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362

MONTHLY REPORTHANFORD ATOMIC PRODUCTS OPERATION

58182

FOR

REPOSITORY POL

JANUARY 1955

COLLECTION Atmospheric ReleasesBOX No. N/ACompiled By
DEPARTMENT MANAGERSFOLDER N/A

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February 21, 1955

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RICHLAND, WASHINGTON

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By the
General Electric Company
under

Contract #-W-31-109-eng-52

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

JANUARY 1955

GENERAL SUMMARY

PRODUCTION OPERATIONS

The reactor input production of plutonium was 102 percent of the official forecast. This production achieved a new record, exceeding by three percent the previous high of December 1954.

KW Reactor was started up at 8:47 a.m. on January 4. Operation continued, with two interruptions to adjust monitoring chambers and add test hole shielding, until 2:04 a.m. on January 5, at which time a Panellit trip shut the reactor down. Slug failures were found to have occurred as the result of inadequate cooling water flow arising from a rear face connector stoppage on tube 4669-KW. When conventional removal methods failed, a six-inch opening was drilled through the rear shield to permit removal of graphite blocks. At month end, blocks, tube and ruptures had been removed, new graphite had been installed, and rear shield repairs were in progress.

The Redox production of the high concentration material was 109 percent of the official forecast. Due to an extension of the planned shutdown for maintenance, the production of the low concentration material as previously forecast was not made. However, the T plant production of low ngs material was 136 percent of the forecast. This production equalled approximately the total commitment of both the Redox and T plants.

ENGINEERING TECHNOLOGY

A successful demonstration of in-pile boiling was conducted in the 100-H re-circulation loop. Stable boiling was obtained for 80 minutes under conditions of 8 percent steam quality at 300 psi and 223 C, or 435 F. This temperature is a new high for the exposure of standard aluminum slugs at Hanford. Normal operating conditions for this loop are liquid phase at 200-C.

Preparation of an engineering feasibility report covering the installation of a gas-cooled irradiation test facility for the GE-ANP fuel element testing program was started. Funds were authorized for a similar study to include a proposed pressurized water-cooled irradiation test facility for the Westinghouse Atomic Power Division.

Studies indicate that if present limitations on high uranium irradiation (slug rupture, Pu-240 formation) were removed, a limiting exposure of about 2000 MWD/ton would exist because of economic considerations.

PERSONNEL AND SERVICES

The ruthenium particle contamination pattern was essentially unchanged. Continued emission of I¹³¹ above the desirable long term limit, coupled with the reduced atmospheric dilution characteristic of the winter season, brought vegetation contamination close to the limit in the environs.

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A-1

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General Summary (Contin)

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Agreements were executed between General Electric Company and the GESA and HAPO Federal Credit Unions covering employee payroll deductions for the purchase of shares in the credit unions. It is expected that deductions for credit union shares will be made for the first time from the monthly payroll for February, and from the weekly pay roll for the week ending February 13.

The new Exempt Salary Plan was made effective January 1.

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STAFF

General Manager, Atomic Products Division F. K. McCune

General Manager, Hanford Atomic Products Operation W. E. Johnson

Counsel G. C. Butler

Manager, Finance D. M. Johnson

Manager, Employee and Public Relations C. N. Gross

Director, Radiological Sciences H. M. Parker

Manager, Engineering A. B. Greninger

Manager, Manufacturing J. E. Maider

Operations Research Study B. F. Butler

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HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
JANUARY 31, 1955

	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>1-31-55</u>	<u>12-31-54</u>	<u>1-31-55</u>	<u>12-31-54</u>	<u>1-31-55</u>	<u>12-31-54</u>
<u>Counsel</u>	3	3	2	2	5	5
<u>Operations Research Study</u>	6	6	1	1	7	7
<u>Special Study</u>	3	4	3	3	6	7
<u>Employee & Public Relations</u>						
General	9	9	1	1	10	10
Salary & Wage Adm.	11	11	12	12	23	23
Personnel Practices	13	14	39	39	52	53
Education & Training	7	7	43	44	50	51
Employee Comm. & Pub. Rel.	10	10	41	41	51	51
Union Relations	5	5	2	2	7	7
Aux. Oper. & Plant Prot.	120	120	806	812	926	932
Community	84	84	327	328	411	412
Health & Safety	54	55	193	195	247	250
<u>Engineering Department</u>						
Engineering Administration	40	34	88	90	128	124
Advance Engineering	9	11	1	1	10	12
Design	180	179	124	123	304	302
Project	224	237	156	153	380	390
Pile Technology	222	225	149	147	371	372
Separations Technology	166	169	87	90	253	259
<u>Manufacturing Department</u>						
General	21	15	7	7	28	22
Reactor	292	292	1 345	1 332	1 637	1 624
Separations	276	281	1 398	1 363	1 674	1 644
Metal Preparation	101	102	544	534	645	636
Transportation	41	42	445	445	486	487
Purchasing & Stores	55	56	207	214	262	270
Electrical Utility	15	16	74	73	89	89
<u>Financial Department</u>						
General	9	9	3	3	12	12
Budgets & Measurements	4	4	4	4	8	8
Contract Cost	23	23	96	94	119	117
General Accounting	9	9	65	66	74	75
Property Accounting	16	16	45	45	61	61
Auditing	15	15	2	2	17	17
SF Accountability	9	8	25	24	34	32
Personnel Accounting	8	9	54	54	62	63
Procedures & Computing	25	26	57	56	82	82
<u>Radiological Sciences Department</u>						
Records & Standards	28	28	152	152	180	180
Biophysics	55	55	64	66	119	121
Biology	34	34	38	36	72	70
Engineering	6	6	1	1	7	7
Adm. & Communications	4	4	5	5	9	9
Grand Total	<u>2 212</u>	<u>2 233</u>	<u>6 706</u>	<u>6 660</u>	<u>3 918</u>	<u>8 893</u>

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AREA PERSONNEL DISTRIBUTION
JANUARY 31, 1955

	100-B	100-D	100-F	100-H	100-K	101	200-E	200-W	300	700-1100-3000	TOTAL
	AREA	AREA	AREA	AREA	AREA	AREA	AREA	AREA	AREA AND	PLANT GENERAL	
<u>Engineering Department</u>											
Exempt	24	62	-	13	32	-	65	63	272	310	841
Other	13	33	2	58	19	-	21	28	214	217	605
Total	<u>37</u>	<u>95</u>	<u>2</u>	<u>71</u>	<u>51</u>	<u>-</u>	<u>86</u>	<u>91</u>	<u>486</u>	<u>527</u>	<u>1 446</u>
<u>Manufacturing Department</u>											
Exempt	64	55	64	64	46	-	36	256	101	115	801
Other	283	302	303	254	224	-	206	1 235	543	670	4 020
Total	<u>347</u>	<u>357</u>	<u>367</u>	<u>318</u>	<u>270</u>	<u>-</u>	<u>242</u>	<u>1 491</u>	<u>644</u>	<u>785</u>	<u>4 821</u>
<u>Financial Department</u>											
Exempt	-	-	-	1	-	-	1	2	5	109	118
Other	-	-	-	2	2	-	-	14	12	323	351
Total	<u>-</u>	<u>-</u>	<u>-</u>	<u>3</u>	<u>2</u>	<u>-</u>	<u>1</u>	<u>14</u>	<u>17</u>	<u>432</u>	<u>469</u>
<u>Employee & Public Relations</u>											
Exempt	21	7	8	11	9	-	4	15	11	227	313
Other	52	46	92	46	74	11	32	116	110	885	1 464
Total	<u>73</u>	<u>53</u>	<u>100</u>	<u>57</u>	<u>83</u>	<u>11</u>	<u>36</u>	<u>131</u>	<u>121</u>	<u>1 112</u>	<u>1 777</u>
<u>Radiological Sciences</u>											
Exempt	2	-	35	-	-	-	2	19	56	13	127
Other	5	-	42	-	-	-	12	16	166	19	260
Total	<u>7</u>	<u>-</u>	<u>77</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>14</u>	<u>35</u>	<u>222</u>	<u>32</u>	<u>387</u>
<u>General</u>											
Exempt	-	-	-	-	-	-	-	-	-	12	12
Other	-	-	-	-	-	-	-	-	-	6	6
Total	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>18</u>	<u>18</u>
Total Exempt	111	124	107	89	87	-	108	355	445	786	2 212
Total Other	353	381	439	360	319	11	271	1 407	1 045	2 120	6 706
Grand Total	<u>464</u>	<u>505</u>	<u>546</u>	<u>449</u>	<u>406</u>	<u>11</u>	<u>379</u>	<u>1 762</u>	<u>1 490</u>	<u>2 906</u>	<u>8 918</u>

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MANUFACTURING DEPARTMENT
MONTH OF JANUARY, 1955

METAL PREPARATION SECTION

A net production of 406 tons of acceptable slugs was achieved during the month. Twenty-two tons of the total were cored pieces canned by the lead dip process. The overall production was 100 percent of the official forecast. A limited inventory of bare metal continued to complicate production activities during the month.

The canning yield for the month was 79 percent for the solid slugs and 69 percent for the cored slugs. The overall canning yield was 78 percent. This was five percent lower than the December yield and due principally to an increase in weld rejects resulting from a number of as yet unexplained depressions in the canned slug weld bead.

The processing of cored slugs was resumed in January 1 with a revised operations sequence which eliminates slug immersion in liquids subsequent to plug welding, thus removing the in-pot explosion hazard. Some 8,500 slugs have been canned with favorable results. The bare slug welding rejects have been reduced to approximately six percent. Sufficient progress has been made in the preparation of cored slugs to permit Fernald to resume fabrication rates in accordance with previously established schedules. Production at Hanford is currently being scheduled within the limits of available uranium components. Development work is progressing on uranium and aluminum plugs that can either be crimped or pressed into cored slugs as a substitute for welded slugs.

All canning operations, except finishing, were moved into the new facility on January 19, 1955.

No autoclave failures occurred during the month.

A total of 1350 acceptable C slugs were cold canned with a yield of 95 percent. As near as can be determined with bond testing incomplete, the hot press canning of 754 additional pieces was accomplished with a very good yield.

REACTOR SECTION

The reactor input production of plutonium was 102 percent of the official forecast. This production achieved a new record, exceeding by three percent the previous high of December 1954.

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The reactor time operated efficiency was 81.9 percent in January. The primary cause of this relatively low efficiency was slug failures, which, although not excessive in number, resulted in a greater than normal amount of outage time. A portion of the outage time caused by failures was utilized for metal discharge, reducing the amount of scheduled outage time to a lower than normal amount.

The plutonium output production was 125 percent of the forecast as the result of the discharge of greater than forecast tonnages of high concentration material during rupture outages. Tonnages of low and high concentration material discharged during the month were 229 and 96 respectively.

Maximum established reactor power levels, excluding enrichment burnout, were increased a total of 178 megawatts, 9 at C, 65 at D, 41 at DR, 10 at F and 53 at H. The seasonal decrease in inlet water temperature and additional gains realized with the process standard limits on trip before unstable boiling resulted in small increases at C, DR, F and H Reactors. Additional factors contributing to increased levels were the improved flattening with fringe enrichment replacement at H, the replacement with uranium of the central zone of enriched lithium loading at DR, and the higher exit water temperature limits at D as specified in a production test to determine the effect of helium concentration in pile atmosphere on pile distortion.

Fourteen slug failures occurred in January. These included five regular uranium pieces (two on production test at 903 and 838 MWD/ton), four J slugs and five uranium slugs in production test tubes containing unbonded, hot press canned solid and hot press canned cored slugs. The reactor outage time required for removal of these ruptures totaled 363 hours.

Eighteen reactor scrams occurred during January. Of these, 11 at B, D, DR, F and H Reactors were caused by normal Panellit variables. One scram at C Reactor was caused by improper switching in the No. 2 electrical equipment room. Another scram at C Reactor resulted from a high level trip of the exit water gamma monitoring Beckman when a slug failure simultaneously produced Panellit and beta monitor indications. One scram at D Reactor resulted from an electrical coil failure in the regulated instrument supply circuit and caused a scram at DR Reactor through the D-DR Reactor high-level inter-tie circuit. Following repair work, a Beckman with faulty circuitry was switched back to the safety circuit at DR, causing both DR and D to be scrambled. DR Reactor was scrambled by a high level Beckman trip when the neutron flux distribution was disturbed and the reactivity increased during flush removal of a poison column. A Beckman scram at H Reactor occurred during the resetting of Beckman ranges. Total outage time attributed to scrams was 56 hours, 24 of which resulted when a galvanometer chamber failure at B Reactor prevented startup within recovery time. An additional 25.2 of the 56 hours resulted from exceeding the scram recovery time following the electrical coil failure at D Reactor.

Process tube leaks in January were limited to one leak at C Reactor in conjunction with a rupture. During the latter part of the month, residual water from this leak curtailed the power level by limiting reactivity. The water collection rate at D Reactor was above normal most of the month, particularly for the first few days following a startup. No leak testing was considered necessary, however,

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and at month end the rate had returned to normal. The water collection rate at F Reactor remained above normal, although significantly less than the December daily rate.

Work on horizontal rods continued during January. At H Reactor one rod was replaced with a "half" rod because of binding and a second rod was replaced with one of the new design standard rods. A rod was removed and the thimble blanked off in D Reactor because of a thimble leak. At C Reactor a scored rod tip was replaced.

The tritium input production program continued with the input production being 122 percent of the official forecast. The high operating efficiency of the DR Reactor contributed to the high production. Forty-three J-N tubes were discharged and replaced with normal uranium. The month end balance at C and DR Reactors was 75 and 369 tubes respectively.

The U-233 input production was only 82 percent of the forecast because of the low operating efficiencies at C and H Reactors. Eighty-eight enriched thorium tubes were discharged at the two reactors during the month with 27 being reloaded with J-Q pairs. The month end balance of J-Q tubes was 156 at C and 94 at H.

KW Reactor was started up at 8:47 a.m. on January 4. Operation continued, with two interruptions to adjust monitoring chambers and add test hole shielding, until 2:04 a.m. on January 5, at which time a Panellit trip shut the reactor down. Slug failures were found to have occurred as the result of inadequate cooling water flow arising from a rear face connector stoppage on tube 4669-KW. When conventional removal methods failed, a six-inch opening was drilled through the rear shield to permit removal of graphite blocks. At month end, blocks, tube and ruptures had been removed, new graphite had been installed, and rear shield repairs were in progress.

SEPARATIONS SECTION

The Redox production of the high concentration material was 109 percent of the official forecast. Due to an extension of the planned shutdown for maintenance, the production of the low concentration material as previously forecast was not made. However, the T plant production of low ngs material was 136 percent of the forecast. This production equalled approximately the total commitment of both the Redox and T plants.

For the first eight days of the month the Redox plant operated at an average rate of five tons per day. Reduced rates were necessitated by longer dissolver time cycles to remove metal heels prior to shutdown, and a partial loss of vacuum in the oxidizer. Following the cleanout, the facility was shut down for the remaining 23 days of the month while scheduled major repairs and equipment changes were effected. The major equipment repairs included regasketing the G-3 organic still, replacing the H-4 oxidizer tower, installing the new J-6 filter, and replacing the D-12 concentrator pot. Difficulties with the 60 ton crane and short time limits contributed to extending the outage.

The T plant operation exceeded all previous records on total metal dissolved, runs started, and product shipped. Efforts are being continued to further increase capacity.

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The TBP facility resumed operations on January 2 following maintenance work in the 241-WR waste vault. Operating rates were limited to 3-4 tons per day by the capacity of the single feed stream concentrator in service. A spare feed concentrator was being readied at month end for activation early in February. The production for the month was 95 percent of the forecast. The decontamination of the final product was within specifications during the month.

The UO_3 plant monthly production was 96 percent of the forecast. The production was limited only by the availability of feed material. Three cars of powder were shipped off-site.

The 234-5 monthly production for the fabricated and unfabricated product was 100 percent of the forecast. The commitment was made with available material early in the month, and an extended outage was started January 11 for the installation of the new Task III reduction equipment. The Isolation Building production was 100 percent of the forecast.

The West Area evaporator operated during the month with a volume reduction of 59.2 percent. The feed was bismuth phosphate first cycle waste. The East Area facility was down the entire month.

The waste metal removal continued to effect cleanout of tanks containing only small quantities of 3-year old or more waste.

GENERAL

Personnel

On Roll January 1, 1955
Net Increase
On Roll January 31, 1955

4772
49
4821

J. E. Maider
J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

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MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY

FOR
MONTH OF JANUARY, 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

None

TITLE

None

J. E. Maider

J. E. MAIDER
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MONTHLY OPERATING REPORT

JANUARY 1955

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February 4, 1955

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION

January, 1955

I. RESPONSIBILITY

There was no change in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

	<u>January</u>	<u>December</u>	<u>Year to Date</u>
Total Acceptable Slugs Canned (Tons)	406	426	406
Composite Canning Yield (%)	78	83	78
Efficiency (%) (Canning Throughput)	92	93	92
Forecast Achievement (Current Commitment)	100	101	100
Net Acceptable Solid Slugs (Tons)	392	424	392
Slugs Returned from Reactor (Tons)	8.22	0	8.22
Canning Yield (%)	79	83	79
Net Acceptable Cored Slugs (Tons)	22	2	22
Slugs Returned from Reactor (Tons)	0	0	0
Canning Yield (%)	69	-	69
Autoclave Failure - Solid (No./M)	.00	.00	.00
Autoclave Failure - Cored	.00	.00	.00
Acceptable C-4 Slugs Canned (Pieces)		4918	
Acceptable Pb-Cd Slugs Canned (Pieces)	4032	1739	4032
Average Steam Generated (M lbs/hr)	64.2	59.5	
Maximum Steam Generated (M lbs/hr)	81.0	77.0	
Total Steam Generated (M lbs)	47,780	45,300	
Coal Consumed (Tons)	2,883	2,906	
Sanitary Water from 3000 Area (Million Gals.)	54.6	54.3	
Total Water from 3000 Area (Avg. Rate-GPM)	1,223	1,216	

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Metal Preparation Section

2. Activities

A net production of 406 tons of acceptable finished slugs was achieved in January. Twenty-two tons of this total were cored pieces canned by the lead dip process. A new production high of 1135 pieces canned for a single line-shift was established on January 13 using a 50-second cycle. Six canning line-shifts were operated throughout the month, three of these on a full relief basis.

A composite yield of 78 percent was experienced in January which is a decrease of five percent from last month. Depressions in the canned slug weld bead were primarily responsible for the increase in reject welds. The cause of the defect had not been determined at month-end but investigations were continuing.

Eight-inch cored slug production resumed during the month using the operation sequence which eliminates bare slug immersion in water subsequent to inert welding. The 22 tons of acceptable finished slugs produced in January increased the finished cored slug inventory to approximately 24 tons.

The canning area of the old 313 Building was released on January 19, 1955 and all canning operations were moved into the new building on that date. Equipment difficulties have prevented the finishing operations from moving into the new area.

A short supply of bare metal continued to complicate production activities during the month. In addition, the shipment of 421 tons of the 485 tons requested for the KE reactor combined with regular shipments of finished slugs to other reactors has reduced finished slug inventory to a minimum. Close liaison between the Reactor and Metal Preparation Sections has been established to insure that sufficient metal is scheduled for delivery to individual reactors as necessary for continuity of operation and to prevent unnecessary finished slug inventory build-up in any one location. Every effort is being made to expedite the return of rejects from the reactors and thus keep all available metal in the production stream.

Fabrication shop personnel were called upon to make special equipment on an emergency basis to assist in the 105-KW difficulty. A twenty-four-foot long drill capable of drilling uranium in a process tube was fabricated within the same day that telephone instructions were given to make it. When the decision was made to remove the graphite stringer, special handling tools, lead-lined containers and supporting equipment were fabricated within 24 hours.

For the last three months of 1954, approximately 25 percent of the uranium metal produced at Fernald was from Paducah sidestream materials. T.D.S. values on Fernald cast uranium over the past two months have varied from 4 to 37 against a normal range of 12 to 16. Bare slug reactivity for this material has varied from plus .373 to minus .465 against a normal range of plus .1 to minus .1. These values indicate a possible range of as much as 128 in-hours in a reactor if the charge were of one extreme or the other. In order to minimize this wide variance, the A.E.C. has been provided with tentative specifications which would require closer control of the isotopic content of this sidestream material.

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2. Activities - continued

As additional canning lines were brought into service in the new building, it became possible for the furnace operator to control more than one operating line. The performance of the new automatic temperature control equipment made possible the increased production without additional personnel.

3. Special Operations

The transformation and outgassing of uranium slugs by salt bath heat treating continued during the month. Short metal supply continued to complicate efficient scheduling of material through these operations.

During the month a total of 1350 enriched "C" slugs were canned by the C process with a canning yield of 95 percent and a total of 754 by the hot press method. As near as can be determined with bond testing incomplete, the hot press canning was accomplished with a very good yield.

4. Schedule Variance

Acceptable canned slug production was 100 percent of forecast.

B. Equipment Experience

1. Operating Continuity

Canning line efficiency was maintained at 92% in January, a decrease of one percent from the previous month. This was due to moving the entire canning operation, continued complications stemming from construction activities, new equipment shakedown and short metal inventories.

2. Inspection, Maintenance and Replacement

Approximately seven hours of canning line downtime was attributed to instrument maintenance this month as a result of broken thermowells. The silicon-carbide thermowells which were recommended by the furnace manufacturer were found to be extremely brittle for our operation. Through an expedited program, all canning and duplex furnaces were equipped with steel wells at month-end.

C. Improvement Experience

1. Production Tests

PT-313-47MT "Cored Slugs From Extruded Blanks and Rolled Rods" (HW-33189)
The processing of cored slugs was resumed on January 11, 1955 using a revised sequence of operations. The new sequence included first outgassing, then pickling, welding the uranium plugs into the cores in an inert gas hood and canning without further deoxidation. As of month-end, approximately 8,500 slugs had been canned with favorable results. Bare slug welding rejects have been reduced to approximately six percent.

Fuel Technology has successfully developed a prototype "gamma ray" core tester to detect AlSi and lead in the cores of finished slugs. Currently, all finished cored slugs are being checked through this unit. A total of 1636 slugs have been tested and 13 rejected for canning bath metal ranging from $\frac{1}{4}$ -inch to slightly over four inches in the cores. Actual measurements of bath metal in the cores correlated very well with readings obtained in the gamma ray core tester.

