, and we were able to transmit the Consolidated Cost Section report for February 1955 to AEC on the tenth working day of the month. In the future, the cost units are to furnish their reports on the same day as the trial balance; ordinarily this date will give us sufficient time for our report to AEC, but occasionally it may require some overtime.

Listed below is the total-to-date balance of Plant and Equipment on the books of General Electric, Atomic Energy Commission and all prime contractors.

	(In Thousands)		
	Asset	Reserve	Net
Completed Plant and Equipment	$746,475	$305,979	$440,496
Construction Work in Progress	41,462		41,462
Total Cost Recorded (G.E. Books)	787,937	305,979	481,958
AEC and Other Contractor Costs			
Land and Land Rights	5,476		5,476
Construction Work in Progress-1)	200,975		200,975
Total Plant	$994,388	$305,979	$688,409

	(In Dollars)	
	This Month	Last Month
1) Kaiser	$119,982,237	$119,766,675
Blaw-Knox	61,437,413	60,196,751
AEC	19,555,570	22,724,472
Total	$200,975,220	$202,687,898

During the month one employee was granted military leave. Total Plant Accounting personnel at March 31 was 40, comprising 7 exempt and 33 non-exempt.

INVENTORY ACCOUNTING UNIT

Final results of the third annual physical inventory of Transportation fuel and lubricants reflected a net overage of $93 over the reconciled book value of $13,776. The results of this inventory by type of material are as follows:

INVENTORY ACCOUNTING UNIT (continued)

	Reconciled Book Value	Physical Inventory Value	Over (Under) Book Value	Turnover
Regular Gasoline	$ 6,936	$ 6,827	$ (109)	31.8
Diesel Fuel	2,968	2,273	(695)	9.6
Cetane Fuel	611	590	(21)	81.7
Kerosene & White Gasoline	1,269	951	(318)	6.1
Oils & Lubricants	1,992	3,228	1,236	11.6
	$13,776	$13,869	$ 93	23.2

The shortages of fuel are nominal when compared to the turnover rates. Overage of oils and lubricants resulted from over-disbursements during the past year of heavy oil and chassis grease. Due to the difficulty of accurately measuring disbursements of heavy oil and chassis grease, Inventory Accounting recommended that these materials be classified as shop stock.

The third annual physical inventory of coal and fuel oil under the custody of Manufacturing and Employee and Public Relations Departments was completed on March 31, 1955. The results of the inventory will be issued in April 1955.

Preparatory work has begun in making the necessary arrangements with personnel of Manufacturing Department for taking the physical inventory of Essential Materials. This inventory is scheduled to be taken during April 1955.

All of the designated control custodians for special materials, in compliance with Organization and Policy Guide 04.10, conducted a quarterly physical inventory of special materials as of February 28, 1955 and reported the results to Inventory Accounting by March 10, 1955. Reconciliation of the individual reports with accounting records disclosed only minor descrepancies which, upon investigation, were corrected and custodial records adjusted.

The quarterly gold report as of March 31, 1955 will be issued in the near future. This report reflects our gold usage for the past quarter and is forwarded to the Manager - Corporate Accounting in Schenectady.

The reserve structure for inventories has been enlarged to include reserves for coal, essential materials and general supplies, while the excess materials inventory reserve is to be increased to 90 percent of acquisition value. In conjunction with the establishment of new reserves or changes in the percentage of reserve to inventory value, the procedure "Accounting for Excess Materials and Equipment" has been revised and will be issued shortly. Briefly the new reserve structure is:

	Percent of Reserve
Coal	5%
Essential Materials	5%
General Supplies - Stainless Steel	20%
General Supplies - Other	10%
Spare Parts and Standby	25%
Excess Materials	90%

INVENTORY ACCOUNTING UNIT (continued)

Work has also begun on revising all document controls and procedures that affect inventories at HAPO. The revised procedures and controls should be completed by June 30, 1955.

Following is a summary showing inventory account balances for the months of February and March, 1955, together with amount of change.

(In Thousands)	Book Balance 2-28-55	Book Balance 3-31-55	Increase (Decrease)
Current Inventories			
General Supplies	$ 1,581	$ 1,799	$ 218
Fuel and Lubricants	73	80	7
Essential Materials	3,956	4,042	86
	5,610	5,921	311
Special Materials	1,360	1,351	(9)
Spare Parts	3,166	3,189	23
Standby	48	48	0
Excess Materials	478	358	(120)
Total Inventories - Gross	10,662	10,867	205
Less: Essential Materials Reserve	0	113	113
General Supplies Reserve	0	92	92
Spare Parts Inventory Reserve	725	717	(8)
Standby Inventory Reserve	12	12	0
Excess Inventory Reserve	172	52	(120)
Total Inventories - Net	$ 9,753	$ 9,881	$ 128
As a Memo: Excess Equipment	$ 505	$ 529	$ 24
Excess Equipment Reserve	(241)	(271)	30

PROPERTY MANAGEMENT UNIT

A comprehensive review of the Equipment Budget with field personnel was completed during the month. As a result of the review approximately $125,000 of questionable items were deleted after consultation with the activities concerned. An evaluation report on the equipment budget as a whole was prepared and submitted to the Manager-Finance. This report included a comparative analysis of funds requested by HAPO for Research and Development equipment as compared to the national average. These figures were then related to the emphasis being placed on certain phases of our research work.

A review was made of the work being performed in the HAPO machine shops and our position in relation to vendor-type items being fabricated on site. A general policy discussion was held by the Manager-Finance with the Manager-Manufacturing on the subject. A decision was reached that a policy guide was not required at this time; however, the matter will be reviewed administratively to insure that work being performed is held within proper limits.

PROPERTY MANAGEMENT UNIT (Continued)

Final approved lists of equipment to be held for future use upon the closeout of the Kaiser and Blaw-Knox contract have been received. The heavy equipment is being prepared for storage and placed in the White Bluffs heavy duty shop and the adjacent automotive shop. Precision optical instruments are being stored in the 2101 Building vault along with precision equipment held for the graphite line. Other instruments are being stored in the adjacent Stores-controlled area of the 2101 Building. This equipment will be under the warehouse control of the Stores Sub-Section and will be inventoried and carried in a special ledger account, "Construction Equipment Held by AEC Request", by the Plant Accounting Unit.

In connection with materials, approximately $250,000 worth of automotive and heavy equipment parts stocks currently held by Kaiser will be transferred to General Electric Stores Sub-Section at 20 percent of acquisition cost and will be carried in sub-accounts under General Ledger 0630 - Construction Work in Progress - Manufacturing. Also, about $500,000 worth of stainless steel currently held by Blaw-Knox will be transferred to Minor Construction under similar arrangements.

The AEC contingency reserve pool of approximately 200 units of automotive and heavy equipment is now in the process of being transferred to General Electric custody. This equipment will be stored opposite the transportation facility on a part of the present Excess and Salvage Yard.

A final decision has not yet been reached on the disposition of the White Bluffs Area. The General Electric Company has been requested to take over the maintenance of the power distribution lines using General Electric maintenance personnel.

The Kaiser-Blaw Knox auction of surplus equipment and materials will be held commencing Monday, April 25, 1955.

At the request of the Commission a Tabulation of Scientific Research and Development Equipment and Installations was prepared for AEC submission to the Inter-departmental Committee on Scientific Research and Development (ICSRD), which is preparing a tabulation of all major research and development equipment and installations currently held by federal agencies. This tabulation will be furnished to all government agencies for their use in considering the acquisition of new major equipment or facilities for scientific research purposes.

A review of recent reports on Stores Inventory and Excess Personal Property in the hands of the Commission as of December 31, 1954, shows HAPO to be tied with Savannah for the best position of any major AEC contractor as to the "number of months investment in current use inventories". The AEC average was 4.8 months; HAPO and Savannah, 3.7; Oak Ridge, 4.2; Santa Fe, 7.2; and Schenectady, 5.5.

Nineteen items of shop equipment were acquired for various units from Kaiser and Blaw-Knox. A saving of approximately $10,000 to HAPO was accomplished through these transfers.

PROPERTY MANAGEMENT UNIT (continued)

It may be of interest to note that during the past twelve months a savings of some $111,000 has been effected by the procurement of excess equipment from other AEC sites. This saving is the result of the coordinated effort of Property Management and the Purchasing Sub-Section.

It may be of further interest to note that since January 1, 1954, in our upgrading program and to fill plant requirements for additional equipment, HAPO has been able to procure from Kaiser and Blaw-Knox for $135,145 surplus equipment having an initial asset value of $511,521.