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1. Production Tests - continued

Development is also progressing on uranium and aluminum plugs that can either be crimped or pressed into cored slugs as a substitute for welded plugs. The most promising method of uranium plugging to date appears to be one in which plugs about 25 mils thinner than the standard $\frac{1}{4}$ -inch plugs are seated and crimped under a total pressure of about 20 tons. A total of 100 slugs have been processed by this method and no bath metal was found in the cores after canning.

Sufficient progress has been made in the preparation of cored slugs to permit Fernald to resume fabrication rates in accordance with previously established schedules. Production at Hanford is being scheduled within the limits of available uranium components.

2. Process Tests and Revisions

Testing of a 45-second canning cycle was started during mid-January. The material was canned using the 45-second poppet system and all material produced was tested by the Penetration Tester. The results to date indicate that the 45-second cycle is operationally feasible and the quality aspects of the production are being investigated.

Uranium slugs heat treated in rod form in the new Fernald furnace using carbonate salt were continuously monitored during the month. Although the total hydrogen content of these slugs has not changed, there has been a significant reduction in the porosity of the bonding layer. This appears to be caused by a change in the distribution of hydrogen in the slug core. At month-end the outgas annealing of slugs had been temporarily discontinued in order to determine the necessity for hydrogen removal. Future production will be followed closely in order to detect any abnormally porous braze content which could be attributed to the presence of hydrogen.

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

An increase in unit costs for January is estimated at .005 per unit. This results from a decrease of 5% in yields.

2. Material Variance

Material unit costs are expected to increase .01 per unit due to lower yields.

3. Other Costs

I.M.E. costs will also increase approximately .01 as a result of about 5% decrease in total production.

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E. Plant Expansion1. Project Status

Project CA-514 "Expansion of 300 Area Production Facilities. Over-all design is complete and construction has progressed to 61% of completion as now scoped. The total authorized funds are \$5,085,000 and the total estimated cost is \$6,200,000. Total cost plus commitments to January 16, 1955 was \$3,814,383. Installation of the last heating and ventilating unit has been completed but not yet accepted. This completes the installation of all heating and ventilating units in the entire 313 Building; however, the major portion of the duct work is yet to be completed. The penthouse for the five heating and ventilating units in the old building was completed. All furnaces, instrument panels, overhead duct work and steel floor plating have been removed from the old canning area. Ten resistance furnaces have been re-installed in the new area with eight accepted to date. Work is continuing on the overhead conveyor system in the canning area. The twenty remaining autoclaves have been installed except for a portion of the insulation. All six production welders have now been accepted. A special study was made relative to the loss of nitric acid through the exhausting of nitric fumes from the penetration etch machine. Investigation is continuing. The general and supporting facilities are 85% complete. Modifications of the 3706, 3707-A, and 3707-B buildings are 44% complete. Plumbing and framing of the First Aid and Patrol sections of the 3706 Building have been completed.

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

The tentative starting date is June 1, 1955. A work order has been issued for preparation of detailed design.

F. Significant Reports Issued1. Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-34073	Metal Preparation Section Weekly Inventory Report	HE Berg	1-5-55
HW-34283	Monthly Report, Metal Preparation Section, Process Sub-section	EW O'Rourke	1-3-55
HW-34366	Monthly Report, New Fuel Element Production Program, December, 1954	WA Blanton	1-7-55
HW-34486	Uranium Quality Control Analytical Results	WG Hudson	1-10-55
HW-34500	Monthly Cost Report, Metal Preparation Section, December, 1954	HS Krider	1-17-55

2. Non-Routine

HW-34287	Evaluation of New "Triclene D" Degreasing Solvent	DS Dixon	1-3-55
HW-34369	Lot Designation-Cored Slugs	SM Gill	1-7-55
HW-34424	Dimensional Evaluation of the Initial Production of Drilled Cored Slugs	DE Christensen	1-12-55
HW-34450	Harvey Machine Co. Aluminum Caps-Vendor Evaluation	TD Naylor	1-12-55

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Metal Preparation Section

III. PERSONNEL

A. Organization

No change.

B. Force Summary

	<u>Start of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Operations	207	210	+ 3
Power & Maintenance	328	330	+ 2
Process	86	91	+ 5
Projects & Personnel	13	13	0
Section Total	636	646	+10

C. Safety Experience

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

A near-serious incident occurred on January 19 when approximately 25 gallons of pickle acid was discharged onto the roof of the 313 Building and subsequently to the concrete pad below. There were no injuries or apparent property damage. A blank flange on the end of a "Y" in the pipeline had corroded through, leaving an opening about an inch in diameter. Although the flange was coded as stainless steel and appeared to be stainless, laboratory analysis proved it to be Monel.

A second near-serious incident occurred when a hoist fell into the 50 percent caustic tank while lifting approximately 400 pounds of process material from the tank. No one was injured. Investigation revealed the locking plate on the hook which anchors the hoist body to the overhead monorail trolley had sheered off, permitting this hook to slowly unscrew itself from the hoist body and subsequently allowing it to drop into the caustic tank. In an effort to prevent recurrence of the incident, a more comprehensive inspection procedure has been initiated and better lock-plate devices are being investigated.

D. Radiation Experience

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

E. Personnel Activities

1. Visits and Visitors

W.M. Mathis visited the Washington, D.C. Operations Office of A.E.C. to discuss metal requirements and attended the Metallurgical Development Advisory Committee meeting at the Savannah River Plant. He also visited Sylvania Electric Products in Hicksville, Long Island to discuss hot press canning.

B.E. Page attended the Plant Maintenance and Engineering Conference in Chicago, Illinois.

K.V. Stave visited the Engineering Departments of Washington State College and Gonzaga University as a part of the Company's technical recruitment program.

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E. Personnel Activities - continued

2. Meetings

Forty-six safety and security meetings were held and 59 round table and information meetings were held for exempt and non-exempt members of the Section.

Three exempt members attended Training and Development Programs (W-10).

A "Supervisor-Employee Discussions" guide was formulated for use by first line supervisors when talking to individual employees.

Final arrangements have been made for the "Work Simplification" training program to start February 1, 1955.

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HW-34631

Richland, Washington
February 7, 1955

MANUFACTURING DEPARTMENT
REACTOR SECTION
MONTHLY REPORT
JANUARY, 1955

I. RESPONSIBILITY

The Reactor Section in January assumed operating and maintenance responsibility for the KE Water Plant facilities in order to provide water back-up for KW Reactor. Responsibility for the removal of metal from, and repair of, channel 4669-KW at KW Reactor was relinquished to the Engineering Department on January 11.

II. ACHIEVEMENT

A. Operating Experience

A record high total reactor input production was achieved in January, exceeding the previous record established in December, 1954, by 2.4 per cent. This record was achieved primarily as the result of increased reactor power levels. Reactor time operated efficiency was 81.9 per cent, a slight improvement over the 81.6 per cent December, 1954, efficiency. The primary cause of this relatively low efficiency was slug failures which, although not excessive in number, resulted in a greater than normal amount of outage time. A portion of this failure outage time was utilized for metal discharge, reducing the amount of scheduled outage time to a lower than normal amount.

Plutonium input production exceeded forecast by approximately two per cent as the result of increased reactor power levels. Mint input was approximately 22 per cent above forecast as the

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A. Operating Experience

result of a high, 96.2 per cent, operating efficiency at DR Reactor. Thorium input production was approximately 82 per cent of forecast, because of low operating efficiencies at C and H Reactors. Production charged to the Mint program at C and DR Reactors was 1.0 and 16.2 per cent, respectively. Production charged to the thorium program at C and H Reactors was 7.8 and 6.8 per cent, respectively.

KW Reactor was started up at 8:47 a.m. on January 4. Operation continued, with two interruptions to adjust monitoring chambers and add test hole shielding, until 2:04 a.m. on January 5, at which time a Panellit trip shut the reactor down. Rupture and water leak indications were traced to tube 4669-KW. Slug failures were found to have occurred in the tube as the result of inadequate cooling water flow arising from a rear connector stoppage. When conventional removal methods failed, a six-inch opening was drilled through the rear shield to permit removal of graphite blocks. At month end, blocks, tube, and ruptures had been removed, new graphite had been installed, and rear shield repairs were in progress. Additional information pertaining to this incident may be found in document HW-34461, "Preliminary Report KW Reactor Incident" and HW-34904, "Monthly Report Reactor Section - Operations Sub-Section January, 1955."

Plutonium megawatt day output production was approximately 25 per cent above forecast as the result of the discharge of a greater than forecast tonnage of high concentration material during rupture outages which presented convenient opportunities to discharge material approaching goal concentration.

Effective January 1, goal concentration was increased from base goal plus 175 megawatt days to base goal plus 250 megawatt days, except at D Reactor, where a pilot concentration program of base goal plus 300 megawatt days is in progress, and at C Reactor which is producing low concentration material. Tonnages of low and production concentration material discharged during December were approximately 229 and 96, respectively. The latter figure includes approximately 28 tons discharged at D Reactor at essentially base goal plus 300 megawatt days.

Maximum established reactor power levels, excluding enrichment burnout, were increased a total of 178 megawatts, nine at C Reactor, 65 at D Reactor, 41 at DR Reactor, 10 at F Reactor and 53 at H Reactor. At all five reactors, the increase was attributed partially to the seasonal decrease in inlet water temperature, and at all except D Reactor, partially to operation under limits specified by Process Standard 105-A-040, "Process Tube Outlet Water Temperature Limits - Trip Before Instability." Additional

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A. Operating Experience (Continued)

factors contributing to the increased levels included; at D Reactor, operation under limits permitted by Production Test 105-546-E, "Effect of Helium on D Pile Distortion;" at DR Reactor, replacement of central zone JN loading by uranium; and at H Reactor, replacement of nine depleted "C" columns with new "C" columns, and improved flattening.

Fourteen slug failures at all reactors occurred during January. Distribution by reactor and type is tabulated below:

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>Total</u>
Regular 8-Inch	1		1		1	2*	5
"J" Material				4			4
Production Test		5**					5
Totals	1	5	1	4	1	2	14

* Two regular eight-inch failures at H Reactor were from Production Test 105-539-E, "Slug Exposure at a Concentration of 900 MWD/Ton."

** Of the five Production Test failures at C Reactor, three were from Production Test 105-578-A, "Irradiation of Unbonded Slugs," and two were from Production Test 105-577-A, "Irradiation of Solid and Cored Hot Pressed Fuel Elements."

Reactor outage time required for removal of January slug failures was 328.2 hours.

1. Statistics

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>Total</u> <u>Average</u>
Reactor Time Operated							
Efficiency (%)	75.5	71.7	86.5	96.2	86.9	75.0	81.
Reactor Outage Time (Hrs)							
Plutonium Production	182.1	76.0	97.3	0.8	69.8	63.2	489.
Special Irradiations and Tests	-	134.8	3.5	27.8	28.0	122.8	316.9
Total	182.1	210.8	100.8	28.6	97.8	186.0	806.1
Reactor Unscheduled							
Outage Time (Hrs)	96.2	154.2	100.8	28.6	31.2	152.8	563.8
Metal Discharged (Tons)	67.2	143.8	28.1	0.5	40.7	45.1	325
Water Quality (ppm Iron)							
Raw Water - Average	0.04	0.04	0.04	0.05	0.04	0.06	
Raw Water - Maximum	0.05	0.06	0.06	0.06	0.05	0.07	
Process Water - Average	0.004	0.005	0.004	0.005	0.004	0.005	
Process Water Maximum	0.007	0.008	0.005	0.006	0.006	0.005	
Water Pumped (MM Gals)							
Bldg. 190 to Reactor	1799	2897	2205	1826	1879	1928	12534
Bldg. 182 to 200 Areas						301	301
Bldg. 181		5265		4757	2244	2552	14818
Steam Generated (MM Lbs)		166		267	149	107	689
Coal Consumed (Tons)		16151		8909	7246		42402

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A. Operating Experience (Continued)2. Activities

Operation at all reactors except D Reactor was limited during January by temporary outlet water temperature limits as specified in Process Standard 105-A-040, "Process Tube Outlet Water Temperature Limits - Trip Before Instability." At D Reactor, operation was limited by the provisions of Production Test 105-546-E, "The Effect of Helium on D Pile Distortion," which permits use of up to 60 per cent helium.

Charge-discharge activities associated with major special irradiation programs included the discharge, without recharging Mint material, of 43 J-N tubes at DR Reactor. The month end balance of J-N tubes at C and DR Reactors was 75 and 369, respectively. At C Reactor, eight J-Q tubes were discharged, and four were recharged with J-Q material resulting in a month end balance of 156 tubes. At H Reactor, 80 J-Q tubes were discharged and 27 were recharged with J-Q material, resulting in a month end balance of 94 J-Q tubes under the quantity irradiation program.

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

	<u>Tubes Charged</u>	<u>Tubes Discharged</u>	<u>Casks Shipped</u>
Production Tests	23	46	5
Chemical 10-66	0	8	5
Mint (flattening)	18	18	0
Totals	41	72	10

B. Equipment Experience

Eighteen reactor scrams occurred during January. Of these, 11 at B, D, DR, F and H Reactors were caused by normal Panellit variables. One scram at C Reactor was caused by improper switching in the No. 2 electrical equipment room. Another scram at C Reactor resulted from a high level trip of the No. 1 Beckman, caused by a slug failure which simultaneously produced Panellit and beta monitor indications. One scram at D Reactor resulted from an electrical coil failure in the regulated instrument supply circuit. This scram caused a scram at DR Reactor through the D-DR Reactor high-level inter-tie circuit. A second scram at D Reactor resulted through the inter-tie from the No. 3 Beckman at DR Reactor when the Beckman was returned to service after repair work. Investigation revealed faulty circuitry. DR Reactor was scrambled by a high level Beckman trip when the neutron flux distribution was disturbed and reactivity increased through flushing rather than displacing a poison column. One Beckman scram at H Reactor occurred during the resetting of Beckman ranges. No. 3

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B. Equipment Experience (Continued)

Beckman had just been un-bypassed, and No. 4 bypassed when the scram occurred. All were well below the trip point. Total outage time attributed to these scrams was 56.6 hours, 24.0 of which followed a Panellit scram at B Reactor as the result of galvanometer chamber failure, and 25.2 of which resulted from exceeding the scram recovery time following the electrical coil failure at D Reactor.

Process tube leaks in January were limited to one leak at C Reactor in conjunction with a rupture. During the latter part of the month, residual water from this leak curtailed the power level by limiting reactivity. The water collection rate at D Reactor was above normal most of the month, particularly for the first few days following a start-up. No leak testing was considered necessary, however, and at month end the rate had returned to normal. The water collection rate at F Reactor remained above normal, although significantly less than the December daily rate.

Horizontal rod work in January included: at H Reactor, installation of a standard new type rod in channel No. 7, and replacement of No. 2 rod, because of binding, with a new type "half" rod; at D Reactor, removal and blanking off of rod "B" due to a thimble leak; and at C Reactor, removal and replacement, due to scoring, of rod tip No. 14. This new tip was later also found to be scored, and the rod was removed from service. Subsequent examination revealed the "scoring" to be a rod seam, and the rod was returned to service.

Reliability checks of Panellit systems of five of the six operating reactors during January revealed 52 faulty trips as detailed below.

	<u>High Trips</u>	<u>Low Trips</u>	<u>Misc.</u>	<u>Total</u>
B Reactor	11	3	6	20
C Reactor	1	9	0	10
D Reactor	No Check Made			
DR Reactor	3	1	0	4
F Reactor	14	1	0	15
H Reactor	2	1	0	3
Totals	<u>31</u>	<u>15</u>	<u>6</u>	<u>52</u>

This level of gage performance is approximately the same as in December.

The Kingsbury thrust bearings on all 1500 h.p. motors at Buildings 181-KW and KE are being replaced by Minor Construction forces. The new bearings are insulated to prevent bearing or shaft surface damage

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B. Equipment Experience (Continued)

from shaft currents. Two silicate pumps, one alum pump, and one air compressor at Building 183-KW have required overhaul due to internal difficulties not corrected by construction forces.

Emergency repairs to broken gland seal equalizing lines on process water pump units Nos. 3 and 4 at Building 190-C were made in January. Several equalizing line failures have been experienced at this location due to excessive vibration.

The KW Reactor temperature monitor is not yet in operating condition since some controllers require further calibration and the present controller test facility is not adequate. The vendor is to supply a more sensitive calibration indicator. Present instructions require that this equipment be in the safety system prior to start-up.

C. Improvement Experience

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

PT-105-7-MR (Irradiation of High Quality Production Uranium Slugs)
Irradiation to failure of 10 tubes of high quality production uranium slugs continued at H Reactor without incident in January.

PT-105-539-E (Slug Exposure at a Concentration of 900 MWD/Ton)
A supplement to this test authorizes additional exposure of the two groups of material under the test until three ruptures in each group occur. One "B" group failure and two "A" group failures have occurred, leaving three ruptures to be achieved before discharge of the test.

PT-105-506-E (Recirculation Studies)
Suppl. C
Immediately prior to the shutdown of January 6, stable boiling was maintained in recirculation tube 0961-H at H Reactor for approximately 80 minutes with steam quality estimated at eight per cent. The return to liquid phase was made without difficulty during reactor shutdown.

PT-105-567-A (Preliminary Irradiation of J-Q Columns)
One of the 12 tubes under irradiation at H Reactor was discharged and recharged J-Q as per the provisions of this test.

PT-105-579-A (Quantity Irradiation of J-Q Columns)
At H Reactor, 81 tubes were discharged as scheduled, with 27 tubes recharged, leaving a balance of 94 tubes in the reactor at month end. At C Reactor,

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C. Improvement Experience

PT-105-579-A (Continued)

eight tubes were discharged and four tubes were re-charged, leaving a month end balance of 156 tubes in the reactor.

PT-105-537-E (Effect of J-Q Pairs on Radiation Damage to Graphite)

Thirteen J-Q tubes were charged at F Reactor during January to determine the effect of J-Q pairs on radiation damage to graphite.

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

This test was started to study the effect of increased helium concentrations on graphite at D Reactor. It permits outlet temperatures up to 110 C, providing trip-before-instability limits are not exceeded, and a 60 per cent maximum helium concentration to maintain graphite temperatures between 460 and 500 C.

Three revised Process Standards - Reactor were approved and issued during January. These were Standards titled "Ball 3X System," "Make-Up of Uranium and Uranium-Alloy Tube Charges," and "Make-Up of Special Charges." The first Standard established a firm setting for the "very low water pressure" Ball 3X system trip at KW Reactor, based on process water pressure decay test data obtained during a simulated electrical power failure. The other two Standards specified the shortening of K Reactor rear dummy charges to permit accommodating the complete dummy charge in the charging machine magazine.

During January, field inspection coverage by Process Sub-Section representatives was extended from an eight to a 24 hour basis to insure adherence to Process Standards. In addition, the practice of requiring the presence of a Process Engineer and a Process Physicist at all cold reactor start-ups was instituted to provide additional aid in the event problems are encountered during start-ups.

Seven additional light scattering microphotometers, for a total of nine, have been received, and are being calibrated. These instruments, which provide the most satisfactory method available for predicting the tendency of water to form film in process tubes, will be placed in each of the eight water facilities and the Process Control Water Laboratory.

"O" ring gasket seals have been obtained for use with Van Stone flanges in reducing leakage into reactors. The ring is placed over the outside of the tube behind the flange, forming a seal between the tube and the gunbarrel. Initial use of these rings will be at F Reactor where they will be installed during the horizontal rod outage in February.

Personnel in the Reactor Section engaged in work which might be expected to result in inventions or discoveries have reported that no inventions

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C. Improvement Experience (Continued)

or discoveries were made during the period covered by this report

D. Events Influencing Costs

During January, Reactor Section costs were adversely affected primarily by the continued relatively low operating efficiency which resulted from slug failure and scheduled outage time. In addition, an approximate \$19,000 increase in coal costs as the combined result of a seasonal increase in consumption and a Financial Department adjustment of \$0.25 per ton to coal received in order to adjust coal in storage to the current market value.

Beneficially affecting Reactor Section costs was the new record high input production which was 2.4 per cent above the previous record established in December, 1954. In addition, the absence of major maintenance outages in January, a marked decrease in process tube leak testing work, and a reduced amount of horizontal rod work as compared to December combined to aid in reducing Section costs.

Preliminary estimates indicate that both plutonium irradiation and total irradiation unit costs will establish new record lows, approximately two per cent below the previous records established in December, 1954.

January Reactor Section charges to the expansion program increased considerably as the result of the operating difficulties at KW Reactor, as described in "Operating Experience" above.

E. Plant Development and Expansion1. 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 1/20/55.

CA-512

(100-K Facilities)

Construction completion for the K Reactors and Water Plants, estimated by the AEC as of January 14, 1955, are:

KW Reactor	100.0 up 0.1
KE Reactor	98.9 up 1.6
General Facilities	100.0 up 4.5
KW Water Plant	100.0 up 0.1
KE Water Plant	99.7 up 1.7

KW Reactor started up temporarily on January 4, as described under "Operating Experience" above.

KE Reactor work is progressing satisfactorily, with indications that the plant should be ready for turn-over on or about February 10. Acceptance testing is estimated to be about 80 per cent complete. The Power Sub-Section took over operation of the entire

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E. Plant Development and Expansion

1. Project Status

CA-512 (Continued)

KE Water Plant on January 3, with Kaiser Engineers responsible for maintenance, in order to have Reactor Section operational jurisdiction over back-up water facilities for KW Reactor. Approximately 85 per cent of the regular metal for the initial loading, representing the capacity of all available storage space, has been received and inspected.

CG-558 (Reactor Plant Modification for Improved Production)
Scope design is estimated to be 99.2 per cent complete. Design criteria for 100-F Area were approved by the Design Council completing approval of all criteria for this project.

Fifty horizontal rod extrusions are now on hand at Pacific Oerlikon, and 14 more are enroute from Alcoa. It is anticipated that Alcoa can easily complete the entire order since the over-all allowable twist specification has been relaxed from three to four degrees. Twenty-three horizontal rods (11 half and 12 full) are on hand in addition to seven which have already been installed in F, H, and DR Reactors on an emergency basis. The boron carbide ring vendor will be granted an additional approximate \$25,000 for completion of ring fabrication as the result of un-anticipated costs. The first rod replacement outage is scheduled for February 7 at F Reactor.