Assistance was given the Stores Sub-Section in their study of warehousing requirements directed toward a Property Management recommendation to the Manager - Manufacturing that equipment held for possible future use in various isolated locations throughout the plant be brought under better warehousing and control conditions.

One hundred seven requests for the disposition of property were investigated, processed and approved during the month.

Thirty-one requests for appropriation totaling $87,071 were investigated and approved during the month.

APPROPRIATIONS UNIT

The following Plant and Equipment projects were processed through the Appropriations Unit during March. General Electric and the AEC approval action was as indicated below:

Project Number	Title	Amount of This Request		Total*	Date to AEC	Disposition
CA-514 Rev. 3	1952 Hanford Expansion - 300 Area Production Facilities	$ 815,000		$ 5,900,000	3-18-55	Approved by AEC Board 3-31-55
			GE	5,188,000		
CA-539 Rev. 6	Additional Waste Storage Facilities for Redox	47,000		3,622,000	2-4-55	AEC-38, Mod. 6, dated 2-25-55 auth. AEC $3,622,000. Wk. Auth. dated 3-3-55 auth. GE $705,000
			GE	705,000		
CG-558 Rev. 4	Reactor Plant Modifications for Increased Production	- - -		26,800,000	3-3-55	Approved by AEC Board 3-31-55. To be forwarded to Washington for approval of schedules
CG-598 Rev. 1	Purex Acid Fractionator	- - -		- - -	- - -	AEC Agenda 4-7-55
CA-601 Rev. 1	General Grounds Improvements - 300 Area	96,000		96,000	2-7-55	Forwarded AEC, Wash. for approval 3-31-55
			GE	22,500		
CA-606	Additional Office Space - Central Stores Warehouse	125,000		125,000	11-3-54	GE requested return of proposal without action 3-28-55
			GE	10,000		
CG-608 Rev. 1	Redox Crane Viewing Room	- - -		- - -	3-22-55	Approved by AEC Board 3-31-55
CG-609 Rev. 1	Charge-Discharge While Operating - Test Facility	27,500		69,000	3-7-55	HW-346, Mod. 1, dated 3-14-55 auth. GE $69,000
CG-613 Rev. 1	Hanford 4X Program - Metal Conversion Plant	2,660,000		3,000,000	3-31-55	AEC Agenda 4-7-55
CG-618	Replacement of Steam Line Support Poles	95,000		95,000	1-17-55	HW-354 dated 3-14-55 auth. GE $95,000

APPROPRIATIONS UNIT (continued)

Project Number	Title	Amount of This Request		Total*	Date to AEC	Disposition
CA-615	Mechanical Maintenance Shop Centralization 100 Areas	$ 92,000	GE	$ 92,000 42,000	1-12-55	AEC letter dated 3-16-55 returned proposal and requested over-all study
CA-619	Alterations to 186-D Building	32,000		32,000 8,000	3-10-55	AEC Board deferred proposal 3-31-55 for further study
CG-620	Melt Plant Modifications - 314 Building	24,000		24,000	2-3-55	HW-352 dated 3-14-55 auth. GE $24,000
CG-622	Replacement of Discharge Chute Liners, 100 B, D, & F Areas	172,000		172,000	2-16-55	HW-353 dated 3-9-55 auth. GE $172,000
CA-623	Roads, Walks and Storm Sewers - 700 Area	89,000		89,000 12,600	3-15-55	To be returned to GE unapproved
CG-624	Redox Railroad Tunnel Ventilation Barrier	57,000		57,000	3-21-55	Approved by AEC Board 3-31-55 to be forwarded to Washington for approval
CA-625	Additional Waste Disposal Facilities - 200 Area	115,000	GE	115,000 115,000	3-18-55	AEC-56 dated 3-25-55 auth. AEC $115,000. Wk. Auth. dated 3-29-55 auth. GE $115,000
CG-626	Alterations to Redox Inert-Gas Vent System	115,000		115,000	- - -	Received by Supervisor - Appropriations 3-28-55
IR-184	Expansion of Facility for Testing Fuel Elements by Induction Heating - 314 Building	- - -		- - -	2-24-55	Request for extension of time approved 3-7-55

*Total previous authorizations plus this request.

SF ACCOUNTABILITY SECTION
MONTHLY REPORT - MARCH, 1955

The report on Section Planning, Scheduling and Integration of Unit Activities was completed as of March 31, 1955. This program has been coordinated to the 1955 Exempt Employee Appraisal Form and to the Position Descriptions. Up to the present time no revisions in the Position Descriptions have been required.

The Section engaged in a two day conference with D. E. George and Dr. R. F. Lumb of the Washington, D. C. office of the Division of Source and Special Nuclear Materials, U. S. Atomic Energy Commission. Two main topics of interest related to the problems of tube by tube measurements and accounting in the Reactor Areas and to the influence of dissolver heels and methods of calculation in the Separations Areas. The conferences were attended by representatives of Operations, Process, Analytical and Nuclear Physics.

Recalculation methods including those developed since July, 1954 were discussed and it was agreed to review the application to the current fiscal year. It is anticipated that the bias in current methods will be eliminated as well as other corrections to be derived from the use of tube by tube accounting. Commitments were made to provide the results of these recalculations by April - May or June as they become available. In no case, however, will the deadline date be extended beyond the end of the fiscal year. The division of the work load between Reactor Section-Manufacturing and of SF Accountability has been mutually agreed to.

The discussions relative to the "dissolver heel" problem were directed towards a factual presentation of the facilities available and of the nature of the physical problems associated with dissolver loading, withdrawals and inventory. The inaccuracies introduced by the dissolver heels at inventory time have been the subject of considerable investigation and the approach to the problem appears to be in advance of similar attempts at control at other sites.

Metal Preparation Area-SF Accountability Unit

The reporting procedure used for Manufacturing Cost coverage has been mutually revised. The principal advantages gained are in reduction in time required for preparation and in extension of current coverage requirements.

The potential recovery of Pickle and Slug Recovery Solutions by the UO_3 process rather than by off-site recovery as C-6 oxide has now been developed to the point of formal recommendations to the USAEC for approval. Three major advantages exist: (1) Better utilization of materials; (2) Direct recovery of nitric in UO_3 rather than loss by neutralization as required by C-6 oxide process; and (3) Appreciable freight savings in shipments involving the differential of tariff for UO_3 vs C-6. The main objection centers on the policy decision of mixing Normal and Depleted Uranium which in the past has generally resulted in increased off-site costs. Local savings are estimated at $75,000 annually.

Liquidation of side stream material having a Uranium content were conducted on an expanded scale during March.

Material released by Metal Preparation and by Technical Section and shipped off-site amounted to approximately twenty-one tons SF content. These shipments included the first oil immersed turnings shipped from this site and also included sludges and salt bath flux of Normal Uranium content.

The G.A.O. review conducted with the assistance of representatives of the USAEC was completed after an audit covering nine full working days.

SF Accountability Section - Monthly Report
March, 1955

Individual accounts for Basic and Special Quota materials were established covering the ten items listed by the USAEC. The detail of these accounts is anticipated to materially increase the work load due to the numerous provisions of GM-PRO-2 which applies to materials in this category. This is the first calendar year in which HAPO has been involved in a major Basic and Special Materials program and is currently five times the magnitude of any previous year.

Eleven individual shipments were processed by SF Accountability during the month. This included packaging, transportation to common carrier or registered mail, arrangements for outside barricade transportation, material passes, bill of lading and courier service. All shipments had prior USAEC approval and there were no cases of unauthorized shipments of classified materials.

Separations Areas-SF Accountability Unit

Redox is currently operating on low MWD material. Scheduled operation involves transfer to the high MWD program in early April. A clean out will precede the reactivation at which time dissolver heel clean out will be effected and comparisons of book to measured inventory will be feasible.

Building 234-5 operations have been very limited. The RMA line has been shut down during March with the exception of trial runs at the new Task III facilities and some special tests. Start up for the RMA line and the new Task I is scheduled for early April.

Recuplex Facilities - Construction is largely complete. Cold runs have not yet been started. Present information is that plutonium will be processed in May, 1955 and that it will be some time after this before recovery will enable us to review factors used in By Difference accounting.

Isolation Building 231 has been operating on a reduced schedule handling 224-T product only and which has been converted exclusively to nitrate.