Back-up instrumentation has been deleted from the scope of Project CG-558. The need for this facility is now doubtful, since existing pressure gages will be replaced with new gages. At month end, a few of the new gages had been received for testing.

CA-431 (100-C Plant)

Reynolds Aluminum Company has produced 16 acceptable full length extrusions, leaving eight more to be furnished. The 16 extrusions will be shipped to Western Gear for fabrication. A packing test of the 10-foot rod section to determine poison density per unit length was satisfactory. An order was placed with the Norton Abrasive Company for boron carbide to be sent to Western Gear for final packing of the rods.

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E. Plant Development and Expansion2. Plant Engineering

A number of engineering and development studies were active in the Section during January. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in document HW-34891. Several items of interest are reported below.

A modification for increasing Panellit gage reliability from the aspect of gage resetting is being studied for later testing. The change proposes that a magnetic field cover the entire operating range of the gage, and work in conjunction with a normally open Mercoid switch. The magnetic pull of the proposed gage would allow operation rather than actuate the trip. However, when the pressure fell outside the operating range, the magnetic field would release the Mercoid vane, initiating a trip.

In an effort to remove contaminated film from within reactor discharge area effluent piping for the purpose of improving radiation levels, the feasibility of recirculating acid through the reactor is being studied. Available data indicate that chromic acid is the most desirable agent for this work. Based upon the results of additional tests, a Process Test will be prepared.

F. Significant Reports1. Routine

Monthly operating reports issued for December were:

HW-34147-A	Reactor Section	J. H. Warren	1/7/55
HW-34411	Operations Sub-Section	R. O. Mehann	1/1/55
HW-34292	Process Sub-Section	O. C. Schroeder	1/3/55
HW-34285	Projects and Personnel Development	F. A. R. Stainken	1/3/55
HW-34329	Radiation Monitoring Sub-Section	P. C. Jerman	1/5/55
--	Maintenance Sub-Section	E. E. Weyerts	1/5/55
HW-34327	Power Sub-Section	J. C. McLaughlin	1/5/55

Other routine reports issued during January included:

HW-34538	"Monthly Progress Report, Reactor Section Expansion, January, 1955."	J. P. Langan	1/24/55
--	"Status of Reactor Section Projects, Informal Requests, and Budget Items."	F. A. R. Stainken	1/20/55
--	"Reactor Section Process and Cost Improvement Report, October to December, 1954."	J. H. Warren	1/7/55
HW-34331	"Reactivity Balance and Associated Data - Period December, 1954."	A. P. Vinther	1/3/55

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F. Significant Reports (Continued)

2. Non-Routine

HW-34373	"Power Surge Incident - 100-DR"	J. T. Baker	1/7/55
--	"Incident Concerning #3 Control Beckman in 105-DR"	T. M. Clement	1/17/55
HW-34123	"Process Test MR-105-26, Evaluation of Thermoswitches for Localized Temperature Monitoring"	W. E. Cawley	12/14/54
HW-34312	"Front Face Crossheader Check Valves"	A. K. Hardin R. D. Schilling	1/4/55
HW-34518	"Coolant Distribution Problems in Large Nuclear Reactors"	J. E. Robb	1/3/55
HW-34476	"Reactor Control System Utilizing Boron Trifluoride"	W. E. Cawley	1/18/55
Confiden- tial	"Proportional Counter, No. 2 Beckman, and Galvanometer Sensitivity"	A. P. Vinther	1/21/55
Official Use Only	"Process Change Authorization RP-2, Coarse Mesh Screen TBI Limit for D Reactor"	O. C. Schroeder	1/14/55
Official Use Only	"Process Change Authorization RP-3, Slug Rupture Limit Based on Slug Core Behavior"	O. C. Schroeder	1/14/55
Official Use Only	"Process Change Authorization, RP-4, Maximum Pressure Limits for Panellit Gauges"	O. C. Schroeder	1/24/55
--	"Annual Achievement Report - Goals for 1954 - Reactor Section"	J. H. Warren	1/12/55

III. PERSONNEL

A. Organization

There were no appointments made in the Reactor Section during January.

Operations Sub-Section crews and Radiation Monitoring Sub-Section personnel were transferred to KE Reactor in January, essentially completing the staffing of KE Area facilities.

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B. Force Summary

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Operations	364	366	+ 2
Maintenance	596	603	+ 7
Projects & Personnel			
Development	40	40	0
Power	487	488	+ 1
Process	60	62	+ 2
Radiation Monitoring	79	78	- 1
Section Total	1628	1639	+ 11

Changes during January included 11 transfers into the Section, four transfers out of the Section, six new hires, three terminations, one reactivation, and no deactivations. Reactor Section force increases were primarily the result of the addition of manpower to staff 100-K Area.

C. Safety Experience

One Major Injury, No. 107, and one Sub-Major Injury, No. 268, occurred in the Reactor Section during January. The Major Injury occurred on January 19 in Building 190-C when a Maintenance Sub-Section pipe coverer, who was insulating a pipe, tripped as he descended a four-foot step ladder, causing him to fall across the ladder which had tipped over. A fracture of the first vertebra resulted. The Sub-Major Injury occurred on January 25 in the Building 1717-F shop when a Maintenance Sub-Section truck driver dropped a piece of metal on his finger while straightening up material on a rack. A chip fracture of the finger resulted.

D. Radiation Experience

One Class II Radiation Incident, No. 88, and two Class I Radiation Incidents, Nos. 408 and 418, occurred in the Reactor Section in January. Class II Radiation Incident No. 88 occurred at F Reactor on January 30, and involved a Maintenance Sub-Section employee who received high-level contamination on the knee of his protective clothing when contaminated water splashed while bleeding off a process tube under hydrostatic test. The tube had contained a rupture which was discharged the previous day. Class I Radiation Incident No. 408 occurred on January 7, and involved a potential overexposure of an Engineering Department employee as the result of inadequate instruction of personnel involved, and failure of a memo, which authorized extended exposures, to explain all conditions. Class I Radiation Incident No. 418 occurred on January 4, at KW Reactor, and involved consideration of radiation and contamination

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DECLASSIFIED**D. Radiation Experience (Continued)**

conditions which might have resulted from the slug failure incident as described under "Operating Experience." These incidents are described in detail in documents HW-34872, HW-34524, and HW-34898, respectively.

Exposure and contamination control at KW Reactor associated with the drilling of the rear shield and removal of one stringer of tube bearing blocks, the first time work of this nature has been attempted, was excellent.

E. Personnel Activities

At month end, 16 employees are receiving on-the-job training for engineering or supervisory assignments in the Section; 12 of these are on assignment under the rotational training program.

On January 17, O. C. Schroeder presented an informal talk on reactors to the regular luncheon meeting of approximately 40 members of the College Place, Washington, Kiwanis Club. The "A Is For Atom" film was also presented.

A two-week training school was held for five new Operations Sub-Section supervisors during the period January 10 through 21. The school included attendance at the FMS course in the mornings with afternoon instruction on supervisory problems presented by Unit Superintendents.

Two information meetings on Project CG-558 were presented jointly by E. J. O'Black, N. H. Skarshaug and W. R. Conley in 100-B Area. A total of approximately 70 people attended the two meetings.

F. A. R. Stainken assisted the Technical Recruitment Unit in recruiting technical personnel at the University of Idaho on January 19 and 20. He also participated in a four-man General Electric panel presentation before a combined meeting of the A.I.E.E. and A.S.M.E. at the University on January 19.

R. D. Schilling visited the Bumstead - Woolford Company of Seattle, Washington on January 24, to observe the performance of a multi-point temperature monitor.

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HW-34631

Richland, Washington
February 7, 1955

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
JANUARY, 1955

I RESPONSIBILITY

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

II ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	<u>January</u>		<u>December</u>	
	<u>Normal</u>	<u>Acid Wash</u>	<u>Normal</u>	<u>Acid Wash</u>
Charges started in Canyon Bldgs.	97	2	92	1
Charges completed in Conc. Bldgs.	102	1	90	1
Special charges - Conc. Bldgs.	0		11	
Charges completed - Isolation Bldg.	160		418	
Average Waste Losses, %	3.67		4.01	
Special charges - Isolation Bldg.	12		32	
Material balance, %	105.5		108.2	
Yield through Process, %	101.8		104.2	
Average cooling time (days)	104		100	
Minimum cooling time (days)	60		88	

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b. Redox Operations

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WITH DELETIONS**

	<u>January</u>	<u>December</u>
Equivalent charges started	28.0	315.2
Charges completed	59.7	320.8
Tons Uranium delivered to storage	36.8	215.6
Average Production Rate per operating day, Tons	5.1	7.6
Average Daily Operating Rate for the month, Tons	1.2	7.0
Average yield, %		
Uranium	98.0	97.6
Plutonium	106.3	102.6
Total Waste Loss, %		
Uranium	0.88	0.37
Plutonium	2.01	0.66
Average cooling time, days	103	116
Minimum cooling time, days	97	69
Percent down time	77.0	9.0

c. 234-5 Operations

	<u>January</u>	<u>December</u>
Batches completed through Task II	26	168
Runs completed through Task III	37	166
Reduction yield, RM	97.4	97.3
Waste Disposal, units	0.5	2.1

d. UO₃ Operations

	<u>January</u>	<u>December</u>	<u>To Date</u>
Uranium drummed, Tons	110.75	269.95	8321.31
Uranium shipped, Tons	107.96	325.79	8318.52
Average cooling time, days (Redox)	115	116	
Minimum cooling time, days (Redox)	85	74	
Waste loss, %	0.2 Est.	0.1	

e. TBP Operations

	<u>January</u>	<u>December</u>	<u>To Date</u>
Tons received from Metal Removal	87.77	20.50	4807.02
Tons shipped to UO ₃ Plant	76.12	12.84	4647.85
Average Production Rate per operating day, Tons	4.45	4.18	
Average Daily Operating Rate for the month, Tons	2.46	0.41	

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e. TBP Operations (Continued)

	<u>January</u>	<u>December</u>
Average yield, %	101.04	96.61
Total Waste Loss, %	3.41	4.74
Ratio Actual Waste Volume to Theoretical	12.01	1.17
Percent Down Time	44.83	90.10

f. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	1 142	6 044
Filtered water pumped, gpm	528	915
Steam generated, lbs/hr	61 780	167 000
Maximum steam generated, lbs/hr	79 042	196 000
Total steam generated, M lbs.	45.969	124 266
Coal consumed, tons (est.)	3 106	7 463

g. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>January</u>	<u>December</u>
Metal Waste reserve storage capacity - T Plant	504	660
1st Cycle reserve storage capacity - T Plant	384	517
Metal Waste reserve storage capacity - B Plant	1095	1095
1st Cycle reserve storage capacity - B Plant	74	74
Redox Waste reserve storage capacity	1383	1 406

2. Activities

a. Redox Processing

A reduced rate necessitated by the long dissolver time cycles to remove the metal heels and loss of vacuum in the oxidizer, resulted in an average rate of 5 tons/day during the first eight days of the month, after which the extraction batteries were shut down and remained down for the remainder of the month while scheduled major repair and equipment changes were effected. Difficulties, such as operation of the 60 ton crane and extremely short time limits encountered during repair work, extended the shutdown to the end of the month. Operation was scheduled to be resumed processing low enriched uranium on or about February 3rd.

b. Metal Recovery

1) TBP Processing

Following the TBP outage as a result of the OOL-WR tank failure late in December, operations were resumed on January 2nd.

DECLASSIFIED1) TBP Processing (Continued)

Operating rates were limited to 3-4 tons per day by the capacity of the 6-1 feed stream concentrator. A spare 7-1 concentrator is being readied for parallel operation to increase capacity and this unit will be activated early in February.

2) UO₃ Processing

Operation of the UO₃ Plant was normal throughout the month with production being limited only by the availability of feed material. There were no unusual processing difficulties. Foaming was not a problem and radiation levels at the calcination furnaces remained at a level of 22 mrad/hr.

3) Waste Metal Removal

Sluicing operations continued to effect clean-out of the storage tanks containing heels of aged material (3.1 years). Cleaning operations in the 204-C tank were essentially completed and this tank should be ready for inspection during the coming month. It is forecasted that at a rate of 200 tons per month TBP will be able to operate a full year before the age of the uranium feed becomes one year or less.

c. Isolation and Metal Fabrication Processing

Production in the Isolation Facility was limited by the amount of feed material available from the Redox and T Plant facilities. In the Metal Fabrication Facility, the monthly commitment was completed early in the month and operations were curtailed for installation of the new Task III Reduction equipment.

d. T Plant Processing

Production exceeded the established schedule and new production records were established for metal dissolved, runs started and runs shipped. Efforts are being continued towards increasing the plant productivity, and an increase of the dissolving capacity by approximately 15 percent has been obtained by charging the dissolvers with 1050 slugs of metal instead of 840 previously charged.

3. Special Operationsa. Waste Evaporators

Operations in the 242-T Waste Evaporator were normal throughout the month. The 242-B facility remained in standby.

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a. Waste Evaporators (Continued)

<u>Evaporator</u>	<u>Feed Gallons</u>	<u>Bottoms Gallons</u>	<u>Concentrate Gallons</u>	<u>% Volume Reduction</u>
242-B	0	0	0	0
242-T	354 075	145 375	209 700	59.2%

b. Plutonium Recovery, Metal Fabrication

Recovery operations were suspended early in the month due to the shutdown of Redox facilities. Operations will remain suspended until after Recuplex start-up.

4. Schedule Variance

Redox production for plutonium and uranium was less than scheduled due to difficulties encountered in maintenance work, extending the length of the planned shutdown. T Plant established three new production records while exceeding the commitment by approximately 36 percent. The Section commitment for separated plutonium slightly exceeded the forecast. All commitments for the Isolation and Fabrication Facilities were met.

Uranium recovery production, hampered by limited evaporation rates in TBP and lack of Redox feed material, was slightly less than forecasted. Three carloads of UO_3 Powder were shipped in January.

B. Equipment Experience1. Operating Continuity

Redox down time totaled 23 days to effect major equipment changes and maintenance work.

TBP Plant operated at a reduced rate due to the limited capacity of the one first cycle evaporator.

Operations in the Isolation Facility continued throughout the month without interruption. Operations in Metal Fabrication were curtailed after January 11 to effect replacement of the Task III Reduction equipment.

Continuity of operations were not significantly affected by mechanical difficulties in T Plant. Reworking of high waste solutions and processing of flushes to recover product build-up in process equipment amounted to approximately three days lost production time.

2. Inspection, Maintenance and Replacementa. Redox Equipment Changes

The following major maintenance work was done during the planned shutdown of the Redox facility:

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a. Redox Equipment Changes (Continued)1) G. Cell

Extensive leaks around both the G-3 (organic still) tube bundle flanges were repaired. Considerable difficulty arose during this work. Failure of 4 studs on the west tube bundle and two on the east, hindered efforts to stop the leakage. Remotely installable "C" clamps were fabricated and placed on both tube bundle flanges to replace the broken studs. A gasket for remote installation had to be designed and installed on the west tube bundle as well as replacing the tube bundle before the leaks were finally repaired.

A new G-5 to H-3 (centrifuge feed) jet assembly was installed. This assembly contained parallel jets and control valves to permit back flushing either jet while the other is operating.

2) H Cell

Very low vacuum in the H-4 (oxidizer) tank was seriously hampering production rates and personnel safety at the time of the shutdown. The following steps were taken to eliminate this problem:

- a) A new vapor line (H-4 to H-5) was installed to replace the old one which had a leak in the expansion joint. This was the second vapor line jumper to fail at this point in the past three months.
- b) A new H-5 (ruthenium scrubber) recirculating pump discharge jumper was installed to correct a leak in a flange of the old jumper.
- c) A new H-4 tower was installed when efforts to unplug the old tower failed. The new tower was redesigned with a sixteen inch chevron plate section replacing the packed section of the column.

H-4 pot vacuum was much improved after making these corrections and its capacity is now estimated to be in excess of 9.5 tons per day.

3) J Cell

A new J-6 (Condenser vent) off-gas filter was installed and the discharge diverted into the sand filter via a new in-cell jumper and vent jet.

4) D Cell

The D-12 (waste concentrator) pot was replaced with a spare of similar design. Previous plans had called for replacement with

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4) D Cell (Continued)

the newly designed tube bundle type, however, it was decided to modify its design in order to eliminate the tube bundle gasket leakage problems encountered with its G-3 counterpart. Similar leakage in the D-12 position could not be tolerated.

A new D-13 (waste header receiver) to D-12 A jet had to be fabricated and installed when the installed jet became damaged in handling.

b. 60 Ton Crane - Redox

Almost four days of lost time during the shutdown were attributed to difficulties encountered with the operation of the 60 Ton crane. The major troubles were the impact wrenches and in the Reelite cables. Repair work was hampered by the extremely short time limits and approximately two and one half days lost time was encountered in decontaminating the crane so that maintenance work could proceed.

c. Failure of the Emergency Power Circuit - Redox

On January 22, 1955, all circuits connected to the 2300 volt emergency bus bar were out of service for approximately four hours due to the fact that the batteries which operate the circuit breakers during power outages had discharged to the point that there was insufficient voltage to operate the emergency main breaker. Primary source of the condition of the batteries was found to be a blown fuse in the line to the charging generator. An alarm circuit has been installed to warn operating personnel in the event that the battery voltage gets too low to operate the emergency main breaker.

d. Rerouting of Dissolver Vents - Redox

Fabrication of all lines and jumpers for diverting of the off-gas jet lines to the stack was completed. The tie-in will be made when canyon cell work permits reduction of air flow through the main ventilation system.

e. First Cycle Concentrators - TBP

Failure of the 6-1 feed evaporator to concentrate adequately has reduced the capacity through the first cycle operation in TBP. Investigation into the cause of the limitations has disclosed the need for sealing the condensate system from the condenser vent system and the possible need to increase the positive pressure seal in the vapor line seal pot. There was also a strong indication that the pressure drop across the condenser was excessive and at month end plans were made to replace it. Corrective action was initiated. In addition a spare 7-1

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e. First Cycle Concentrators - TBP (Continued)

concentrator is being prepared and the 7-1 concentrator is being renovated for the equipment installation during the coming month. Operation of the two concentrators in parallel will boost the production capacity significantly.

f. Luckey Pot #20 - UO_3

The Selas gas-fired calcination furnace pot #20 developed a leak early in the month. Inspection showed a similar condition to that of pot #19. Repairs consisting of dye checking, cutting out the failed portion and welding in a new piece will be done early in February.

C. Improvement Experience1. Process Tests and Revisionsa. Uranium Decontamination - Redox

The uranium produced prior to the building shutdown was of good quality and no decontamination problems were encountered.

b. Series Operations - TBP

Series operations to date have been satisfactory except for the low rate through the first cycle due to the limitations of the 6-1 feed concentrator. Second cycle has operated successfully at rates up to 8 tons per day. Decontamination through the two cycle operation has been excellent. Loss of uranium from the Section 8 inter cycle stripper overheads was high initially but was satisfactorily reduced by adding reflux to the column.

c. Pot Caking - UO_3

Caking in the electric calcination pots was rather serious, especially during the latter part of the month. Although one of the contributing factors was probably the increased metallic impurities in the pot feeds, it appears that the sulfamic acid addition is the major cause. A test program is currently in progress to determine if high reactivity ratio powder can be produced by using sulfuric acid as the pot additive in place of sulfamic acid. Preliminary runs are being made using 0.015, 0.030 and 0.050 weight percent SO_4 additions.

d. Waste Scavenging

TBP Plant wastes were scavenged according to the plans developed in the December meeting of Manufacturing, Engineering and Radiological Sciences, however no improvement in performance was noted. Studies which might improve existing results are being rigorously pursued.

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d. Waste Scavenging (Continued)

Based on samples of scavenged first cycle waste from T Plant, Radiological Sciences recommended cribbing of scavenged first cycle waste which did not contain coating waste. Equipment to separate the two wastes was installed, and routine scavenging of first cycle waste was initiated on 12-31-54.

2. Inventions or Discoveries

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

D. Events Influencing Costs

Although the number of personnel in the Separations Section increased by thirty-one and T Plant established a new production record, Separations costs are expected to reflect a decrease of approximately four percent from the December level of expenditures.

The decrease in costs is primarily due to the reduced essential materials requirements which is the result of the curtailed Redox production.

E. Plant Development and Expansion

1. Project Status

a. Project CA-513-A - Purex

Construction is approximately 94.3 percent complete, with a construction completion date now tentatively set as March 15. Completion of the Purex manuals and procedures is approximately 85 percent, with completion expected by March 1.

For a capacity factor of 1.5 times instantaneous design rate, Design Section determined that fourteen jumper changes and some "cold side" instrument changes would be required. It is planned to have the Project accomplish the necessary changes for the increase.

Deferment of the Ammonia Scrubber installation at Purex was recently agreed to by the Project Representatives in favor of extending the dissolver off-gas lines into the air stream of the stack. This has good promise of solving the ammonium nitrate particle problem.

b. Project CG-551 - 234-5 Expansion
Project CG-496 - Recuplex Installation

Removal of the old Task III equipment was completed without

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- b. Project CG-551 - 234-5 Expansion
Project CG-496 - Recuples Installation (Continued)

incident. Installation of the new equipment is progressing ahead of schedule. The March 1, 1955 "ready-for-use" date appears realistic.

Final Inspection facilities installation is proceeding satisfactorily. Relocation of Final Inspection equipment is to be accomplished during February.

Construction progressed satisfactorily during the month. The February 1, 1955, "ready-for-use" date has been changed as follows: Reception and Blending and Solvent Extraction equipment, February 20, 1955. Acceptance tests and equipment calibration will be started by February 15.

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

Due to procurement and construction difficulties, completion dates have been delayed slightly on some of the Phase II project. Work will be completed on the 233-S Concentration Building by Minor Construction on February 4, and the ready for operation date is now March 1. The completion date for the silica gel cell is now early April, one month later than formerly anticipated.

- d. UO₃ Expansion - Metal Recovery

The process flow scoping prints were presented to the Design Council and approved, however some revisions are necessary to allow for Uranium segregation. The decision was reached to employ continuous calciners to operate in conjunction with the existing equipment. A review of the production schedules shows the urgency of completing this program by December 1 and at month end work was in progress to expedite the design, procurement and construction phases of the project.

- e. 4X Program - Project CG-603

Scoping of the remaining work necessary for B Plant reactivation and T Plant modification on the basis as originally set down for this program was completed and the scope document forwarded to the Design Council for review and concurrence. At month end a few items as defined in the scope needed clarification and were being reviewed by a Manufacturing representative.

Location of cribs for disposal of supernate from scavenged waste was changed to conform to recommendations of the Radiological Sciences Department. The new location is south of the 200 East Area and will serve as a disposal area for both TBP and First Cycle scavenged wastes. This location provides ample room for installation of additional cribs.

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e. 4X Program - Project OG-603 (Continued)

Minor Construction essentially completed the necessary supporting facilities early in the month and began work in the canyon proper. The first "hot" work consisted of re-gasketing trench and cell jumpers at the Section 19-20 end of the canyon.

Requisitions for an estimated 75 percent of the equipment required for the reactivation program have been issued. To date centrifuges, reactrol units, and deep well turbine pumps appear to be the limiting equipment from a procurement standpoint.

2. Manufacturing Engineering

a. Standards

The essential materials standard for the Redox Plant was revised and published for the current process. The studies which have been completed on a revised labor standard for the Redox Operations Unit and on a new labor standard for the Plant Services Unit are being discussed with Plant supervision. Revised labor standards for the Metal Recovery Plant are 70% complete; Z Plant, 60%; and T Plant, 14%.

b. Work Simplification and Cost Reduction

Twenty-nine Separations personnel completed the second series of Work Simplification Round Tables this month. A preliminary audit of the results totals 34 proposals for improvements in the utilization of manpower/materials having an annual savings potential of \$176,000.

The third series of round table conferences is scheduled to start the first week of February.

The office records and reports study for the three General Maintenance Units was continued this month. Present records, reports and procedures are currently being analyzed in cooperation with the customer units.

The combined study of the methods and procedures of the T Plant dispatcher and switchboard operator is essentially complete. Further investigation of some items is proceeding. The elements of both jobs and the proposed changes have been discussed with T Plant Operations Unit. Indications are that considerable job simplification and substantial savings may result. A preliminary report is being prepared for circulation to supervision involved.

A study to determine the effect of scheduled processing in Z Plant on the availability of PR-RC containers was completed. Results show that (1) fifteen containers now assigned to the transfer of S Plant material should be reassigned to the transfer of T Plant

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b. Work Simplification and Cost Reduction (Continued)

material and (2) scheduled processing in the A Plant would not be limited by the present total supply of containers.

c. Engineering Assistance

Industrial Television - Redox: Work has started on testing and adjusting component parts. Some modification of equipment is required to meet operating conditions. Final assembly is scheduled by February 15.

Redox Ventilation Study - Cell Mock-Up Test 277-S: Shop work is approximately 95% complete. Tests are scheduled to start January 31, depending on weather conditions at that time.

Ventilation: The careful control of air flows during the ventilation modifications in 234-5 Building to accommodate the Task III installation has permitted normal building functions to operate safely. A preliminary balance of the new sample gallery hood vent system in 202-S was made to check installation features. The program of partially blanking off preheat coils, to gain humidity control and freeze protection, has been accomplished in 234-5, 231, 222-S, and 271-U. Ventilation operability tests for Purex Area were approved and distributed.

Cask Car Study: The study of cask car decontamination continued. Initial design of manually opened well lids is complete. Modification of an existing car will begin shortly after design approval is obtained.

d. Property Management

Fire Station Annex Replacement, 200-W Area: Due to the high cost of replacement and the anticipated short duration of need, it has been decided to renovate the existing building. A Work Order has been issued to apply shakes to the exterior of the building; remaining items are minor and fall into the class of normal routine maintenance.

Ventilation Units, 2101-M Building: A letter has been prepared requesting the Engineering Department to prepare a Project Proposal to renovate the ventilating units located on the exterior of the 2101-M Building.

Property Disposal: An estimate obtained from plant forces indicate the cost of \$18,000 to salvage the lumber in the 2713-WA Building (Old Spare Parts Warehouse). Burning in place is not feasible due to the proximity of utilities; removal to the burning ground would cost an estimated \$16,900. Consequently, it appears that every effort should be expended to dispose of the building to an outside contractor.

F. Reports Issued

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HW-34631

1. Routine

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-34879	Separations Section Redox Plant Sub-Section Monthly Report - January, 1955	R.T. Jessen
HW-34833	Separations Section Metal Recovery Plant Sub-Section Monthly Report - January, 1955	V.R. Chapman
HW-34877	Separations Section T Plant Sub-Section Monthly Report - January, 1955	C.T. Groswith
HW-34869	Separations Section B Plant Sub-Section Monthly Report - January, 1955	T. Prudich
HW-34848	Separations Section Z Plant Sub-Section Monthly Report - January, 1955	W.N. Mobley
HW-34859	Separations Section Analytical Control Sub-Section Monthly Report - January, 1955	L.M. Knights
HW-34864	Separations Section Radiation Monitoring Sub-Section Monthly Report - January, 1955	A.R. Keene
Official Use Only	Separations Section Projects & Personnel Development Sub-Section Monthly Report - January, 1955	O.V. Smiset
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - January, 1955	C.P. Cabell
HW-34807	Monthly Progress Report - Plant Expansion - Projects & Personnel Development - Separations Section - January, 1955	F.A. Hollenbach
HW-34255	Essential Material Consumption for T Plant Month of December, 1954	G.E. Cooper
HW-34256	Essential Material Consumption for TBP Plant December, 1954	G.E. Cooper
HW-34257	Essential Material Consumption for Redox Plant - December, 1954	G.E. Cooper
HW-34258	Essential Materials ordered January 1 to January 31, 1955	G.E. Cooper
HW-34259	Essential Materials Area Report to Cost and Purchasing, December 1 to December 31, 1954	G.E. Cooper
HW-34281	First Cycle Supernatant Ground Disposal	D.E. Peterson
HW-34412	Separations Section Waste Status Summary for December 1954	D.E. Peterson
HW-34635	Justification for Additional Waste Storage Tanks	D.E. Peterson
HW-34478	Separations Section Process Council Minutes	C.R. Anderson

2. Non-Routine

HW-34057RD	Basic Information for 231 Building Operations Unit - Direct Labor Standard	R.S. Himmelright
HW-34541RD	Essential Materials Standard for the Redox Plant	R.H. Silletto
None	Status of Projects, Informal Approval Requests, and Budget Items, January 1955	R.M. Shervem

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Separations Section

2. Non-Routine (Continued)

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-34276	Standard Physical Data for Calculation of Steam Standards for Precipitation Separations Process	W.G. Browne By A.E. Barber
HW-34549	A Decade of Progress in the Chemical Separations of Plutonium	W.N. Mobley
Non-Issue	Purge Gas Report #1 - Present Helium Requirement vs. Actual Helium Consumption in the 234-5 Bldg.	C.L. Brown
Non-Issue	Purge Gas Report #2 - Estimation of 1955-1957 Carbon Dioxide Needs for the 234-5 Bldg.	C.L. Brown
None	Redox Program and Study Plans	R.T. Jessen
HW-34386	UO ₃ Shipping Container Evaluation	C.R. Anderson R.E. Olson
HW-34627	Analytical Control Quality Report, January 10, 1955	L.M. Knights By M.J. Rasmussen
HW-34370	Laboratory Quality Control Program, January 7, 1955	L.M. Knights By D.F. Shepard
HW-34799	Radiation Incident, Class II, Number 87	A.R. Keene
HW-34862	Radiation Incident, Class II, Number 89	D.R. Koberg
HW-34483	Radiation Incident, Class I, Number 407	D.R. Koberg
HW-34863	Radiation Incident, Class I, Number 419	J.P. Corley

III PERSONNELA. Organization

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

B. Force Summary

	<u>Start of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Redox Plant Sub-Section	232	236	4
Metal Recovery Plant Sub-Section	278	279	1
Z Plant Sub-Section	183	180	-3
T Plant Sub-Section	206	207	1
B Plant Sub-Section	26	33	7
Power & Maintenance Sub-Section	333	335	2
Projects & Personnel Development	77	92	15
Analytical Control Sub-Section	158	157	-1
Radiation Monitoring Sub-Section	149	154	5
Section Total	1644	1675	31

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C. Safety Experience

There were no major or sub-major injuries in the Separations Section in January. At the close of the month, the Section had operated 456 days without a lost time injury.

D. Radiation Experience

Two Class II and two Class I radiation incidents occurred and included: (1) a localized exposure above the permissible limit to an employee who received clothing contamination while performing monitoring work in the T Plant canyon, (No. 87); (2) localized exposure above the permissible limit from skin contamination received by a crane operator in the Redox crane cab, (No. 89); (3) failure of an employee to monitor himself while taking electrode readings at a Redox waste catch tank (No. 407); and (4) exposure of an operator to a sampler blowback at the 241-TXR waste vault (No. 419).

Redox canyon and crane surfaces became badly contaminated from the H cell crane work during the shutdown. At month's end, the high surface dose rates of 10-20 rads/hr limited working time on the crane bridge to only a few minutes. Decontamination was sandwiched between necessary cell crane work at every opportunity. Canyon air contamination frequently was 100 times the normal level during operations, thereby requiring constant independent air supply protection.

The contamination on the canyon deck was so intense as to cause dose rates of 100-200 mr/hr through the canyon roof. Flushing the canyon deck reduced these levels by a factor of two.

A dramatic improvement in emission of particles from the Redox stack was noted since late December. No measurable fallout occurred around the Redox stack area. This was attributed to an aggressive water-flushing program in the old jets inlet mixing chamber, the adjacent duct and the bottom section of the Redox stack. Analyses of the 191-S catch tank indicated as much as 650 curies may have been washed from these surfaces.

Removal of the Task III process hoods in 234-5 was accomplished with excellent control of contamination. This work presented a high potential for exposure of personnel to surface and airborne plutonium. Excellent planning was very effective in achieving desired control during removal and burial of the hoods.

E. Personnel Activities

1. Personnel Programs and Training

GE Selection Program evaluation was completed for four Separations Section personnel. Sixteen exempt persons completed Supervisors Safety Training program, thirty-one attended Purex Training program, and thirty attended the fourth Information Meeting for first line

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Separations Section

1. Personnel Programs and Training (Continued)

supervisors. Fifty-four non-exempt people attended the various training programs presented for Separations Section personnel. Twenty Instrument people are enrolled in the nine weeks Instrument Training Program, and twenty welders are attending Welding Instruction Program.

2. Visitations

W. N. Mobley attended a planning conference at Albuquerque, New Mexico from January 18 to 24.

R. A. Kennedy made an inspection trip to Western Gear Works in Seattle to expedite delivery of Redox type electrical connectors.

Messrs. K. C. Vint, B. C. Wing and John Conley of the General Electric Company ANP Department (Arco, Idaho) conferred with Metal Recovery Plant supervision and examined equipment in the weeks beginning January 10 and 17. They specifically sought experience and answers in the following fields:

- a. Operating, maintenance and decontamination experience on waste evaporation.
- b. General decontamination work and procedures as practiced.
- c. Remote maintenance experience and procedures.

Dr. C. H. Ice of the DuPont Savannah River Project spent January 26 discussing analytical problems with D. F. Shepard of the Methods Unit.

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HW-34631

February 1, 1955

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

January, 1955

ACHIEVEMENT

Operating Experience

Power Statistics (see last page for details)

Plant Contract

Probable time of January Peak demand . . . 6:00 - 6:30 a.m., 1-4-55
Probable peak demand for January 139,000 KW*
Comparative peak demand for December . . . 115,000 KW*
Billing Demand for January 159,000 KW

*As indicated by telemeter

For the first time since May, 1954, a new process load peak demand was established when 100-KW started up. However, as noted above, the billing demand for January will be the Contract demand figure (159,000 KW) as it is the greater; a difference of some 20,000 KW between the measured demand and the Contract demand.

Test Power Contract

This Contract was cancelled at midnight, January 31, 1955. A summation of the total savings accrued from the application of this Contract will be made when the final power bills are received.

* * * *

BPA System

On January 13, for a period of about one-half hour prior to 7:33 a.m., swings of system voltage of 2 to 3 KV and frequency to 60.4 cycles occurred. The cause was due to icing conditions on the Coulee-Spokane #3 and #4 lines.

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At 9:48 p.m., January 1, 1955, the 66 KV circuit breaker at the Hanford substation which supplies 66 KV power to White Bluffs and 100-K Temporary Construction substation relayed out and after one reclosure attempt, again opened. The line and facilities were patrolled without any indication of trouble. The breaker was closed manually at 1:49 a.m. and held. No further indications of trouble have subsequently developed and it is assumed the unknown cause of the fault cleared itself.

* * * *

On January 14, a truck operated by Minor Construction forces in 100-D ran into a pole which carries the double circuit 13.8 KV 100-D-100-H tie line. It was necessary to replace a broken crossarm and (5) insulators. The lines did not short circuit.

* * * *

There was no production loss occasioned by action of the Section during the month.

* * * *

Equipment Experience

At 11:05 p.m., January 12, a 2300 V aerial disconnect switch in the 300 Area distribution system was reported to be arcing. The switch was isolated by switching load to other lines and repairs made the following day. No load was dropped.

Events Influencing Costs

Overtime hours expended were approximately 1.6% of total hours worked.

* * * *

Attendance for the month was 98.84%.

* * * *

Plant Development and Expansion

User responsibilities of the 13.8 KV facilities in 100-KE were assumed by the Section at 4:30 p.m., January 4, 1955.

* * * *

Project CG-558--During a down period of 105-B on January 4 and 5, 13.8 KV supply lines to 190-B, 181-B, and 105-B were taken out of service while Minor Construction forces performed work on the lines.

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ORGANIZATION AND PERSONNEL

Force Summary

	<u>January</u>
Exempt personnel	16
Dispatchers	5
Electricians	12
Linemen	23
Substation Operators	29
Secretary	1
Stenographer	1
Clerk	1
Storekeeper	1
Draftsman	1
	<u>90</u>

No change during the month.

Safety Experience

One minor injury occurred.

This injury was sustained when a lineman stepped out of a truck onto icy snow; slipped and fell on a rock, striking himself in the groin. The incident occurred at a remote location along the 230 KV line while the man was making routine patrol inspection. Prompted by the incident, personnel performing similar duties alone now are required to report their location and direction of travel periodically by radio.

Radiation Experience

No incidents were reported.

Personnel Activities

At the monthly informative meeting the writer reviewed the Section's performance and activities during 1954.

* * * *

Meetings were conducted by Separation's R.M.U. in order to better acquaint Section craftsmen with the procedures and responsibilities associated with contamination problems within our areas of work. The meetings were well conducted and well received.

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Two representatives of the State Department of Labor and Industries gave a demonstration on pole top resuscitation methods for the benefit of Section craftsmen. The practice is not new to our activity, however, due to the demonstrator's evident competency and skill, the results were quite good.

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POWER STATISTICS
ELECTRICAL UTILITY SECTION
FOR MONTH ENDING JANUARY 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)	25950	26350	46300	45900	75.3	77.1
A-4 Out (100-D)	15840	17040	24708	25400	86.2	90.2
A-5 Out (100-H)	11320	9910	16500	16350	92.2	81.5
A-6 Out (100-F)	8560	8790	14200	13300	81.0	88.8
A-7 Out (100-KW)	2880	4752	9000	47500	43.0	13.5
A-8 Out (200 Area)	6240	6150	9800	10500	85.6	78.7
A-9 Out (100-KF)	5808	4224	46000	46000	17.0	12.3
TOTAL OUT	76598	77216	166500**	204950**	61.8	50.6
MIDWAY IN	77698	78114	143200*	148000*	72.9	70.9
115 KV System						
BB3-S4 Out (300 Area)	2416	2448	4360*	4440*	74.5	74.1
66 KV System						
B9-S11 Out (100-K)	288	210	800*	480*	48.4	58.8
B7-S10 Out (W. Bluffs)	360	393	1102*	1035*	43.9	51.0
Hanford Out	58	61	300**	300**	26.0	27.3
TOTAL OUT	706	664	2202**	1815**	43.1	49.1
HANFORD IN	749	633	1800*	1700*	55.9	50.1
Project Total						
230 KV Out	76598	77216	166500**	204950**	61.8	50.6
115 KV Out (300)	17500	2448	36425**	4440**	64.6	74.1
66 KV Out	706	664	2202**	1815**	43.1	49.1
TOTAL OUT	94804	80328	205127**	211205**	62.1	52.1
230 KV In	77698	78114	143200*	148000*	72.9	70.9
115 KV Out (300)	17500	2448	36425**	4440**	64.6	74.1
66 KV In	749	633	1800**	1700**	55.9	50.1
(1)TOTAL IN	95947	81195	181425**	154140**	71.1	70.8

*Denotes Coincidental Demand

**Denotes Non-Coincidental Demand

(1)Includes 100-K metered test power

Average Power Factor - 230 KV System 89.

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MANUFACTURING DEPARTMENT
PURCHASING AND STORES SECTION
MONTHLY REPORT FEBRUARY, 1955

I - Responsibility

Custody and accountability of the material to be held in the Special Equipment Held for Future Use account has been assigned to the Spare Parts Unit. This account includes various tools, jigs, fixtures, and precision instruments that are required for construction of graphite reactors. The large or bulky items will be warehoused in the Automotive and Downcomer Shops at White Bluffs and the small items and instruments warehoused in 2101 building, 200 East area. Necessary man power to warehouse the material will be furnished by Kaiser Engineers and the stock records will be established by this Unit. Kaiser Engineers will also perform other services as required.

Effective February 1, 1955 the Stores Sub-Section will become responsible for the 101 Building at Hanford which will be used for storage of contaminated equipment presently warehoused in the Ice House at White Bluffs.

II - Achievement

Purchases of excess stocks from Kaiser Engineers did not approach our estimate. When completed these purchases should total approximately \$60,000.

The Commission is considering the retention of some \$300,000 worth of Kaiser's automotive parts which Stores would maintain for about two years in order to utilize as many of these parts as possible on the Project. Since it isn't firm as to how many pieces of equipment will be kept in the motor pool, the Commission feels that it would be costly to sell these parts now. The expense of maintaining this inventory would not be included in the costs normally liquidated by a handling charge.

Although the work load in General Supplies increased due to heavy disbursements and receipts of material from Kaiser, issues to the field are current.

In January an increase of 1415 shipments of material were received over December 1954 resulting in 260 more receiving reports. Despite this increase Receiving operations are current.

The purchase of a marking machine for identifying stainless steel is being considered. Much of the color coding in the past has been unsatisfactory because of the methods used. Coding with paint sticks has been found to be semi-permanent while coding with paint or lacquer has been expensive and sometimes confusing as a standard for each color has not been established. If the marking machine is satisfactory, heat number, type and corrosion results can be printed with permanent ink on the steel.

Activity in Spare Parts during January reached what is believed to be an all time high with 1694 store orders processed amounting to \$148,000.

Achievement (Cont.)

The spare parts status report requested by Separations Section was submitted January 31, 1955. This report includes on hand, on order, delivery data and other information pertaining to critical or essential operating items for the 200 Areas.

The first Spare Parts Catalog was issued January 12, 1955. Two more catalogs are nearing completion.

Supervision in the 100-F and 100-H Areas were advised that the Area Stores in those locations would be closed effective February 7, 1955. Direct deliveries from Central Stores will replace the Area Stores.

Status of Essential Material Contracts being processed:

- a. Nitric Acid - Supplemental contract approved by vendor and G. E. and sent to A.E.C. for approval.
- b. Caustic Soda - Two contracts have been approved by the Commission and are in force.
- c. Liquid Aluminum Sulphate - Discussion with the Commission resulted in approval of the award to General Chemical Div., Allied Chemical and Dye Corporation, on a one-year, rather than a three-year basis.
- d. Sodium Dichromate - Requirements were received from the field, and requests for quotation have been prepared and sent out.
- e. Dry Aluminum Sulphate - Requirements were received from the field and requests for quotation prepared and sent out.

A meeting was arranged with eight Power representatives, one from each of the areas, and J. M. Fox, Jr., Plant Metallurgical Engineer, to discuss with Dr. G. H. Rohrback of the Crest Research Laboratories, Inc., condensate return line corrosion problems which were costing us approximately \$75,000 per year. Dr. Rohrback recommended use of certain chemicals and a special probe method of corrosion detection rates, which were very well received by our plant personnel. A requisition is presently being written to obtain the chemicals and the measuring devices to permit evaluation of Dr. Rohrback's materials and methods.

The Purchasing Liaison Unit has expended considerable effort developing the total procurement picture involved in the LX Program. This has been of value both to Purchasing and to the various groups involved in the requisitioning of material and supplies, as effective work can be done toward obtaining requisitions for long-delivery items and other critical components.

Previous dry cleaning and laundry requirements for police and firemen uniforms have been handled by purchase orders - four per month based on the lowest of bids solicited once a year. This is being changed to supply contract and bids have been requested, covering the period from April 1, 1955, to October 31, 1956. This will allow the expiration of this proposed contract to coincide with the current contract for dormitory and hospital laundry work, and, in the future, will allow all these items to be combined into one contract.

Achievement (Cont.)

The penetration etch machines, cap and can cleaning machines and sleeve cleaning machines purchased from the Udylite Corp. did not meet the performance specifications when they were set up in the 300 Area. Negotiations are now in progress with Udylite to get the operating difficulties corrected.

Supply Contract SO-5 was issued January 14, 1955, to the Lummus Corporation, covering the design of an acid fractionator at a fixed price of \$33,100. The contract also included an accounting formula to be used as a basis for negotiating a fixed price for fabrication after the design is completed.

Service Metal Fabricators Company presented a claim in the amount of \$15,190, which they contend is due them because of Engineering difficulties encountered in manufacturing an alpha monitor assembly on our order HWC-6665. The claim is presently being evaluated by our Engineering Department.