Numerous process flow changes are associated with the changes in 234-5 Bldg., and in

SF Accountability Section - Monthly Report
March, 1955

Reactor Areas-SF Accountability Unit

Development of the accounting controls now involves 35 accounts, 21 of which have been completed. The remaining 14 accounts are scheduled for early completion. The major problem involves source data and includes format, flow and time schedules. Up to the present time, no major difficulties have developed. Cooperation of the Manufacturing-Reactor Areas continues on a very satisfactory level.

Appreciable progress has been made on the cored slug problem. Corrections of the factor weight charge have been accomplished. In addition, the controls have been extended to all Piles. In anticipation of ultimate discharge the Pile charge-discharge form currently in use by Reactor Area has been revised so as to provide adequate entry for cored slug data. The major remaining problem of identity of cored slugs after Pile discharge is now under investigation. As a potential solution to this problem, F. W. Richardson has devised a modified tong which incorporates methods of distinguishing cored from solid slugs. The proposal is now under review by Reactor-Engineering.

The staff is to be increased by one SF Accountability Clerk on April 18, 1955 by intra-department transfer.

SF Accounting Unit

The system of SS material accounts for the Hot Semi-Works was completed during March.

Preliminary conferences were held with the USAEC-Hanford Operations Office personnel relative to the scheduling of the Depleted Uranium physical inventory portion of Survey #12. Prior portions of this survey have been completed and a letter of congratulations has been received, from the USAEC, complimenting SF Accountability on the progress to date.

Review of Redox continues on schedule. As reported in the Reactor Area Unit, procedures have been directed towards the development of the accounting systems for this Unit.

SF Measurements Unit

A method of correction for bias which develops from the use of average MWD values has been devised. Numerous problems associated with its application are currently under investigation and the bias correction will be applied at the time the SF Reactor Area assumes responsibility for the Unit reports.

By request of SF Accountability, the Gumprecht curve has been extended so as to provide coverage for all levels of current operation. As now constructed the curve provides relationship of MWD level to grams of Plutonium produced.

Measurement factors for cored slugs including average weight, losses to process solutions and precision data are now under development with completion scheduled for late April.

The feasibility of the installation of a receiving tank at UO_3 for Redox and Purex transfers is currently under investigation. This request for economic feasibility is directed towards the solution of the measurement problem associated with receipts at UO_3. The problem centers on the adverse influences of line hold-up and of the limitations in Inventory of hold tanks as part of the transfer system. Pipe line distances exceed over one mile.

SF Accountability Section - Monthly Report
March, 1955

The sample frequency review of TBP process resulted in the elimination of one of the two duplicate feed samples.

Inventory problems associated with the 233-S head end operation at Redox have been the subject of review. Similar studies of the new facilities in 234-5 Bldg., are currently under investigation.

A revised UO_3 drum tare weight was determined as an improved weight control. Offsetting the increased reliability was the development of scale difficulties which raised questions of bias. Potential correction was indicated but after extensive re-weighing was not found necessary.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION

MARCH, 1955

	Current Month	Prior Month
Personnel Changes During Month		
Employees at beginning of month	466	469
Additions and transfers in	10	10
Removals and transfers out	(16)	(13)
Employees at end of month	460	466
Personnel by Component at Month - End		
General	11	11
Auditing Section	16	17
Budgets and Measurements Section	8	8
Contract Cost Section		
General and Consolidations Cost Unit	12	11
Engineering Cost Unit		
General	5	5
Design Cost	7	7
Project Cost	17	19
Technical Cost	11	10
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	10	10
Community Cost	5	6
Medical Cost	3	3
Manufacturing Cost Unit		
General	2	2
Financial Representatives	10	8
Budgets and Control	17	17
Reports and Records	16	18
Product Costs	4	3
	121	121
General Accounting Section		
Accounts Payable Unit	25	25
Accounts Receivable Unit	22	21
General Books Unit	17	19
Administrative Planning	3	3
Contract Reimbursements	5	5
	72	73