STATISTICS

Traffic Unit

	January 1955	Sept. 1, 1946 to Date
Savings		
Rate Reductions	\$ 3,555	\$ 1,786,977
Freight Bill Audit	1,460	135,715
Loss & Damage & Overcharge Claims	582	142,917
Ticket Refund Claims	243	44,412
Household Goods Claims	73	17,715
	<u>5,913</u>	<u>\$ 2,127,736</u>

Work Volume

Travel Requests	152
Reservations Made	400
Expense Accounts Checked	167
Shipments Traced	36
Quotations Furnished - Rates & Routes	569
Freight Bills Approved	727
Amount	\$308,540

<u>Carload Shipments</u>	<u>CMSTR&P</u>	<u>NP</u>	<u>UP</u>	<u>Total</u>
Inbound	309	164	431	904
Outbound	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
	309	164	431	904

Stores Sub-Section

	Inventory Account	
	General Supplies	Spare Parts
Store Orders processed	29,309	1,694
Value of issues by store order	\$325,752	\$148,024
Value of cash sales	\$ 442	
Value of payroll deductions	\$ 2,793	
Total Value of disbursements	\$328,987	\$148,024
Line items in account	28,746	26,095
Back orders on hand	354	350
Out of stock items	224	316
Percent of line items out of stock	.8	1.2
Shipments received	7,651	
Receiving Reports Issued	5,547	
Excess Material & Equipment		
Received	\$237,361	
Issued for project use	\$225,812	
Shipped off-project	\$ 77,107	
Revenue from scrap & surplus sales	\$ 4,239	
Requisitions Screened	2,511	
Items Furnished	528	

Purchasing Sub-Section

Requisitions	On Hand 12-31-54	Received	Placed	On Hand 1-31-55
General Supplies Unit	571	2,009	2,011	569
Process Equipment Unit	290	447	498	239
Essential Material Unit	12	29	33	8
A.E.C.	249	497	475	271
Total	1,122	2,982	3,017	1,087
Number of Purchase Orders Placed	HW	HWC	Total	
General Supplies Unit	1400	326	1726	
Process Equipment Unit	374	109	483	
Essential Material Unit	28	-	28	
Local Purchase	52	1	53	
Total	1854	436	2290	
Value of Purchase Orders Placed	HW	HWC	Total	
General Supplies Unit	\$ 334,256.94	\$ 190,549.56	\$ 524,806.50	
Process Equipment Unit	260,091.70	691,322.91	951,414.61	
Essential Material Unit	704,458.12	-	704,458.12	
Local Purchase	442.49	10.75	453.24	
Total	\$1,299,249.25	\$ 881,883.22	\$2,181,132.47	

Purchasing Sub-Section (Cont.)

<u>Purchase Order Alterations Issued</u>	<u>HW</u>	<u>HWC</u>	<u>Total</u>
Number	119	43	162
Gross Value	\$ 64,941.47	\$ 48,398.16	\$ 113,339.63

<u>Expediting</u>	<u>HW</u>	<u>HWC</u>	<u>Total</u>
Orders on hand 12-31-54	1,827	419	2,246
Orders received	1,768	445	2,213
Orders completed	1,843	402	2,245
Orders on hand 1-31-55	1,752	462	2,214

III Organization and Personnel

<u>Force Summary:</u>	<u>12-31-54</u>	<u>1-31-55</u>	<u>Change</u>
Employees on roll	267	262	-5

Safety Experience: A study is being made on the feasibility of installing an overhead hoist in Receiving to be used in unloading equipment beyond the capacity of the electric lift trucks. There are unsafe practices being currently used in unloading such items from carrier trucks. A monorail type hoist could be installed in one of the truck bays and the heavy equipment could be unloaded safely at this point.

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TRANSPORTATION SECTION
MONTHLY REPORT
January 1955

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Transportation Section personnel forces increased from 486 to 487 by two new hires, two transfers in, one reactivation - personal illness, two terminations, one transfer out, and one deactivation - personal illness.

Bus operations and other transportation services were provided on satisfactory schedules throughout the month despite several periods of inclement weather. Ice and snow control required approximately 1000 man-hours of which 663 were overtime. Special emphasis was placed on sanding operations immediately before the heavy day shift traffic when icy conditions were more prevalent. Road conditions contributed to a number of vehicular accidents, although no serious injuries were sustained. Two Patrol sedans and one carryall were damaged beyond economical repair.

Meetings have been held with representatives of the Engineering and Financial Departments relative to the recent request of the Commission that the General Electric Company assume management responsibility for a consolidated pool which would contain some 600 pieces of primarily construction type equipment. Basic problems of a procedural nature involving the budgeting of replacement equipment and the handling of depreciation are under advisement. It has been generally agreed that the establishment of such a pool would result in economies while offering other advantages to the Plant.

Prepared personnel and overtime forecasts with supporting narrative justifications for the FY 1956 and FY 1957 Operating Budgets. Revised personnel estimates at 6-30-55 total 512 or nine less than provided for in the FY 1955 Midyear Budget Review.

Development of requirements for the FY 1956 and FY 1957 Equipment Budgets is in progress. Letters requesting information on additional units have been sent to Plant organizations. Vehicle fleets are being surveyed to determine replacement needs.

Landlord responsibilities for the new Consolidated Transportation Facility were fully assumed on January 3 with the development of operational procedures, revised cost system, and the transfer of budgeted funds for the last half of FY 1955. Devised a format for the recording of landlord expenditures which should facilitate cost control and the preparation of the annual landlord report. Prepared a summary of the maintenance costs for November and December on the 1171 Heating Plant. Discussions have been held with the Administration Area Maintenance Sub-Section, the Commission, and vendor's representatives regarding the inadequate performance of the heating plant and the resultant abnormal maintenance requirements. Negotiations are still in progress with the Commission regarding a work order to cover the above normal expenditures.

Received the final status report on the physical inventory of Road Materials (0420-930) which was accomplished on November 4. The physical inventory value exceeded the reconciled book value by \$1,467; however, this represented a variance of only 1.4% on the \$104,083 of material consumed since the previous physical inventory. No book adjustment was made for the overage inasmuch as the established unit costs are average rates for the year and minor fluctuations from seasonal factors are expected.

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Transportation Section

The annual physical inventory of Fuel and Lubricants (0450-950 thru 956) has been scheduled for February 10. Representatives of the Inventory Accounting Unit and the Transportation Section are making a pre-inventory tour on January 31 and February 1 preparatory to the development of the detailed procedure. Arrangements will be much the same as last year except for changes in locations, some transfers from inventory to shop supplies, and different financial representatives.

The final status report covering the physical inventory of Automotive and Heavy Equipment Parts (0420-931), Railway Equipment Parts (0420-932), and Antifreeze (0420-933) is still in preparation. Reconciliations have been generally completed and discussions are in progress with the Inventory Accounting Unit on the variances.

Furnished information relative to the cost accounting system and records on equipment maintenance to Mr. Shalin of the Commission in connection with the Form 82 Report.

The 100-K Area Garage was activated on January 10 with the assignment of one Auto Mechanic Journeyman and one Lube and Tireman from existing forces at the new Consolidated Transportation Facility. The much improved working conditions and specialized shop equipment are resulting in numerous efficiencies and savings. The work order to Kaiser Engineers for servicing Patrol vehicles in the 100-K Area has been closed.

Effective January 17 operation of the service station at the new Consolidated Transportation Facility on the No. 1 Shift was discontinued. This action followed a study which disclosed that the low volume of fuel disbursements during this period could be made at other times, with emergency service being rendered from the nearby 1171 Shops where personnel are always on duty. The Pump Attendant made available by this change was utilized to fill a vacancy as a Serviceman.

Effective January 10 train crew strength was reduced from four men to three men. This change coupled with the addition of one employee and one replacement permitted the establishment of full seven day shift coverage for railroad process service. The new operating arrangement is far superior in all respects and will result in a net annual savings of about \$14,000 from reduced overtime requirements plus being able to handle a greater number of process movements.

The audit of motor pool operations was issued by the Auditing Section on January 27, 1955. The report stated that the operations audited were satisfactory. Transportation Section personnel provided informational assistance and participated in the formulation of recommendations.

Completed the installation of a fueling station in the 200-West Area for servicing locomotives engaged in railroad process service. Fueling operations have been performed on an overtime basis from a tank truck since the move from Riverland.

Commercial rail traffic during January decreased by 7.29% over December as receipts of construction materials continued to lessen. The following recapitulation indicates the distribution of commercial cars handled:

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Transportation Section

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<u>Carload Movements</u>	<u>- Loads In</u>	<u>Empties In</u>	<u>Loads Out</u>	<u>Empties Out</u>
General Electric Company	987	4	2	955
AEC	2	0	0	2
AEC - Kaiser (cement)	7	0	0	4
Blaw-Knox	10	0	0	11
Kaiser Engineers	2	0	0	2
Lord Mechanical	1	0	0	1
Thorne & Marble	1	0	0	1
U. S. Army	<u>27</u>	<u>1</u>	<u>1</u>	<u>27</u>
	1,037	5	3	1,003

Railroad process service during January decreased by 41.46% over December due to production difficulties at the Redox Facility.

Special movements of vessels from the 272-East Shop to the Purex Facility were continued and should be completed in February.

Switching service is being provided for the removal of certain equipment from the 221-B Building.

Railroad car movements including process service totaled 2,288 in January compared to 2,683 in December.

The Plant Bus System transported 11.05% more passengers in January than in December. This is an increase of 5,961 passengers over November which was the previous high since February 1954. The following statistics indicates the magnitude of service rendered:

Passenger Volume	160,501
Revenue - Bus Fares	\$ 8,025.06
Earnings - Transit Advertising (December)	\$ 87.32
Bus Trips	7,332
Bus Miles - Passenger Carrying	206,801
Passenger Miles	5,327,244

Special bus service was provided on January 14 for a tour of the 300 Area by an advisory committee on biology and medicine.

Completed the revision of dash heaters on the twenty-two 53-passenger coaches to improve heat distribution and ventilation.

The Richland Bus System transported 7.5% fewer passengers in January than in December. This is a return to normal patronage following the Christmas shopping season. The following statistics indicate the volume of service rendered:

Total Passengers Including Transfers	12,016 ✓
Revenue - Bus Fares	\$ 730.11
Earnings - Transit Advertising (December)	\$ 3.97
Bus Trips	1,011
Bus Miles - Passenger Carrying	5,358
Passenger Miles	30,021

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Transportation Section

Eight former evacuation buses are being made ready to replace a like number of high mileage units now being utilized by the Richland Bus System and the 700-300 Area Shuttle Service. The replaced units will be excessed.

Off-Plant chauffeured automobile trips (Company business and/or official visitors) totaled 169 which were rendered to the following locations:

Benton City, Washington	13
Grandview, Washington	2
Hinkle, Oregon	20
Kennewick, Washington	21
Mabton, Washington	3
Pasco, Washington	66
Pendleton, Oregon	13
Prosser, Washington	5
Sunnyside, Washington	7
Walla Walla, Washington	2
West Richland, Washington	2
Whitstrand, Washington	1
Yakima, Washington	14

Statistics on fuel distribution for January are not available since the period is being extended to the annual physical inventory on February 10.

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

Motor Overhauls	55
Class A Inspections and Repairs	87
Class B Inspections and Lubrications	1067
Weekly Inspections - Fuel Trucks and Off Plant Vehicles	25
Semimonthly Inspections - Buses	162
Monthly Inspections - Railroad Rolling Stock	15
Visualiner Inspections	88
Other Routine Maintenance Repairs and Service Calls	1809
Accident Repairs and Paint Jobs	44
Tire Repairs	491
Wash Jobs	175
	<u>4,018</u>

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

<u>Code</u>	<u>Type</u>	<u>No. of Units</u>	<u>Total Mileage</u>
1A	Sedans	338	606,876
1B	Buses	137	256,711
1C	Pickup Trucks	436	267,290
1D	Panel, Carryall, Sta. Wagon	169	167,421
1G	Jeeps	2	863
1H	Power Wagons	50	24,869
68 Series	Trucks	215	102,202
		<u>1,347</u>	<u>1,426,232</u>

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Transportation Section

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

Five welders, five compressors, one motor patrol, and one motor crane were acquired from Construction and readied for replacement service.

Stabilized the sand dune blow area north of the new Consolidated Transportation Facility with 7,000 cubic yards of pit run gravel requiring 1,016 man-hours. This material was spread over an area of approximately ten acres. During periods of high wind the sand and dust constituted a serious safety hazard on the nearby railroad and roads.

The decontamination of grounds and surfaced areas in the 200-West Area continued throughout January requiring 400 tons of asphaltic pre-mix, 400 cubic yards of crushed aggregate and 330 man-hours. An additional 200 contamination control signs were erected in the 600 Area.

Maintenance of Plant roads, excluding snow removal, and the production of road aggregate materials required 701 man-hours.

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

	<u>MC 3</u>	<u>Mc 5</u>
Stock at Start of Month	43.14	23.89
Received During Month	31.27	0
Used During Month	17.8	0
Stock at End of Month	56.61	23.89

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

	<u>3/4" to 0</u>	<u>1/4" to 0</u>	<u>5/8"</u>	<u>1/4"</u>	<u>3/4"</u>	<u>2" to 3/4"</u>
	<u>Pre-mix</u>	<u>Pre-mix</u>	<u>Chips</u>	<u>Crushed</u>	<u>Crushed</u>	<u>Railroad</u>
	<u>Tons</u>	<u>Tons</u>	<u>Cu.Yd.</u>	<u>Rock</u>	<u>Rock</u>	<u>Ballast</u>
				<u>Cu.Yd.</u>	<u>Cu.Yd.</u>	<u>Cu.Yd.</u>
Stock at Start of Month	408	373	1,775	1,283	771	1,855
Made During Month	0	384	0	0	0	0
Used During Month	0	61	0	245	31	1,855
Stock at End of Month	408	696	1,775	1,038	740	0

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ENGINEERING DEPARTMENT

JANUARY 1955

SEPARATIONS TECHNOLOGY SECTION

Series operation in the Metal Recovery Plant was found satisfactory from a process standpoint with decontaminated uranium having fission product gamma activity below that of natural uranium.

Following 300 hours of demonstrated operation, technical specifications for a plant-scale continuous calciner were forwarded to the Design Section. Based on these and the performance data obtained during the test period the decision was made to continue the design scope on the original assumed basis that the continuous units would be satisfactory for plant application.

PILE TECHNOLOGY SECTION

In the examination of slugs retrieved from KW reactor, the presence of UAl_3 and UAl_4 has been positively determined employing X-ray diffraction techniques. An examination of the slugs from tube 4669 indicates that the slugs #1-10 were undamaged. Slugs #11-15 suffered melting of the uranium. In slugs #16-24 the uranium and aluminum had been cast into a continuous mass. Slugs #25-34 had the jackets missing, but the uranium was in comparatively good shape. In slugs #35 and 36 the jackets were misshapen, and slugs #37 and 38 were in satisfactory condition. The slugs were placed in the pile with #1 at the upstream end of the charge. Analysis of the diffusion products on one slug indicated the composition to be approximately 70% uranium, 20% aluminum, and the balance silicon.

Holes were observed in the process tube at positions 17, 19, and 31 feet from the front face. The entire process tube had melted in two spots 19-1/2 and 27 feet from the front face. No evidence of melting of the process tube occurred up to 17 feet or downstream from a position 36 feet from the front face.

Two failures occurred of hot press canned, nickel-plated uranium slugs at approximately 500 MWD/T and three failures of unbonded (C process) canned uranium slugs at approximately 250 MWD/T. Radioactive gases came from all five in the basin. This has not previously been observed with uranium. Failure causes are not as yet well evaluated. The tube of internal-external cooled slugs has reached 120 MWD/T.

The results of the exponential experiments have led to an equation which should accurately predict the critical buckling of a reactor, if the dimensions and neutron absorbing quality of all components are known. In applying this equation to the KW reactor, the greatest uncertainty appeared to be in the KW graphite "quality." If Test Pile figures for the "quality" were used, the calculated bucklings were 4-6 microbucks high of the measured values; if KW diffusion length measurement figures were used, the discrepancy was less than the assigned uncertainties in the measurement (+ 2 microbucks). Therefore, the agreement may be described as fair to excellent depending on the graphite "quality." A summary report of the calculation, HW-34643, has been issued and a detailed report is in preparation.

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A successful demonstration of in-pile boiling was conducted in the 100-H recirculation loop. Stable boiling was obtained for 80 minutes under conditions of 8 percent steam quality at 300 psi and 223 C, or 435 F. This temperature is a new high for the exposure of standard aluminum slugs at Hanford. Normal operating conditions for this loop are liquid phase at 200 C. The primary value of the boiling experiment is the demonstration of boiling stability under in-pile conditions.

The operation of the D Pile under a production test to evaluate the use of 65 percent helium with 500 C graphite temperature was initiated during the month. Concurrent with this test the D Pile power level is about 15 percent above a base point established by process specifications. Careful study is being made of graphite stack distortion while operating under these conditions.

Rod effectiveness tests from KW startup indicate that the available safety control falls short of complying with original design criteria. Coupled with the larger than anticipated reactivity effect of water, action may be necessary to provide additional safety control.

Performance of the sub-critical monitor at DR was again shown to be satisfactory and action has been taken to initiate on-pile installation at all piles.

KW Pile in the vicinity of 4669 and through the adjacent vertical rod channels was shown to be clean of large lumps of uranium with the special gamma scintillation counter having a locating sensitivity of 0.1 cm³ of U within 1 inch. The vertical traverses showed that a large percentage of the integrated power developed in KW to date was concentrated in the bottom portions of the pile.

DESIGN SECTION

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

	<u>Total Effort</u>
Design Development Programs	26%
1952 Hanford Expansion Program	16%
Reactor Plant Modification for Increased Production	17%
4-X Program	11%
1706-KER Recirculation Facilities	5%
Other Projects and Design Orders	25%

Total design for Project CG-558 Reactor Plant Modification for Increased Production advanced on schedule to 58% complete. Scope design is 100% complete and detailed design 52% complete. The major design effort during the month included the preparation of bid packages for Phase I contracts for the 190-B Building annex and for the 190-D Building annex.

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Engineering Department

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Design of the 1706-KER facility moved ahead on the basis of the modified scope. Detail design is 86% complete and is being expedited in an attempt to complete design on schedule.

Status of design progress is as follows:

	<u>Design Scope</u>	<u>Detailed Design</u>
CG-599 - 4X Program - 100 Area	75	60
CG-603 - 4X Program - Bismuth Phosphate Plant	98	46
CG-613 - 4X Program - Metal Conversion Plant	73	1
CG-614 - 4X Program - 300 Area	85	-

Reactor design development activity continued on the investigation of a water wall concept as a means of transferring a coolant supply in and out of the reactor. Also under study is an improved gas system for simplified and more efficient reactor cooling and drying. Analysis of present reactor shielding data is continuing in an effort to develop more efficient and improved shielding materials and methods for application to new reactor designs.

Separations design development work included further study of the Redox Plant contamination problem. Preliminary scope was completed for Redox In-Cell Ozonization Facilities and for Inert Gas Blanketing of process vessels. A preliminary study of feasibility and cost of donversion of the TBP Plant to a thorium separations facility including facilities for recovery of acid and source material was completed.

Preparation of an engineering feasibility report covering the installation of a gas-cooled irradiation test facility for the GE-ANP fuel element testing program was started. Funds were authorized for a similar study to include a proposed pressurized water-cooled irradiation test facility for the Westinghouse Atomic Power Division.

PROJECT SECTION

<u>Project No.</u>	<u>Title</u>	<u>Completion Scheduled</u>	<u>Actual</u>
CG-496	Recuplex	91%	91%
CA-512	100-K Area Facilities		
	KW - Water Plant	100	99.9
	Reactor and Building	100	99.9
	KE - Water Plant	100	99.8
	Reactor and Building	100	99.2
	General Facilities	100	99.6
CA-513-A	Purex Facilities, Part "A"	100	95.9
CA-514	300 Area Expansion	61*	61*
CG-535	Redox Capacity Increase, Phase II	95	91
CA-546	Fuel Element Pilot Plant	50	50
CG-558	Reactor Plant Modifications	4	3
CG-603	Hanford 4X - Bismuth Phosphate Plants	3	3

* Percentage according to latest revision of project proposal

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Inspection was completed on 257 orders, which with 125 newly assigned orders leaves the total number requiring inspection at 393.

Extensive work was done toward rehabilitation of 105-KW Reactor. Penetration through the biological and thermal shielding was completed January 20, and Technical Section assumed responsibility for removing the graphite stringer. On January 27, Project Section assumed responsibility for re-assembling the reactor. The 100-KE Water Plant buildings were accepted for operation on January 28, with specific exceptions. Beneficial use of 105-KE reactor was expected between February 5-9, 1955. Over-all completion of acceptance testing was about 90%, and 60% of the acceptance tests have been signed. Adjustments and calibrations are being made, and punch list items are being cleared. At Building 1706-K, acceptance tests were started on electrical systems and pumps. Progress at 1706-KER consisted of placing forms, steel, and concrete for walls and roof slabs.

Negotiations were continued with Electric Boat Company on engineering features of the two spare Purex concentrators. Major equipment installation was completed in Cells "A," "B," "C," "D," "F-2" and "M," making over-all installation of vessels and engineered equipment about 87% complete. Process jumper fabrication progressed to about 93% complete, and installation was over 50% complete. The following portions of Purex Facility, Part "A," were considered complete: 203-A Storage; 211-A Chemical Tank Farm; 216 - 240-A Waste Cribbs and Lines; 272-E Mock-Up Building; 291-A Stack; General Outside Utilities and Facilities; 283-E Filter Plant Addition; 241-A Waste disposal Facility; and the Aqueous Make-up and the Laboratory of the Service Section in 202-A Building.

ADVANCE ENGINEERING SECTION

A study of the incentives and deterrents for cooling future Hanford-type reactors with sodium instead of with high temperature water has been initiated.

A study of a proposal^{DT} by Carbide and Carbon Co. that Hanford piles be fueled exclusively with highly enriched uranium and with diffusion plant tailings has been completed.

Studies indicate that if present limitations on high uranium irradiation (slug rupture, Pu-240 formation) were removed, a limiting exposure of about 2000 MWD/ton would exist because of economic considerations.

ORGANIZATION & PERSONNEL

Total on Roll, January 1, 1955	1,460
Accessions	22
Separations	38
Total on Roll, January 31, 1955	1,444

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A. B. Greninger
A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

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ENGINEERING ADMINISTRATION SECTION

JANUARY 1955

The annual book order was placed during the month. The successful bidder being Stechert-Hafner of New York. As in previous years, outstanding items will be received against the 1954 purchase order until the middle of March. At that time the remaining outstanding items will be transferred to the new purchase order.

There was more activity in the TS File this month than at any time since this file was taken over by Engineering Administration. New TS 30-day inventory forms patterned after the 30-day inventory forms used in Files were drafted and mailed out to holders of TS documents. The first self-inventory is to be taken February 1, 1955.

During the month the following major contract activities were handled:

1. Special Agreement No. G-50 between General Electric and General Telephone Directory Company at Long Beach, California, covering the printing of the Hanford Works Official Telephone Directory was sent to the Contractor for execution January 20, 1955.
2. 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 has been executed by General Electric and will be forwarded to the Commission for approval immediately.
3. Special Agreement No. G-52 between General Electric and the GESA Federal Credit Union providing for payroll deduction from members of the Credit Union was executed January 31, 1955.
4. Special Agreement No. G-53 between General Electric and the HAPO Federal Credit Union providing for payroll deduction from members of the Credit Union was approved January 31, 1955.
5. Consultant Agreement No. 124 between General Electric and Dr. Arvid T. Lonseth providing for consultant services in the field of evaluation of integral equations was executed January 25, 1955.
6. Special Agreement No. G-55 between General Electric and Pacific Scientific Company providing for the calibration of testing machines was executed January 10, 1955.
7. Modification No. 5 to Special Agreement No. G-22 between General Electric and Future Farmers of America, Inc., providing extension of time of the contract and for the transfer of title of sheep was sent to the Commission for approval January 28, 1955.

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Engineering Administration
Section

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8. Special Agreement No. G-57 between General Electric and Hugh H. Russell providing for the services of an arbitrator to arbitrate the differences between General Electric and Anderson Motors was executed January 26, 1955.

R. J. Schier

R. J. SCHIER, MANAGER
ENGINEERING ADMINISTRATION SECTION

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PILE TECHNOLOGY SECTION
MONTHLY REPORT

JANUARY 1955

VISITORS & TRIPS

A. M. Armstrong and G. Banerian of the Aerojet Corporation, Azusa, California, visited HAPO January 11-12 to discuss pump applications and reactor material safety problems.

J. H. Bach and J. G. Christ of Westinghouse Atomic Power Division visited HAPO on January 31 regarding non-destructive testing.

R. L. Carter, North American Aviation, Downey, California, spent January 27-28 at HAPO consulting on graphite problems.

D. H. Cornell from KAPL visited HAPO January 6-7 and January 24-25 to discuss KAPL-120 renovation.

R. W. Coyle from ANPD-GE, Idaho Falls, will be at HAPO, January 1 through June 30 to maintain liaison pertinent to establishment of in-pile facility.

R. S. Dalrymple, Reynolds Metal Company, Louisville, Kentucky, visited HAPO on January 5 to discuss impact extrusion and corrosion problems.

Paul Daly from Westinghouse, Pittsburgh, visited HAPO January 18-22 to discuss in-pile experiments.

J. E. Draley from ANL visited HAPO January 10-11 to discuss high temperature corrosion of aluminum.

T. G. Glasson from KAPL visited HAPO, January 24-25, to discuss KAPL-120 renovation.

A. E. Guay and C. E. Polson, National Lead Company, Fernald, Ohio, attended a Metal Quality Working Committee Meeting at HAPO on January 17-20.


D. H. Gurinsky and R. Meyer from BNL visited HAPO, January 17-18, to discuss graphite.


A. H. Hardt, duPont - Savannah River Plant, visited HAPO January 17-21 to discuss metal quality.

H. H. Hausner, Sylvania Electric, Pittsburgh, spent January 28 at HAPO regarding tests on fuel elements.

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File Technology Section

J. R. Keeler and C. R. Tipton from BMI visited HAP0, January 18-20, to discuss metallurgical problems relating to Hanford.

F. H. Meyer, Jr. from National Lead Company, Cincinnati, spent January 10-14 at HAP0 consulting regarding corrosion problems.

M. B. Reynolds from KAPL spent January 25-28 at HAP0 regarding Hanford assistance.

A. E. Ruehle, Mallinckrodt Chemical, St. Louis, attended a Metal Quality Working Committee Meeting at HAP0, January 17-18.

C. M. Slansky, Phillips Petroleum, Arco, spent January 5-7 at HAP0 consulting on separations processes.

Fred Tingey, Phillips Petroleum, spent January 26-28 at HAP0 discussing statistical data pertinent to 25 burn-out in J and C slugs.

L. F. Bupp spent January 31 at Oregon State College, Corvallis, Oregon recruiting technical personnel.

J. J. Cadwell spent January 4-6 at KAPL, January 7 at ANL, January 10-11 at National Lead Company, Cincinnati, January 11 at GE-ANP, Cincinnati, January 12-13 at Savannah River and January 14 at Mallinckrodt Chemical Corporation, St. Louis, consulting on fuel element technology. Mr. Cadwell also contacted faculty at the University of Wisconsin on January 8.

J. M. Davidson and J. F. Fletcher visited Phillips Petroleum Company, Idaho Falls, January 3-7, consulting on graphite experiments.

E. A. Eschbach spent ~~January~~ January 17-18 with Atomic Power Study Group, Schenectady, and January 21-22 at KAPL discussing reactors and fuel technology. He visited National Lead Company, Fernald, Ohio, January 21-24, to observe and discuss uranium fabrication, and on January 19-20 attended a meeting of the metallurgy development advisory committee at duPont - Savannah River Plant.

T. W. Evans and M. D. Freshley spent January 19 at Phillips Petroleum Company, Idaho Falls, consulting regarding the MTR.

T. W. Evans, D. C. Kaulitz, and M. J. Sanderson visited Phillips Petroleum Company, Idaho Falls, January 5-6, to observe experiment in MTR.

W. J. Ozeroff attended the American Physical Society meeting in New York City, January 27-29, to recruit technical personnel.

J. W. Riches spent January 25-27 at Bridgeport Brass Company, Adrian, Michigan, consulting on uranium metallurgy.

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File Technology Section

N. O. Strand visited Byron Jackson Company, Los Angeles, January 26-28, concerning design and procurement of a high temperature, high pressure test loop.

G. W. Stuart spent January 9 at Oregon State College, Corvallis, Oregon, consulting with OSC Physics Department in reference to thesis of M. V. Davis and attended the American Physical Society meeting in New York City, January 27-29.

E. C. Wood spent January 17 at ANL and January 21 at National Lead Company, Fernald, Ohio, discussing non-destructive testing methods. Mr. Wood also attended meeting of metallurgy development advisory committee January 18-20 at duPont - Savannah River Plant.

P. D. Wright visited Bridgeport Brass Company, Adrian, Michigan, January 10-17 to observe pilot lot extrusion.

ORGANIZATION & PERSONNEL

Personnel totals are as follow:

	<u>December 31</u>	<u>January 31</u>
Administrative	2	2
File Engineering	94	94
File Materials	59	59
Fuel Technology	108	109
Physics Research	35	36
Metallurgy Research	70	69
Contact Engineering	4	4
Total	372	373

File Engineering: Mary I. Clark, Steno, hired January 31; R. L. Loundagin, Technical Graduate, permanently assigned on January 17; R. R. Duniway, Engineer II, entered military service January 18; and A. T. Whatley, Engineer I, transferred to ANP (Idaho Falls) on January 21.

Fuel Technology: D. E. Johnson, Technical Graduate, permanently assigned on January 24.

Physics Research: J. L. Carter, Engineer I, transferred from West Lynn, Mass. on January 24.

Metallurgy Research: Cecilia C. Sumner, Secretary C, on leave of absence January 3.

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PILE ENGINEERING SUB-SECTION

PROCESS TECHNOLOGY

Power Level Limitations

The operating limit at DR Pile during January, 1955 was a 95 C outlet temperature. C, F, and H Piles were similarly limited by Manufacturing to a 100 C outlet temperature. B Pile was limited by graphite temperatures. D Pile was limited by trip-before-instability limits.

Process Specification Changes

Revised Process Specification 11:00, "Allowable Heat Generation in a Process Tube" was approved. The revision allows higher tube outlet temperatures for tubes equipped with coarse-mesh cone screens at B, D, DR, H, and F Piles. Because the failure rate of the K Pile tube outlet temperature monitoring elements may be so high as to cause an excessive number of scrams if left in the safety circuit, the by-passing allowance for the temperature monitor was changed so that it can be completely removed from the safety circuit should this be necessary. A tube outlet temperature safety factor of 15 C, the same as exists at other piles, was specified for use when more tubes are bypassed than required for adequate temperature monitor protection.

KW Startup Incident

KW Pile officially started up at 8:45 a.m. on 1-4-55 and operated at low levels (240 max.) until 2:04 a.m. 1-5-55 at which time the pile was scrambled by panellit gage 4669. Water leak indications were received just prior to the pile shutdown. A rear face pigtail survey showed the rear face assembly on 4669 to be reading 1.5 R. The charge was found to be stuck. Later investigations showed that no water flow had existed in the tube since startup, caused, most probably, by a rubber disc in the rear pigtail. Rubber discs were used during the KW startup tests to prevent water from flowing into selected areas of the pile. The panellit gage on tube 4669 was found to be set to read midscale at approximately the existing header pressure, therefore, it would not trip under no-flow conditions. After removal of the end pieces of the charge, evidence of charge melting was found. Forces up to 40,000 lbs. were used in unsuccessful attempts to remove the charge, resulting in some movement of the graphite stack and rear thermal shield.

It was decided to remove the graphite tube row together with the charge. A 6-3/4" hole was drilled through the rear biological and thermal shields. The graphite tube blocks and stuck charge were then removed from the pile. Because of the pyrophoric nature of the charge previously melted, careful fire precautions were observed. Three minor spark showers occurred, all with small quantities of uranium, while transferring material to the casks. After removal of the material to 300 Area for metallurgical examination, a slab of previously melted material ignited while handling and burned.

Replacement of the graphite tube blocks and reassembly of the pile is now underway under direction of the Project Section.

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Replacement of C Columns with Enriched Uranium

A preliminary study of the use of enriched uranium as a substitute for the U-235 aluminum alloy used for spike enrichment indicates that savings of roughly \$5,000 can be achieved for each C column replaced. Additional advantages are:

1. A gain in production of about 1 per cent can be achieved by using the non-productive power of the alloy columns for plutonium production as well as enrichment.
2. Enriched uranium slugs will not have the decreased reactivity or high burnout that characterizes the present alloy columns.
3. The value of U-235 on the plant at any one time would be decreased.
4. Safer pile operation, reduced graphite temperatures and reduction of tube damage from fuel vibration are additional benefits that can be derived by the situation.

Ruptured Slugs

There were five failures of regular production metal slugs during the month. A uranium cleavage failure of a Group 11 Metal piece occurred in B Pile and a side failure of a recanned piece occurred at D Pile. At H Pile a uranium cleavage failure, and a failure as yet uninspected occurred in smooth-surfaced, triple-dip canned slugs being irradiated to high exposures. One smooth surfaced, triple-dip canned piece failed in F Pile. This piece has not yet been inspected.

At C Pile three cold-canned uranium slugs charged under PT 105-578-A failed at exposures of 161, 206, and 264 MWD/T. Two of the charges were stuck and neither has been inspected. The rupture from the third tube had a roughened area at the cap end, from which radioactive gas bubbles were issuing. Also at C, failures occurred in two hot-press canned uranium slugs charged under PT 105-577-A. One of these has not yet been inspected. The other will not be classified as to type of failure until the piece has been examined by the Radiometallurgy Unit. Four J-slug failures occurred during the month. Three of these pieces exhibited swelling and splitting of the jacket. The fourth piece was swollen and heavily corroded, however no definite break in the jacket was observed.

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

This production test authorizes the irradiation to failure of 4 tubes of cored-uranium lead-dip slugs and 4 tubes of standard control slugs in both high and low power tubes. The 4 tubes charged at C Pile have operated for six months (760 - 875 MWD/T) without incident. The 4 tubes charged in F Pile September 14 have reached 600 - 700 MWD/T without incident.

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

Two tubes each containing two four-inch, mechanically bonded, point-pressure-welded slugs centered with normal uranium pieces were charged in D Pile. One tube was discharged after an exposure of 271 MWD/T and an examination revealed no evidence



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of diffusion or interaction between can and core. The remaining tube was discharged after 577 MWD/T exposure but a post-irradiation examination has not been completed.

Powder Metallurgy Slugs - PT 105-576-A

This test authorizes 5 control tubes at C Pile, 10 control tubes at F Pile and about 40 supplementary tubes at F Pile. Two ruptures will be incurred in C Pile. All slugs at F Pile will be discharged at normal goal exposures of 675 - 775 MWD/T. The C Pile tubes have operated without incident for 4 months and have reached exposures of 525 - 540 MWD/T. Those loaded at F Pile have operated for 3 months without incident. One tube was discharged after 180 MWD/T and a preliminary inspection reveals no abnormalities. A second tube was discharged after 369 MWD/T but no inspection has yet been made.

Unbonded Slugs - PT 105-578-A

This test authorizes the irradiation to failure of "C" process - canned solid and cored uranium slugs, and of nickel-plated "C" process - canned solid uranium slugs. A total of 16 were charged, 5 tubes to go to rupture. One rupture of a cored slug occurred after an exposure of 206 MWD/T and one rupture of a solid slug occurred after an exposure of 161 MWD/T. All cored slugs (4 tubes) were discharged when the rupture occurred.

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

This production test authorizes the irradiation of solid slugs with fusion and diffusion welds, cored slugs with fusion welds, and control slugs. Fifteen tubes were charged and four of these will be irradiated to rupture. Two ruptures have occurred. One solid slug with diffusion weld failed after 556 MWD/T and one solid slug with fusion weld failed after 603 MWD/T exposure. The cored slugs, none of which have been discharged, have reached an exposure of 520 - 540 MWD/T.

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

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

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

The metal under these tests came from rods which were rolled from ingots which differed slightly from the ingots from which standard production metal rods are rolled. Pre- and post-irradiation measurements will be obtained. No ruptures are anticipated. Present exposure levels are about 225 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.

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

This test authorizes the irradiation of three tubes each of standard lead-dip slugs, unbonded point-pressure-closure, and mechanically bonded point-pressure closure slugs. The slugs are loaded at C Pile and are scheduled to go to one rupture for each type. No ruptures have yet occurred with exposures of about 200 MWD/T.

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

This test authorizes charging 3 control tubes for metallurgical examination from each month's supply of cored slugs received at HAPD during the development period of cored slug production. One tube of extruded cored slugs, already available, was charged November 5. Drilled cored slugs (when available) will also be tested by loading equal numbers of drilled cored slugs and extruded cored slugs in the same tubes. Exposure will be limited to 900 MWD/T and no slug failures are expected.

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

This test authorizes 4 tubes of extruded cored slugs and 4 tubes of standard production metal to be charged in C Pile to be irradiated until two ruptures occur in each type metal. (The four tubes of standard production metal will probably be dropped from the test to spare 2 ruptures.)

Uranium Silicon Alloy - PT 105-586-A

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

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

This test authorizes irradiation of 7 tubes of I and E slugs in C Pile. Three tubes will be discharged at exposures up to 1200 MWD/T. Four tubes will be irradiated until 2 ruptures occur. It is planned to measure the outlet water temperature in the core and in the annulus. The first tube was charged on January 2.

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. 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.

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Quantity Irradiation of J-Q Columns - PT 105-579-A

This test as originally planned has been revised and the revised details are covered in HW-33170. C Pile and H Pile are each loaded with 160 tubes of J-Q slugs. Coal exposure is 200 MWD/tube. Eighteen tubes in H Pile will be exposed until 2 ruptures occur. To date 162 J-Q columns have been discharged. No ruptures have occurred during the past month. No graphite heating problems have been encountered.

PILE PHYSICS

KW Pile Experimental Program

The extensive startup experimental program at the KW Pile was completed early in the month prior to initial production operation. Tests completed after the end of the December reporting period included the fully loaded pile rod effectiveness measurements, a 4-column enrichment inter-action experiment, a flux distribution measurement to test the effectiveness of combined fringe poisoning and fringe enrichment as a method for controlling shield deterioration with a minimum effect on production, and a zero-power wet coefficient test in which the water re-circulation facility was used for pile heating. Preliminary results of these tests are given in the following paragraphs.

Fully Loaded Pile Rod Effectiveness Tests - KW Startup

The minimum numbers of vertical safety rods, horizontal control rods, and steel ball Ball IX columns necessary to hold the fully loaded wet pile sub-critical were obtained experimentally. The numbers required to hold the pile with a cold, clean excess of 750 ih were 22 VSR's, 22 steel ball columns, and 17 HCR's. Corresponding results with the pile containing 32 "C" enrichment columns and 5 "P" columns and estimated to have an excess reactivity of 800 ih were 29 VSR's, 29 steel ball columns, and 19 HCR's. Rough extrapolation of the above data in conjunction with individual rod strength measurements, made by rising periods with the above configurations, indicate the strength of the respective systems to be approximately 1100 ih (41 VSR's), 1300 ih (51 steel ball columns), and 850 ih (20 HCR's). A scram transient measurement of the 41-rod VSR system in the pile held barely super-critical with nearly 17 HCR's indicated a shadowed strength for the VSR system of less than 750 ih. The fact that these system strengths are considerably lower than calculated for "black" channels coupled with the larger-than-anticipated reactivity effect of water means that the available safety control falls short of complying with the original design criteria for safety control system capacity.

It is possible to increase the effectiveness of the vertical safety system by about 200 ih by replacing the steel balls with boron steel balls. On completion of the detailed evaluation of this problem now underway, recommendations for or against such replacement will be presented formally.

Test of Fringe Poison and Enrichment for Shield Protection - KW Startup

This test consisted of comparing the flux in the pile reflector (proportional to that reaching the shield) in an unperturbed natural uranium loading with that existing when a vertical blanket 20 lattice units in height of alternate columns in the fifth lattice unit from the fringe contained "C" material and every third column in the outer lattice unit was loaded with mint. With the reactivity and flux distribution

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conditions balanced so as to simulate equivalent maximum specific tube and total pile operating levels, the flux in the reflector and thus the heat load on the shield was reduced approximately 40 per cent by this particular combination of poison and enrichment.

Four-Column Enrichment Inter-Action Test - KW Startup

Uncertainties in interpretation of the C Pile startup "C" column enrichment inter-action experiment could not be resolved because the effect of these columns on the local flux was not established. The experiment was therefore repeated at KW Pile startup in the four central tubes in the fully-loaded pile with complete radial traverses taken before and after charging the four columns. Results of this test in terms of reactivity contribution per column indicated a doubling with two columns, tripling with three clustered columns, and quadrupling with four columns in a block. The ratio of the local flux to the average over the pile went up 50 to 60 per cent in going to the four-column loading; by the weighting theorem, a factor of two change in relative local flux would increase the reactivity weighting the observed factor of four.

Wet Temperature Coefficient Test - KW Startup

The wet temperature coefficient test in which the heating was done using the hot water recirculation facility indicates that for uniform cell temperatures in the range from 10 to 80 C the positive graphite temperature coefficient is of approximately the same absolute magnitude as the negative metal temperature coefficient. The detailed analysis underway will have to be completed, however, to evaluate the individual coefficients with any precision as the heating and chilling steps for separating the two coefficients could not be performed as fast as desired.

KE Pile Startup Planning

A supplement to the original startup document has been approved for the KE startup, which authorizes a calibration of the HCR system by simulating a transient by means of the ball valve poison column system, a 9-column reactivity test for recycled metal (which had gone through the diffusion plant), and a radial flux traverse through the fully loaded dry pile held critical by the vertical safety system.

Pile Safety Studies

HW-34625, "Power Excursions in Hanford Reactors Associated with Complete Flow Stoppage," by J. H. Brown has been prepared in final form for publication as a formal report. This document describes the methods of calculation and results which were presented at the recent Reactor Safeguard meeting held at Hanford.

Product Quality Studies

Arrangements have been initiated to have 12 tubes selected from one of the PT 539-E (Corrosion Study) discharges for processing at the Hot Semi-Works plant next summer. A production test will be prepared soon formalizing arrangements to obtain quality and yield data on high exposure material irradiated to higher than 1000 MWD/T.

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Graphite Temperature Coefficient as a Function of Plutonium Buildup

A rough draft of a production test to measure the trend in the graphite coefficient of a K reactor as a function of metal exposure has been circulated for comments by the appropriate Manufacturing and Technical personnel. A meeting was held with Reactor Section people early in the month to discuss the operational aspects of the proposed experiment. In order to measure the temperature coefficient it is proposed that the temperature of the pile be changed by changing the pile gas composition rather than the power level. Results would also be checked by evaluation of occasional shutdown transients; portions of the HCR system used during the equilibrium tests would be calibrated during these outages.

Thorium Studies

An economic study of producing U-233 by low-exposure thorium irradiation in flattening columns vs. that of producing U-233 in J-Q columns was completed during the month and published as HW-34428 by R.O. Brugge. Conclusions indicate that the higher cost of thorium metal imposed by treating thorium as "flexible" flattening subject to discharge at any time is always less than the cost of U-235 in J-Q loadings.

Tube 2673-H, the third J-Q column slated under PT 105-567-A for special separation at ORNL, was discharged on 1-24-55.

Shield Temperature Studies

The experimental data on iron-masonite shields have been evaluated with respect to radiation leakage as a function of operating conditions and time. A nomograph is being prepared showing the shield condition history of the older reactors.

It is calculated that the maximum temperature in the biological shield at D Pile should be around 130 C under present operating conditions with 300 KW fringe tubes. Under these operating conditions it is expected that it should be possible to detect a change in shield effectiveness -- an increase in gamma leakage of a factor of two in a year or two. An ion chamber has been ordered for careful monitoring of the gamma activity in a specific location as a function of time.

The large oven for heating concrete shield slabs has been modified to run at higher temperatures. It is currently operating satisfactorily at 300 C.

Attenuation Measurements Instrumentation - Neutron Dosimetry

Fabrication and procurement problems associated with the Hurst (ORNL) Dosimeter for measuring the dose directly of fast neutron leakage are under investigation. The possibility is being considered of substituting a pulse-height discriminator for the more complicated Hurst pulse integrator circuitry. If these plans can be developed successfully, the chamber fabrication and testing itself will comprise the main cost and complexity of this effort. Chamber fabrication prints from ORNL have been provided for study by the local Technical Shops.