	Current Month	Prior Month
Personnel Accounting Section		
Payroll Planning and Analysis Unit	7	5
Weekly Payroll Unit	15	17
Monthly Payroll Unit	11	12
Benefit Plans Accounting Unit	11	11
Payroll Reports Unit	7	7
Weekly Payroll Records Unit	7	6
	58	58
Procedures and Computing Section		
Computing Operations Unit	19	21
Numerical Analysis Unit	9	11
Procedural Analysis Unit	20	16
Scheduling Unit	22	24
Records Operations Unit	8	8
	78	80
Property Accounting Section		
Appropriations Unit	4	5
Inventory Accounting Unit	10	12
Plant Accounting Unit	40	40
Property Management	4	3
	58	60
SF Accountability Section		
Reactor Area - SF Accountability Unit	2	2
Separations Area - SF Accountability Unit	12	12
Metal Preparation Area - SF Accountability Unit	8	7
SF Accounting Unit	6	6
SF Measurements Unit	9	9
	37	36
Rotational Trainees	1	2
	460	466

PROCEDURES & COMPUTING SECTION
MONTHLY REPORT - MARCH 1955

GENERAL

More than one half of the program steps required for weekly payroll preparation have been completed for the electronic data processing machine which will be installed this summer.

An interpretive routine has been developed and tested which is capable of assembling program instructions. This routine is being further developed to compile all types of subroutines. This method is an original contribution to the art of automatic programming and has created considerable interest in other computing installations. It is estimated that this system may reduce programming time in some applications by as much as a factor of 10.

To staff the recently established programming group, three men have been transferred from other sections of the Financial Department. One was transferred from the Technical Graduat Rotational Training Program and a second will be transferred in April.

PROCEDURAL ANALYSIS

Forms Control reviewed 432 orders during March covering 1,538,795 forms; 12 orders, amounti to 16,750 forms were rejected; 101 new forms were designed.

"702" Program

Construction work on the 713 Building renovation for installation of the 702 began on March

A two week series of seminars in advanced programming techniques was presented to the Unit during the month.

Weekly Payroll programming status is as follows:

Systems work	85% complete
Logic charts	90% complete
Programming	65% complete
Testing	15% complete

Classified Files 702 conversion status is as follows:

Systems work	90% complete
Logic charts	10% complete

A "Pseudo Punch" routine was developed to permit the 702 to punch cards for preparing repor on the 407 tabulator. This routine will make possible the printing of many reports from on wired 407 control panel. It will be used mainly for short listings.

Programming for the weekly payroll submitted vouchers and adjustments was completed on March 18, 1955. Preliminary 702 flow charts for the calculations pass were virtually

PROCEDURAL ANALYSIS (continued)

completed, and approximately 25% of the programs written as of March 31.

Program theory is being studied and flow charting of logic has begun on the Purchase Order Analysis.

Employee & Public Relations Department

The master file of exempt salary administration was revised to include new titles, new title code numbers, and a new title index from which a listing was prepared.

The office machine master cards were reproduced to up-date new maintenance rate changes.

All forms classified as "Secret" are being reviewed with Security and Classified Files to determine the point at which the forms actually become Secret. Each form is being marked "Secret After Fill-In" or "Secret Prior To Fill-In". "Secret" forms will be printed with brief instructions explaining security requirements for each individual form number. Forms Control has been instructed concerning the types of information which are classified. Forms bearing such information will be cleared with Security to assure adequate control prior to creation of the record. All new forms are being reviewed for compliance with this procedure. Established forms will be reviewed as they are re-ordered.

The Hospital Study was reviewed with Hospital management during March. It will be prepared in final form and released in April.

Engineering Department

Punched card machine flow charts of Classified Files daily procedures were completed, including those required to use a special continuous routine form to be put in use next month. These flow charts will form the basis for 702 programming of Classified Files procedures.

Financial Department

The GESA and HAPO credit union deduction reports were revised to include the credit union account number for each listed employee.

The "Location List of Earnings Statements" report was re-arranged to permit routing of other types of mail to nonexempt employees.

A mark sensing card was designed and a file produced for a monthly payroll analysis requested by Schenectady.

An analysis of resident electric consumption was completed for July and December 1953 from stored meter cards.

The Plant Record Unit History Record form has been approved and ordered. Four type 884 typewriter/tape punches have also been ordered for use in conversion of plant records to this new accounting system. The forms and procedures forwarded to IBM for review have been returned with comments for improving the original procedure.

Manufacturing Department

A survey of clerical methods and procedures used in the Reactor Maintenance Sub-Section was completed during March. The study was made in 100-B Area. Recommendations developed in this study will be contained in the report to be issued in April.