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HEAT TRANSFER

Cooling-by-Boiling Studies

Tests were performed to determine the temperature reached by a heater tube when the tube flow rate is reduced to the value at which "burnout" occurs. Heater tube temperatures above 1200 F have been measured experimentally in the past and burnout can and does actually occur in the sense that the heater tube melts. However, a method of calculating the tube temperature at burnout has been developed, and calculations indicate that this temperature is quite dependent upon several variables. Further, they indicate that these variables can be controlled such that "burnout" would represent only a moderate increase in temperature rather than an increase sufficient to cause melting. Consequently, the tests were aimed toward substantiating the method of calculation. Results were inconclusive on these tests, but there were definite indications that the method is reliable. Further testing along this line is planned because control of the temperature rise at "burnout" should lead to significantly higher permissible steam qualities.

Unless unexpected equipment difficulties are encountered, cooling-by-boiling tests will be performed at 1500 psi in the near future to determine the effect of pressure on quality at burnout.

Equipment Procurement and Installation

Installation of the new generator and associated components was completed, and the generator is now in use.

Design and fabrication of process and heater tubes capable of withstanding 1500 psi or greater is continuing. Considerable difficulty has been encountered in determining practical methods of installing ribs in the process tubes. These ribs are necessary not only for heat transfer reasons but also to insulate the heater tube from the process tube.

K Pile Instability Limits

Experimental studies were made to determine instability temperatures for K Pile more accurately. The new generator was utilized, and tests were run with generator outputs as high as 1200 KW.

Slug Studies

Thermocouples were installed in the process tube at C Pile which was charged with internally and externally cooled slugs. These thermocouples will aid in determining the ratio between heat flow into the annulus and flow into the central hole. No readings have been obtained yet due to wiring difficulties outside the pile. Efforts will be made to clear up these difficulties at the next shutdown.

Calculations were made for Metallurgy personnel to evaluate the temperatures which would exist in a magnesium matrix slug under in-pile conditions.

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K Pile Incident

Considerable attention has been given to analyzing the events which transpired in tube 4669 K. Tentative explanations and beliefs follow:

A first series of questions which was investigated was "Did water flow through the tube prior to pile startup; if not, why didn't the panellit prevent pile startup; since shutdown was delayed, was eventual shutdown initiated by the panellit; and, if so, what caused the trip at that particular time?". Based on investigations by other personnel, it was concluded that there never was flow through the tube due to the fact that the rear pigtail was plugged. In a case of this type, the panellit would normally indicate a high pressure and maintain a high trip which would prevent withdrawal of the VSR's. In this case, however, the panellit apparently had been calibrated improperly so that the high trip on the gage was not activated and withdrawal of the VSR's was possible. It is apparent that shutdown was caused by the panellit because an indication of a panellit scram was received. The reason for this delayed activation of the gage is postulated as follows: The header pressure was 240 psi, the high trip was set at 265 psi, the low trip at 215 psi and the nominal panellit indication was 240 psi since there was zero flow. After the pile was started up, it would be expected that steam would form in the tube and this steam pressure could rise to a value greater than the header pressure. Consequently, reverse flow would have existed in the inlet pigtail. It is probable that this phenomena was of an unstable nature and both reverse and forward flow existed. The magnitude of steam pressure and flow rates during these unstable cycles was not great enough to activate a trip as long as the pile was at a low level. However, as the power was raised, these unstable fluctuations became more violent and the pressure at the venturi throat departed from the nominal value a sufficient amount to activate the trip. This theory is supported by the fact that pile power was increasing at the time of the scram.

It is possible that the above theory of unstable fluctuations causing the trip is invalid. If so, then the trip was probably caused by a build up of steam pressure (due to increasing power levels) and a surge of "reverse flow" sufficient to activate a trip of the panellit. Sufficient time to analyze the problem more thoroughly has not been available, and expenditure of an amount of time necessary for such an analysis does not appear warranted.

It was noted that the process tube apparently ruptured some time prior to shutdown. Although this rupture permitted a positive flow through the venturi, the magnitude of the flow was apparently low enough that a panellit trip was not activated at the time of rupture.

The second series of questions was: "Did observation of tube and slug conditions after shutdown substantiate predictions which have been made regarding the consequences of lack of cooling?". From an overall standpoint, the answer is yes. The predictions specify that melting will occur, and, of course, melting did occur. From the standpoint of detail, the predictions were in error. It has been predicted that, if a lack of cooling existed such as would be the case if flow were removed from a tube after shutdown or such as was the case here, (a) the temperature of the slug would rise to 660 C, (b) the slug jacket would melt and form a pool of aluminum in the tube, (c) the uranium would come in very good heat transfer contact with the tube, (d) the tube would melt, (e) the uranium and the molten aluminum would come in very good heat transfer contact with the graphite and (f) the uranium temperature

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would level off at about 800 C without melting. (This 800 C would be applicable only for a tube power corresponding to that of tube 4669 K and only for a pile having essentially virgin graphite.) Observation of actual conditions show that the uranium definitely did melt, and investigation has indicated that this melting was probably caused by diffusion of the uranium into the Al-Si and aluminum jacket. Subsequent laboratory tests by Metallurgy Sub-Section personnel has indicated that this uranium-Al-Si-aluminum mixture does not melt at temperatures below 1300 C. This mixture was apparently formed before the slug temperature reached 660 C, the jacket did not melt, good heat transfer contact between the uranium and the graphite was not established and the uranium melted since the uranium is relatively insulated from the tube and graphite as long as the slug remains intact. Consequently, the predictions were inaccurate in detail.

A much more important question, however, is "Do the observations tend to validate the predictions that have been made for the sequence of events following loss of cooling during full-level operation?". The answer to this question is unknown. This is due to the fact that loss of water during operation would cause slug temperatures to rise to the melting point of aluminum in a matter of seconds. If the observed diffusion mixture requires minutes for formation, then these predictions are unaltered. If the diffusion mixture requires only fractions of seconds for formation (which seems highly improbable), then the predictions are invalid. In any case, an important factor has been brought to light, and it is expected that considerable effort will be devoted to studies of both the rate of diffusion and the melting point of the diffusion mixture since very little information on the subject is presently available.

ANP Full Element Exposure

Calculations are being made to estimate the graphite temperatures which would exist in C Pile if an ANP fuel element were irradiated in a test hole there. Very high specific heat generation rates are required in the element, and this leads to high rates in the adjacent graphite.

PHYSICS DEVELOPMENT

Prototype Physical Constants Test Reactor

The contractor phase of Project CA-566, the project providing 305-B building to house the prototype Physical Constants Test Reactor and the Thermal Test Reactor, is complete and the building ready for occupancy. The prototype Physical Constants Test Reactor will be moved in early next month and mechanical testing of the components initiated. All mechanical components are complete except the moveable face and the flux leveling devices; these should be completed within a month.

The electronic systems ordered off-site are on hand and operate properly. The basic control and interlock circuits are completely designed and the components are on order. The safety system controller circuits are essentially fabricated and the initial unit, which was expedited, performs properly. An advanced design for an amplifier for the period trip systems has been demonstrated and is now being refined; the advantages are simplicity, reliability and much improved sensitivity.

Metals and Controls Corporation are continuing efforts to develop a lead-U-235 matrix fuel element. However, the progress is not rapid and it may prove necessary to

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redesign this particular element in order to expedite fuel fabrication so that physics programs utilizing this reactor are not unduly delayed. Such a redesign would undoubtedly compromise the desirable, but not essential, nuclear safety characteristics provided by the specified lead-U-235 matrix element.

Slug Rupture Detection

Construction prints for the spectrometers provided under Projects CG-578 and 579 have been provided by Radiation Counter Laboratories and appear quite acceptable. The initial unit will be delivered by March 15 with first full pile installation scheduled for H Pile in May.

Continued attention is being given the design of slug rupture detectors operating under conditions of high temperature and pressure recirculating water coolants. Equipment is on order for a delayed neutron detection system for the KAPL-120 recirculation system to be installed at H Pile. The detailed operational requirements of the KER high temperature and pressure loops are being reviewed; it presently appears that delayed neutron detection may serve best in this application also.

Document HW-34539, "Detection of Low Exposure Fuel Element Failures," R.S. Paul, was issued analyzing the performance of slug rupture detection systems at extremely low metal exposures. It is concluded that ruptures can be detected under these conditions, but that the present equipment, as routinely operated, may not suffice. It is recommended that special instrumentation be provided when slugs of known low integrity are to be irradiated.

KW Pile Contamination

Numerous traverses were made in channel 4669 at KW Pile to ascertain that large quantities of uranium were not retained in the packing following the cleanout operations. A special gamma scintillation counter was employed and all uranium located was removed. It is possible that some general uranium contamination still exists; however, the sensitivity of the detector was such that about 0.1 cm³ of uranium located within one inch of the detector would have been located. Several vertical safety rod channels were also traversed and no uranium contamination was found. The top-to-bottom traverses did show that a very large percentage of the integrated power developed in KW reactor to date was concentrated in the bottom portions of the reactor.

Reactor Safety - Nuclear Instrumentation

The safety circuit controller unit developed for the prototype Physical Constants Test Reactor has been accepted as the basic controller unit for the K piles; this unit replaces the "recorder trip" devices which are unacceptable for use in Hanford safety systems. Efforts are also underway to develop an adequate "trip circuit" which will enable the octant monitoring system at the K piles to be utilized in the safety circuit.

The advanced period trip amplifier design developed for the prototype Physical Constants Test Reactor is being refined prior to fabricating several units. The amplifier operates by comparing the time derivative signal to a reference voltage and sensing equality with a chopper DC amplifier and phase detector; a second phase

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detector operates a meter to display the value of the period. The chief advantage of the system is that it can evaluate a logarithmic amplifier output that changes but one volt for a six decade change in ion current; systems developed previously require one hundred volts per six decade change or auxiliary amplifiers. Hence, the system will operate with improved speed of response and stability at lower ion currents. Only minor modifications are required to adapt the amplifier to operation with a logarithmic counting rate meter.

The performance of the sub-critical pile neutron multiplication detectors was again shown to be satisfactory in a recent cold startup at DR Pile. The approach to critical can readily be followed through the sub-critical neutron multiplication as the safety and control rods are withdrawn. The present basic system appears far enough advanced to warrant initiating action to effect on-pile installations at all piles.

Reactor Safety - Temperature Sensing Instrumentation

Document HW-33612, "Final Report, Development Test No. 105-564-A, Temperature Monitor Prototype Test," D.E. Stephens was issued evaluating the performance of the circuitry of the K Pile tube outlet water temperature monitor. Numerous inadequacies were found, however, none were basic and were either corrected in the K Pile installation or could be corrected in a future installation.

A study of the merits of alternative tube outlet water temperature monitoring systems for the existing piles was issued as HW-34467, "Continuous Effluent Water High Temperature Monitor for B, C, D, DR, F, and H Piles," R.S. Paul and D.E. Stephens, was issued. This study indicated that a continuous outlet water temperature trip in the safety circuits for the older areas would contribute to operating efficiency as well as safety; moreover, if less than 100 per cent of the tubes are to have such monitors, it appears that a one tube in twenty-five is a judicious balance between performance and cost. The primary concern safety-wise is flow instability introduced by either local or gross power surges; in this event the panellits provide a trip after instability and this may not be soon enough to prevent damage to the fuel elements, at least the October incident at H pile would indicate such to be the case and the Heat Transfer Unit is investigating this area of operation in more detail. Development Test No. 105-595-A, "Test of a Cell System Temperature Monitor," R.S. Paul, was approved authorizing an on-pile test of the K type temperature monitor at H Pile to demonstrate the adequacy of coverage provided by a one tube in twenty-five monitor frequency.

K Pile Startups

The instrumentation for the KE Pile startup has been prepared for service. The basic systems are equivalent to those utilized during the activation of KW Pile. A modified BF_3 proportional counter developed specifically for this work is described in HW-34543, "Modification of a Small BF_3 Proportional Counter for Use in a High Neutron Flux," A.W. Thiele.

Lattice Neutron Economy

Measurements of the metal temperature coefficient of reactivity made in the Test Pile have required correction for a substantial positive effect which was associated with the apparatus but not understood. This effect has now been demonstrated to result from the changing density of the cooling gas (air) as the metal cooled. Experiments

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have been designed to utilize a non-absorbing gas (He) to check the validity of the corrections made to the coefficient data.

Measurements of the neutron distributions in the cold, dry and hot, dry (graphite temperature 150 C) KW Pile indicate that the volume average flux in the metal is reduced 5 per cent in the hot, dry case. It is believed that a more complete analysis of the results may yield the change in thermal utilization as well as the effective "neutron temperatures" at the experienced graphite temperature.

Test Pile - Routine Tests

Currently all metal received from Fernald contains a portion of material from the gaseous diffusion plant; Mallinckrodt metal is a virgin uranium. The Fernald material has been blended approximately one part cascade product to three parts virgin uranium. The specifications on the U-235 content of the cascade product have not yet been tightened beyond 0.71 ± 0.02 per cent. As a result the quality of the recent Fernald material is very erratic. A summary of billet egg test results is given below:

NUMBER OF LOTS FALLING IN TDS RANGES

<u>TDS Range</u>	<u>Fernald</u>	<u>Mallinckrodt</u>
0-5	1	0
5-10	6	1
11-15	18	15
16-20	9	0
21-30	4	0
31-40	3	0
41-50	1	0

Both the bare and canned slug tests show similar erratic behavior in Fernald material. A program of testing is being established to give Fernald a quality

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Additional work was performed during the month on the modification of one charging machine at F Pile to permit completely automatic cycling and provide an improved alignment mechanism.

Preliminary investigation of one charge of slugs that had been removed from K Pile gave strong indication of slug cocking. Further evaluation of this problem will be made and recommendations formulated.

Fabrication continued during the month on the new flow mockup for charging and discharging studies. Completion is expected sometime in February.

Horizontal Rod Studies

Several of the revised seals for the horizontal rod conversion program were received late this month and tested. The sealing qualities were found to be very satisfactory under both static and cycling conditions. Leakage rates of approximately 0.06 cubic feet per hour were measured. These values compare most favorably with all other seals presently installed.

The ribbed sphincter seal installed in the "A" rod at C Pile continues to operate satisfactorily. The new version of this seal having five ribs instead of the original three was received and tested this month. Seal leakage rates of 0.06 cubic feet per hour were also obtained for this seal. Severe cycling failed to increase the leakage rate.

Additional assistance was rendered during the month to Project Section on the fabrication of the boron carbide rings for the new horizontal rods.

Vertical Rod Studies

Development work was started during the month on another approach to an air accelerated vertical safety rod. The new system incorporates a latch similar to that used in the K Pile ball hoppers and appears to offer considerable advantages over the valving arrangement previously employed. Work has also started on the development of a water cooling vertical safety rod.

In assistance to the work on tube 4669-KW a hydraulic jack was fabricated to permit realignment of the vertical rod channels. The vertical rods themselves were also examined for damage but no severe galls or scratches were observed.

In conjunction with the preparation of the Project Proposal for a new test tower estimates of equipment and anticipated loadings on the present tower were prepared and transmitted to Design. Another Fire and Safety Inspection of the tower was made and the report of this inspection will be made a part of the project proposal.

Supplementary Control

Laboratory investigations associated with water distribution rates in a graphite stack for the Disaster Control System program were delayed pending completion of special equipment required to maintain alignment of the graphite mockups.

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Calculations from 305 Test Pile data indicate that one amorphous boron filled poison spline will absorb approximately 11 inhours of reactivity in an unpoisoned HDF pile and approximately 7 inhours for a K Pile. This is more than had been expected for this material and appears very promising.

Process Tube Assembly and Piping

The design of the first Venturi tube installation to be used on boiling instrumentation tests was completed during the month. The venturi will be placed in the outlet line of the Heat Transfer Unit's boiling tube and will be used to determine what correlation exists between steam quality and pressure drop in the Venturi.

Fabrication of equipment for Design Test No. 51, "The High Pressure-Temperature Thermal Loop," is still held up pending qualification of procedures and performance specifications.

Attempts continued during the month to calibrate the K Pile Thermohms for end deflection. It was determined that each Thermohm would have to be calibrated separately in order to give an approximation of the deflection and frequency of flexure.

Preliminary results of the application of Stresscoat for pigtail flexure analysis indicated the need for a separate mechanism to give controlled rate and amount of deflection. This apparatus has been designed and is being made.

Shop work is now complete on the new flexible connector testing facility and the equipment is being transferred to the 189-D laboratory for installation.

Physical Constants Testing Reactor

The 305-B building was accepted by the A.E.C. on January 15. Beneficial occupancy is expected by February 1. Mockup work in the 189-D laboratory was stopped early in January and efforts concentrated on minor revision of, and final adjustments to, components. Disassembly of the stationary section of the reactor was started in preparation for the move to the 305-B building. Final assembly and component testing will be carried out in the new facility.

Other Engineering Development Work

Casks and miscellaneous handling equipment were designed and fabricated for use in storing and shipping the material removed from tube 4669 in KW Pile. Assistance was rendered during the removal operations and all of the equipment operated satisfactorily.

One of the slitting saws for irradiated tube examination work was modified to test its ability to cut Zircalloy-2 tube material. Tests are in progress.

Additional modifications were made to the core borer to improve its operation.

Additional equipment was designed and ordered which will incorporate the present temporary hydraulic system in the control panel. The problem of positive indication of cutter position has been solved by the use of an air-jet gage.

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The Industrial television equipment was installed in the 221-B building at the request of Minor Construction and will be used to assist them in some of their remote work.

Print revisions for the graphite miner were completed and the equipment is being modified.

Additional rubber samples were received during the month and arrangements made to irradiate them.

Design is now complete on the ruptured slug removal saw and the job will be placed in the shop early in February.

SPECIAL IRRADIATIONS

Statistical studies are in progress to determine the standard deviation in the exposure of the slugs for Bluenose. Weaseling of these slugs for the assignment of individual slug powers has begun. Statistical study is also in progress to evaluate the accuracy that must be attained in the weaseling processes.

Liaison with KAPL continues in the design of an experiment intended to test the irradiation stability of SIR and SAR fuel elements (KAPL-119).

Design procurement for the modification of the KAPL 120 high pressure, high temperature loop is complete. It has been determined that the installation work will be done by Minor Construction forces. An official cost estimate is being prepared.

The cave for the removal of the KAPL 120 pressure tube is approximately 80 per cent complete. Scheduling of the removal job has been worked out to fit in with other work being done at the extended shutdown at H Pile in March. The tank for the removal of a section of the pressure tube has been completed and accepted.

A set of preliminary specifications has been submitted to Reactor Design Unit for the feasibility study of the irradiation facility proposed by GE-ANP. Further investigation into the heating of graphite by fuel components to be irradiated in this facility is proceeding. No conclusions have been reached at this time. Plans are being formulated for gaging the A hole in C Pile for this facility. New step plugs for the thermoshield have been designed and are being fabricated for installation at the time of the gaging.

A feasibility study is in progress to determine the possibility of putting a high pressure, high temperature recirculating loop in one of the HAP0 piles. This loop is quite similar to the KAPL 120 loop with the exception that WAPD desires the loop be permitted to operate with a limited quantity of fission fragments in the loop water. Preliminary specifications for a scope design, schedule, and estimate have been given to the Design Section. Excess heating of the graphite by fuel elements being irradiated in the loop is being studied.

A high percentage of the samples containing cobalt (ORNL 183) have been observed to be faulty upon testing here at HAP0. Samples are to be reworked in HAP0 shops and resealed in standard slug cans.

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The three process tubes containing graphite for the study of gas-graphite reactions (HAPO 140) are scheduled to be discharged at the next shutdown of H Pile. A new experiment consisting of a train of graphite samples will be charged for further study of the interaction of graphite with CO and CO₂.

Experimental runs have been made in the Snout I facility in the portion of the experimental program to determine the cross section of neptunium-240 (HAPO 143). Difficulties in the counting of this sample after discharge from the pile have been encountered. An impurity, apparently chlorine, gives an excessive background count. An effort is being made to remove this impurity.

An evaluation of data obtained during the KW startup tests and pertinent to flux is in progress. A value of 2.4 has been obtained for the rise factor in an empty process tube.

A Bi-Mg alloy (melting point 551 C) is being studied to determine its suitability for use in in-pile temperature calibration studies (HAPO 156). Plans are in progress for using the Snout facilities in KW Pile in this studies.

Continuous borescoping coverage has been provided as required during the renovation of tube 4669 at KW Pile. Numerous channels in other piles were also examined as requested.

Installation and acceptance testing of the pneumatic rabbit facility in KE Pile is complete. Difficulty is being experienced in finding a suitable rabbit material.

Test data have been obtained for the new general purpose facilities in KW and KE Piles.

Difficulties in the heat exchanger instrumentation of the C Pile water supply for the test holes at C Piles continue to delay its acceptance.

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.

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PILE GRAPHITE STUDIESEffect of Helium on D Pile Distortion, PT 105-546-E

After approximately one month's operation under transient conditions, D Pile reached test conditions. Pile power level was increased with the attendant rise in outlet water temperatures until the test conditions of 500 C maximum graphite temperature and 60 to 65 per cent helium were obtained. Maximum outlet water temperature required was 107 C. The test has resulted in an increase in power level of approximately 15 per cent over the probable level obtainable under Process Specifications. No traverse data have yet been obtained, however, daily graphite temperature maps indicate that there has been little change in the overall fringe zone graphite temperatures.

Full Pile Graphite Burnout Test at C Pile, PT 105-548-E

Final arrangements for a 13 tube J-Q diamond load on channel 2773-C were made. Full sized sample bars as well as process channel samples have been prepared. The final control panel for the "follower furnace" is not yet completed. The production test is now circulating within Manufacturing Department for formal approval. It is anticipated that test conditions (600 C maximum graphite temperature) will be obtained in two steps following the February 15 scheduled outage.

Test Hole Exposure of Graphite Bars, PT 105-521-E

Dimensional measurements on the full sized bars removed from the "G" test hole at C Pile have been made. The average exposure for each bar has been calculated. The exposure temperature for the central five bars varied from 400 to 460 C. The three bars in the fringe had an unknown exposure temperature history but exposure temperature is estimated to be considerably less than the 400 to 460 C range. The data indicate a contraction in both length and cross section for the central five bars. The maximum volume contraction was 0.18 per cent. The fringe bars (3) exhibited an expansion in cross section and no apparent change in length. The maximum volume expansion was 0.06 per cent. The above observations are in qualitative agreement with data obtained from cold and hot test hole irradiations.