PROCEDURAL ANALYSIS (continued)

Radiological Sciences Department

A study was begun in March for Radiological Sciences concerning punched card applications for Radiological measurement evaluation.

A study is being made for the Calibrations Unit of the Radiological Sciences Department to develop a procedure on records covering maintenance and calibration of approximately 1100 radiation monitoring instruments. Records are currently being kept using a kardex system.

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Counsel	3	Standard	Storage	Cartons
Employee and Public Relations Department	54	"	"	"
Engineering Department	59	"	"	"
Financial Department	279	"	"	"
Manufacturing Department	98	"	"	"
Radiological Sciences Department	9			
	502			

Four hundred and fifty-three cartons of records were destroyed.

It is estimated that 92.8% of the Records Service Center vault, exclusive of North Richland, is occupied by records.

Record Retention and Disposal Schedule Numbers 204, "Synoptic Meteorology Records", consisting of twenty-five individual records; 205, "Radiation Measurement Instrument Calibrations Record consisting of sixteen individual records; 206 "Radiation Exposure Incident Investigations Rec consisting of ten individual records; 208, "Radiological Earth Sciences Records", consisting o eight individual records, totaling four schedules consisting of fifty-nine individual record were submitted to the Atomic Energy Commission for approval. Records Retention and Disposal Authorization Number 207, "Commercial Facilities Records", consisting of nineteen individual records were developed and submitted to the Employee & Public Relations Department for inter approval. Records Retention and Disposal Authorization Number 209, "Community Water and Sewage Utilities Records", consisting of twenty-three individual records were developed for internal submission.

The Atomic Energy Commission approved the continuation of the microfilming program and author ized the necessary work to bring the program up to date. The Contracts and Patents Supervisor was requested to negotiate a contract with a commercial microfilming company to perform the work.

NUMERICAL ANALYSIS

A request was received to calculate the exposure of the eight tubes surrounding tube 0777 at C reactor during the two month period this tube was used in the single column experiment, (Bluenose). Standard inlet and outlet temperatures panellit and header pressures were record three times daily during this period. From these data, flows, powers, and exposures were calculated. This information will be used in determining the accuracy of single column exposure computed from standard operating data.

A forty-hour procedural study of SF Accountability procedures and accounting methods in use at the TBP and UO_3 plants in 200-W has been completed. It is anticipated that all data processi

NUMERICAL ANALYSIS (continued)

for these two plants will be done routinely on the machine facility of the Procedures and Computing Section by May 1.

Initial investigations are being made on the conversion of the Hanford Release Report to the IBM 702. It is anticipated that the scope of the problem will be increased in the near future and a comprehensive study of the job will be made before detailed programming is undertaken.

Attitude Survey data processing began on March 25. The questionnaires are presently being keypunched. Initial machine processing will consist of editing the keypunched cards for punching errors and inconsistencies, converting response codes, and calculating certain percentages by Units. A more extensive processing will follow.

The calculation of the average eta (η) of a Hanford cell has been undertaken. The quantity eta is the average number of fast neutrons emitted from the fuel material as a result of the capture of one thermal neutron. The average of this quantity is obtained by integrating appropriately weighted individual values over the significant energy range. Calculations have been completed for three different exposure levels, and one additional level is presently being considered. The results appear to be as expected and seem to explain an anomaly noted during the startup of KW Reactor. Modification of the problem are planned to account for Pu-241 buildup and other aspects of actual pile behavior.

Work has been resumed on the calculation of thermal utilization and resonance excape probabili- of an internally cooled slug. The problem is the same as that solved earlier, with one excepti Previously both inner and outer liner of the slug were assumed made of aluminum; in the presen odel, the inner liner is stainless steel, and the outer liner is zirconium. Present plans call for the calculation of 180 cases, which consist of variations in cell wetness and dimensi The results will be used to determine future courses of action.

The evaluation of a set of algebraic equations was carried out in connection with a plutonium quality study. The calculations were done on the card-programmed-calculator.

Following the computational scheme outlined in the October 1951 issue of "Nucleonics", calculations were made of heavy isotope buildup for 12 values of time at constant flux. Following examination of these results, consideration will be given to the corresponding decay calculations.

Additional computations were carried out on the evaluation of unsteady-state slug temperatures Calculations done last December were discovered to be in error due to the fact that wrong constants were supplied. The correct constants were supplied and the calculations repeated. The results were compared with work done elsewhere and certain discrepancies were noted. The discrepancies are attributable to the mathematical formulation of the problem, which is present being studied by the problem originator.

Two statistical reports in connection with C reactor retention basin study were completed during the month. The computations required the sums and sums of squares of six variables.

Work on the preparation of mathematical subroutines for use with the 702 is continuing. A subroutine for evaluating the floating-decimal exponential function has been programmed, and work is underway on the programming of special floating decimal output subroutines. In addition to the work on subroutines, a tracing routine for floating-decimal computations was developed and programmed. This routine will normally be used to list intermediate floating decimal results directly from the main frame of the 702 and should prove invaluable for debugging long sequential-type computations. The tracing routine is also used to print out appropriate identification whenever an error in floating decimal computation is detected.

NUMERICAL ANALYSIS (continued)

Further development work is underway on SCRIPT, the general purpose assembly routine for the 702. The routine is being further generalized to allow for the automatic insertion of any type subroutine whatsoever. The requirements of the routine for inserting a mathematical subroutine in a program are in general quite different from those inserting a commercial subroutine. To date, some three or four techniques for inserting subroutines have been discovered, and all will be available with the expanded SCRIPT routine.

A series of seminars in fundamental 702 programming techniques was held for members of the Section engaged in programming techniques. Topics covered included the stored-program principle, the use of programmed switches, digit selection techniques on the 702, and the use of the 702 magnetic drum. The seminars will be continued at some later date.

Mr. E. B. Montgomery of the Advanced Engineering Section addressed members of the Procedura Analysis and Numerical Analysis Units on March 15. The subject of Mr. Montgomery's talk was his recent trip to the Western meeting of the Joint Computer Conference held in Los Ang the first week in March.

COMPUTING OPERATIONS

During the month of March the following non-routine assignments were completed for customers:

Atomic Energy Commission	1
Employee and Public Relations	13
Engineering	14
Financial	16
Manufacturing	1
Operations Research	2
Radiological Sciences	2
	49

Service charges for the month amounted to $51 280.98. Services, by customer, were as follows:

Atomic Energy Commission	$ 528.50	1%
Employee & Public Relations	2 441.41	5
Engineering	11 747.37	23
Financial	32 762.24	64
Manufacturing	1 797.92	4
Operations Research	357.96	0 *
Radiological Sciences	1 645.58	3
	$51 280.98	100%

* Less than 1%.

OPERATIONS RESEARCH STUDY

MONTHLY REPORT
MARCH, 1955

The following is the month end summary of personnel:

	As of 2-28-55			As of 3-31-55			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
General	1	1	2	1	1	2	0	0	0
Operations Research Analysts	5	0	5	5	0	5	0	0	0
TOTAL	6	1	7	6	1	7	0	0	0

Mr. P. M. Thompson visited the RAND Corporation of Santa Monica, California on the use of the RAND Corporation computing equipment and to discuss the mathematical formulations on the production scheduling operations research program, from March 18, 1955 through March 28, 1955.

Production Planning

Two reports on the Production Planning Operations Research Program are being issued. One of these is a detailed description of the work to date; the second is a non-mathematical condensation of the first. It has been agreed by the Operations Research Study and production planning personnel of the Manufacturing Department that the techniques presented in these reports have a great potential value for production planning, but that additional detailed model and computing developments are required. In this connection decisions pertaining to the basic computing methods for linear programming systems were made during the month. The machine program instructions will consist of four levels of logic to provide ample flexibility and adaptability in using the same program building blocks to accomplish many purposes. Flow charts of the entire programming problem were completed and some detailed programming done for the new type 702 data processing machine to be installed at Hanford in June. The detailed programming is scheduled for completion by the time the machine arrives. An instructional program has been instituted whereby personnel of the Procedures and Computing Section are being trained in the techniques and uses of linear programming. This training is sufficiently broad to include the detailed programming of the forthcoming Hanford 702 computer, not only for the Production Planning Problem, but for any linear programming problems which may arise in the future.

Other Activities

Preliminary discussions have been held with members of the Engineering Department on the feasibility of applying mathematical optimization techniques to problems in the design of new facilities.

Preliminary studies have been undertaken of several problem areas where operations research and synthesis might be profitably applied. These will lead to recommendations for the approval of certain operations research in the near future.