Temperature Coefficient of Thermal Conductivity of Irradiated Graphite

The thermal conductivity of irradiated graphite in the temperature range 50 to 400 C has been measured by the method of radial heat flow in a hollow cylinder. The sample was cut from a full size bar irradiated at approximately 460 C in G test hole of C Pile from October 30, 1952 to June 18, 1954. The thermal conductivity of the specimen increased at a rate of 0.2 per cent per degree centigrade between 50 and 170 C and decreased 0.04 per cent per degree centigrade from 170 to 400 C. The thermal conductivity of a sample cut adjacent to the cylindrical sample and measured by a longitudinal heat flow method at room temperature was 0.071 cal/cm.sec°C. By extrapolation of the radial heat flow data, a room temperature thermal conductivity value of 0.062 cal/cm.sec°C was obtained. Thermal conductivity measurements of graphite samples irradiated at various temperatures is planned using both longitudinal and radial flow methods.

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KW Pile Stack Distortion

Evaluation of preliminary data obtained on the possible stack movement at KW Pile indicated several discrepancies in the data and no firm conclusions were possible. Subsequent data indicate that only slight movement, except channel 4669-KW, resulted from the attempted discharge of the stuck charge in 4669. Measurements of the width of channel 4669 were taken, using the vertical height-test hole traversing apparatus. These measurements show a maximum width of 4.3 inches near VSR-37. Two constricted spots were observed where the separation had been decreased to $3.740'' \pm .002$ and $3.734'' \pm .005$. The nominal separation is $3.750''$. Considerable minor misalignment was evident from the clearly discernable filler block junctions. It was not apparent that there was any major changes to the top and bottom of the channel.

PILE COOLANT STUDIES

Production Tests

The four tubes at C Pile operating at high outlet water temperatures under PT 105-519-E were discharged two to four weeks before reaching goal exposure in order to prevent these tubes from becoming limiting to pile operation. Manufacturing Department's application of the trip before instability principal resulted in a maximum outlet water temperature of 110°C for these four tubes. Since these small annulus tubes operate at a temperature about 20°C higher than the surrounding tubes, it would not have been possible to raise the pile power level to achieve a maximum outlet water temperature of 100°C in C annulus tubes as was desired. After discharge, these tubes were recharged with a short charge (21 slugs) of regular metal, which will be irradiated to a goal exposure of 200 MWD/T. Steps will be taken to permit operation of these tubes at a maximum outlet water temperature of 118°C after recharging with weighed and measured regular metal slugs.

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.

Corrosion Monitoring

Eighteen process tubes were examined during the month. All nine tubes removed from F Pile showed evidence of heavy galvanic corrosion on the external surface at the upstream end of the rear gunbarrel. One tube also showed some signs of galvanic corrosion near the front gunbarrel.

Laboratory Corrosion Studies

A test of 2-S aluminum corrosion in pH 7.0 water containing 2 ppm sodium dichromate was initiated during the month. Data are being obtained at temperatures of 115, 135, 155, and 175°C . Aluminum slugs are being exposed in both zirconium and aluminum tubes at the two higher temperatures.

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The test of various aluminum alloys that hold promise as possible tube materials is continuing in the 105-D Flow Laboratory minitube mock-ups. Corrosion data at 115 and 135 C are being obtained on the following alloys: 61-S, 63-S, 56-S, 66-S, A54-S, Lurium 5, Lurium 10, M-257, M-276, and M-329. Preliminary data from 20 day exposures show corrosion rates of 2.9 mil/month for M-257, M-276, A54-S and 63-S at 135 C. Alloy M-329 had the lowest corrosion rate, 2.4 mil/month at this temperature while 66-S had the highest rate, 5.2 mil/month. Corrosion rates at 115 C were lower by a factor of about two from those at 135 C and the general trend of alloy corrosion resistance duplicated that observed at the higher temperature. These tests will be continued to 60 days total exposure.

Further investigation of "C" metal slug cocking and chattering has been carried out in the Heat Transfer Flow Laboratory mock-up. Tests to date indicate that seating of the charge on the rear cap and the use of longer "C" metal pieces are the best ways of preventing cocking. No chattering of cocked slugs has been observed in the glass tube, even though the flow rate has been as high as 55 gpm in this C annulus tube.

High-radiation dosage rates are being encountered on the rear face of the reactors during reactor outages. The bulk of this activity has been shown to be Zn^{65} spread uniformly on the inner surfaces of the nozzles and pigtails in a brown film.⁽¹⁾ It has been demonstrated that a full flow purge for 1-1/2 hours with 20 ppm diatomaceous earth will not remove the radioactive film. Ten per cent chromic acid solution will remove approximately fifty per cent of the contamination from aluminum and steel surfaces. Tests have shown that the contaminants do not deposit on stainless steel, black iron, or aluminum and that chromic acid decontamination will cause no damage to reactor components. Further tests are in progress to determine more precisely the decontamination factors which can be achieved.

A test to determine rupture characteristics of slugs canned in different ways was begun in the 189-D Flow Laboratory. Twelve lead-dip and twelve cold canned pieces are being tested. To date, four of each type have ruptured. The thermal convection loop was started up and exploratory operation up to 200 C initiated. The ruptures in each type were quite distinctive. The cold-canned pieces ruptured by developing general swelling at some distance from the holes in the jackets. Two of these were severe enough to produce mild sticking in the tube. The ruptures in the Al-Si bonded pieces occurred, with one exception, at the point of water entry. A small swelling around the edge of the hole first appeared and continued to grow slowly for a time. After a number of days of exposure the swelling, still very small, suddenly and rapidly enlarged in all directions. In one case, in a period of 48 hours, the swelling produced was about an inch in diameter and about 1/4 inch high. This slug stuck so severely in the tube that the tube had to be slit to remove the slug and great difficulty was experienced in removing the tube section from the gunbarrel in which it was contained during the run.

(1) Greene, M.C., "High Radiation Levels at the Discharge Faces of the Reactors," HW-34311, 1-4-55.

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WATER PLANT DEVELOPMENT

Recirculation Studies

The in-pile loop at 100-H operated at 200 C until scheduled discharge after 14 days. The test was resumed at the same temperature with the current run scheduled for about one month's operation. Future runs with lower pH water will be made by the feed and bleed technique for pH control using sulfuric acid. Corrosion data from mock-up loop ELMO-2 at 175 C showed a slight increase in aluminum slug corrosion rates in a zirconium tube as compared to an aluminum tube. Decontamination of loop ELMO-3 was initiated with a sulfuric acid and hydrogen peroxide solution. Four runs have been performed by adding the solution and cleaning it up with the loop ion exchanger. This procedure removed 15 to 20 grams of uranium, or about that amount calculated to have been in the loop from the previous rupture test.

Vendor information regarding bellows sealed valves for high pressure sampling bombs indicates that such valves will be available to withstand both high pressure operation and vacuum degassing for sampling purposes. New conductivity cells are being installed at H Loop to obtain better information on water conductivity effects. Procurement of two vendor-fabricated loops continued; delivery is expected during the second quarter, 1955. Construction of the 1706-KE recirculation facility continued. The revised design criteria was approved which provides for a simplified pumping system to reduce the total project cost.

A report describing the results of slug rupture tests was prepared and a program outlined for rupture testing in various fuel elements being developed.

Boiling Studies

A successful in-pile boiling run was carried out in the H recirculation loop. Boiling was obtained for a period of 80 minutes with a steam quality of 8 per cent at 300 psi and 223 C. At the conclusion of the run the loop was returned to normal flow conditions with no unusual pressure fluctuation. High activity levels were encountered by personnel during the operation because of reduced delay time of the water between the rear face and the -12 Level. No further boiling runs are planned for the H Loop.

Aluminum slug corrosion rates of 0.21 mils per month were observed in a mock-up test after three weeks exposure to 40 per cent quality steam at 190 C and 140 feet per second.

Flow Laboratory

Operation of the five in-pile tubes at 105-D Flow Laboratory continued. The tests of pH 7.0, 6.6, and 6.2 are scheduled for discharge during the D rod outage. At that time the D Flow Laboratory will be shut down and all operations transferred to the 1706-KE Semi-Works. Mock-up tests at the above pH's and at temperatures up to 150 C gave encouraging results regarding continued improvement

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in corrosion rates with pH reduction. There appears to be a significant difference in the rate of attack on steel coupons as pH is lowered from 6.6 to 6.2. Sufficient data on steel corrosion have been obtained to assure that no severe effects on the effluent lines will result from the reduction of process water pH to 7.3.

Plant Tests

The low pH test at 100-F continued. A process specification for the reduction of pH to 7.3 at all areas was prepared and is being circulated for approval.

GRAPHITE AND MATERIALS DEVELOPMENT

Pile Graphite Sampling Device

Six graphite cores were successfully removed from the front fringe of two channels in F Pile under PT 105-537-E. Although the graphite was difficult to cut because of radiation damage, the core borer operated satisfactorily with the carboloy-tipped saws cutting three full cores before requiring replacement. No further changes in the core borer are contemplated before further testing.

Effect of J-N Pairs on Tube Block Graphite At The DR Pile, PT 105-545-E

Samples obtained under this production test have been measured and the data indicate that the J-N loading caused no adverse radiation damage effects to the tube bore graphite in DR Pile. The data also provide further evidence for the feasibility of annealing front fringe expansion by the use of enriched metal loadings. While this result is encouraging, it should be noted that the measurements were based on crystallite expansion of mined powder samples from the bores of the tube channels and therefore, cannot be considered representative of the entire tube block. Any definite conclusion concerning the feasibility of annealing by this method must be obtained from PT 105-537-E (see below).

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

Three pairs of J-Q slugs were charged in the front fringe of each of thirteen tubes in a diamond array in F Pile during the January 17 shutdown. The central tube block will attain heat generation at the front fringe that is representative of loading the front fringe of the entire pile with J-Q pairs. As was mentioned above, core boring was successfully carried out in two of the channels. The next sampling will follow two months' operation of the pile.

Thermal Annealing of Damaged Graphite

Activation energy spectra have been plotted from the X-ray data of several of the laboratory annealing runs up to 500 C which have been made to date. This type of analysis assumes first order kinetics and a distribution of activation energies for the annealing process. The activation energy curve at a given annealing temperature shows a single maximum within the resolution of the method. The maximum moves to higher activation energies and the curve becomes broader as the annealing temperature is increased.

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Infra-Red Spectrum of Damaged Graphite

The infra-red spectra of finely ground samples of damaged graphite were taken in the spectral region of 14 to 35 microns. A sample of CSF graphite with 2516 MD/CT cold test hole exposure was found to be opaque to the radiation out to 35 microns, the limit of the instrument. By varying the concentration, it was found that the graphite acts as a neutral density filter over the complete range. This absorption is presumably due to electronic transitions arising from the semi-metallic properties of the graphite that still exist in this highly damaged sample. Although vibrational transitions must surely exist in the region studied, the resulting bands were not observed superimposed on the very intense continuous electronic absorption.

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

Since the leaking control rod incident at F Pile when a small amount of boron entered the graphite, there has been some question of the accuracy of exposure calculations for the test holes which are based on the total poison in the pile. To check the test hole exposure, the water flow and temperature rise through four pairs of process tubes above and below the test hole were monitored for two operating periods. The results as calculated from poison data and power level data compare as follows:

<u>Operating Period</u>	<u>Poison Calculation MD/CT</u>	<u>Tube Power Calculation MD/CT</u>	<u>Per Cent Variation</u>
10-18 to 11-5	94	85.6	9.3
11-5 to 12-9	148	128.3	14.4

These values fall within the required limits of accuracy.

The Effect of Graphitization Temperature

Two CS-GBF graphites which were graphitized at 2000 C and 2250 C were exposed to 1600 MD/CT in a cold test hole. Their physical expansion coincided with that of pile grade CS-GBF, graphitization temperature of 2500 C, after comparable exposure. It appears that graphitization temperature in the range 2000 C to 2500 C does not affect the radiation damage rate.

Controlled Temperature Graphite Irradiations, PT 105-403-P

Fabrication of the heater assemblies for the Series V and VI irradiations continues in the shops. The pre-irradiation physical properties of the graphite samples to be used in these exposures are being measured prior to canning and insertion in the heaters. Because of equipment failures, new instrumentation is being secured for the Series V and VI exposures. The samples from the Series III exposures, which accumulated approximately 2700 MD/CT equivalent cold test hole exposure, are awaiting measurement of their physical properties.

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High Temperature Irradiation Facility

Discussions were held with MTR personnel on the preliminary design of the controlled temperature irradiation facility and on scheduling of the experiment. Minor revisions of the design, which will result in an improved apparatus, were agreed upon and have been incorporated. In general, the MTR personnel approved the scope and design of the experiment.

Competition for the L-42 position in the MTR has increased considerably since that position was chosen for these tests. Although no commitments were made, some assurance was given that the first installation of the experiment could be made in the fall of 1955. This coincides roughly with the estimated completion date for the apparatus and the control equipment. Competition for the L-42 position may decrease in the future when and if the L-48 position is converted to a similar experimental facility. Phillips Petroleum Company is investigating the feasibility of such a modification at the request of the A.E.C.

Very High Temperature Inpile Heater

Sufficient materials have been ordered and received for constructing a prototype inpile heater designed to fit a three-inch diameter test hole in K Pile. This heater is designed to attain a maximum temperature of 1500 C and to permit sample insertion and removal without removing the heater from the pile.

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FUEL TECHNOLOGY SUB-SECTIONFUEL COMPONENT DEVELOPMENTIngot Quality Studies

The major portion of the slugs produced for the Ingot Quality Study-9c have been received, canned and shipped to the pile areas for irradiation.

It is difficult to make a comparison in the canning performance between the pickled derby material cast at the MCW and the unpickled derby material cast at the FMPC because they were not canned at the same time, they were both outgassed, and the ingots for the unpickled derby portion contained metal reduced from UF₆ which, because of its variable isotopic content, makes comparison of the reactivities of the two groups impossible (i.e., the 305 pile reactivity test results from five test stringers (11 slugs each) from the unpickled derby group ranged from a -.92 to +23.6 inhour/105 pile).

Pre-irradiation test results obtained by the Manufacturing Department show no significant difference between the two groups of metal. The major comparison will be made by the pile irradiation of the slugs.

Uranium Heat Treating

The heat treating data recently obtained by several investigators have been summarized and a tentative recommendation of how to economically exploit these findings at HAPO and FMPC is now under discussion with the HAPO Manufacturing Department. The data show that the drastic quench used in present processing produces a fine grained uranium at the sacrifice of obtaining a textured material (with the 200 planes highly oriented in the rolling direction) and high residual stresses. The recommended modifications will reduce the (200) texture to near randomness, will produce a more uniform macrostructure, and will reduce the residual stresses, with an approximate 25 percent increase in average grain diameter as compared to present production material. The proposed salt bath heat treating cycle is as follows:

1. Salt bath temperature used for transformation shall be 700 - 710 C.
2. Immersion time in salt bath shall be twice the minimum time for complete transformation as determined on cold uranium under ambient production conditions.
3. The uranium shall be removed from the transformation bath and air cooled until complete beta to alpha transformation has occurred, then quenched in a controlled brine solution at a minimum temperature of 50 C. The brine solution is to be composed of water and the heat treating bath salt (saturated or $5 \pm .5\%$ - to be determined).

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During the December development extrusion it was determined that the lead end cracking evidenced in tubes extruded prior to that month was a result of too severe a quench (full 50 psi water pressure was applied to the quench device). Therefore, a new set of extrusion conditions were used in the pilot lot extrusion during the weeks of January 10 and January 17. The cracking was eliminated with no apparent sacrifice of other beneficial properties. For the most part the extrusion of 384 billets at this time was accomplished using 2 psi water pressure delivered to the quench device since some quenching is necessary to limit the oxidation of the extruded tubes. A small number of tubes were extruded with no quench to complete a health and safety survey.

In samples from the center of the tubes, the hole was relatively round and well within tolerance in size and concentricity. The surface of the holes appeared rather smooth although there was some evidence of slight cracks or striations in the hole surface. The tubes extruded with little or no quench were sufficiently straight for loading into H beams for shipment without stretcher straightening at Adrian.

The tubes extruded as development material in December have been received at HAPO. Samples from the twenty-eight as-extruded tubes had a fine grained (.010 mm. average grain size) structure with a swirling pattern across most of the cross-section but with a ring (1/8 to 1/16" wide) of coarse grains around the central hole. Nine-inch tube sections, with ends plugged were beta heat treated in a horizontal position and water quenched. Examination of wafers to date has shown: the heat treated grain size to be about .06 to .10 mm; a columnar tendency to be found on the periphery of most tubes; and the grain size around the central hole to be finer than the remainder of the sample (approaching .05 mm.).

Quality Control

During December and January there has been a substantial decrease (10%) in the hydrogen content of N lot uranium indicating an apparent improvement in the casting practice at SLPC. It is indicated that hydroxyl and moisture analysis should be made on the chloride salt baths in 313 Building in order to determine if changes in these contents are responsible for the increase (45%) in the hydrogen content of LH lot uranium.

Uranium Alloys

The U-1.5 atomic percent silicon alloy studies have shown that uranium alloying to provide grain refinement and improved mechanical properties may be economically applied at HAPO. The actual improvement to be reflected upon slug performance by this alloy can be ascertained only upon irradiation. The U-1.5 percent silicon alloy can be extruded but is not readily fabricated by the current production rolling process applied at Fernald. Accordingly, a study has been made to modify the alloy to improve its rolling characteristics

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with the following results: Additions, in atomic percents of 0.4 Mo, 0.25 Ni, or 0.5 V to 1.5 atomic percent silicon alloyed with uranium provide alloys that can be rolled, especially the 0.4 Mo - 1.5 Si - U composition which, it is believed, could be rolled without revision of the current Fernald pass schedule. The 0.4 Mo - 1.5 Si-U alloy, after rolling and beta heat treating, shows tensile strengths of 136,000 psi as compared to values for similarly treated unalloyed uranium of 90,000 psi while the yield strengths are 76,000 and 36,000 and average grain sizes of .057 and .120 mm respectively.

FUEL ASSEMBLY DEVELOPMENT**Status of Production**

The uranium slug cores canned this month were about 75 percent from material cast at Fernald and 25 percent from material cast at Mallinckrodt. About half of the material from each site was heat treated in rod form in carbonate, the balance in slug form in chloride at Hanford. The hydrogen content of the later lots of Fernald heat treated metal has been lower than in the preceding four months; the salt bath outgassing anneal, used as a remedial measure to prevent gross braze porosity in canned slugs, does not appear to affect a significant reduction in the braze porosity associated with the most recently received heat treated uranium. Further reduction of braze layer porosity to the levels prevailing in the earlier 1954 lead dip production will depend on further in process reduction of hydrogen in the uranium at Fernald.

Fabrication of Dip Canned Cored Slugs

About 9,500 cored uranium slug assemblies were welded this month using the sequence of operations in which the ends of drilled slug cores are closed by welding in uranium plugs (in a helium atmosphere) after the slug surface has been prepared by pickling. Of these, 8,750 were canned with a canning yield about the same as that achieved in solid production. The oxide film overlying the fusion zone of the plug welds has apparently not prevented wetting of the slug ends to a consequential degree. Abnormal numbers of slugs with defects in the canned slug closure reduced yields of both cored and solid slugs.

Canning tests of drilled slug cores with the end plugs fastened in the end counterbores by crimping the edge of counterbore over the edge of the plugs indicate that this method of core assembly may be as effective as the present welding practice in preventing bath metal entry during canning. Cycling tests of slug cores of this type in the "woodsplitter" indicate that this assembly method has no adverse effects on the ability of the cored pieces to resist splitting or otherwise promote rupture of the slug jacket (for example, the plugs remain in place with little metal distortion in these areas). Further immediate development of this core closure technique is planned; it appears that minor revisions of component dimensions may be sufficient to permit practical recovery and re-use of first and second-run canning rejects.

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Woodsplitter tests were performed on cored slugs with the cores partially or completely filled with lead or Al-Si. Contrary to previous concepts, results indicated that partially filled cores are not likely to cause rupture in the piles. Splitting of the cores was not induced in cycled slugs either in the as-canned conditions or following furnace heating to promote extensive reactions of the lead or Al-Si with the interior of the cores.

Hot Pressed "C" Alloy Slugs

About 750 hot pressed "C" alloy (U-Al) slugs were fabricated in the Metal Preparation facilities this month. This initial production is being held for bond testing before final acceptance (an ultrasonic bond testing unit was not available this month). It is estimated that the canned slug yield after bond testing will be about 90 percent. The results of the canning experience from hot press canning fabrication of "C" alloy slugs indicate that it may be feasible to provide bonded U-Al fuel elements for all enrichment commitments early this year.

Hot Press Process

Two hot-pressed, nickel-plated, solid fuel elements failed in C pile on January 18 and 23. The first failure, which had a diffusion welded closure, reached an exposure of 558 MWD/T; the second failure, which had a fusion weld superimposed on the diffusion weld, reached an exposure of 603 MWD/T. The latter piece stuck in the tube. The cause of the failures has not been established pending examination in the radiometallurgy facility. Six tubes of material from the hot-press production test remain in C pile; three tubes of hot-pressed, nickel-plated diffusion bonded cored material at exposures of 550 to 600 MWD/T, and three lead dip control tubes at exposures of 625 to 675 MWD/T.

The one tube of internally and externally cooled, nickel plated, hot-press canned fuel elements which was charged into C pile during last month-end shutdown has reached an exposure of 125 MWD/T. Data on the water temperature rises in the hole and annulus have not been obtained due to insufficient shutdown time to complete the instrument connections.

A four-inch uranium core coated with vapor deposited zirconium applied at 1050 C by iodide decomposition by KAPL was hot pressed at 600 C/12 tsi/15 minutes at pressure. Chisel testing the fabricated slug indicated a bond similar in strength to an Al-Si production fuel element. Examination of the chiseled portion revealed a separation between the U-Zr alloy and the zirconium. Metallographic examination showed a 0.001 inch thick zirconium layer, 0.001 thick Zr-U reaction layer, and two alloy layers between the aluminum and zirconium. No process difficulty was experienced in canning the zirconium coated core.

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Cold Closure Process

Solid steel and cored (3/8 inch holes, 1/2 inch thick plug-in counterbore) eight-inch uranium slugs have been sized into aluminum cans and closed by the cold closure process using a high strength molybdenum steel (type 4340) closing die, hardened to 44 Rockwell C. The cored uranium slugs underwent deformation under the 156,000 pound/square inch closing pressure. The core length decreased approximately 3/16 inch and the uranium became barrel-shaped with a maximum increase in diameter over the original dimensions of about 13 mils. There was no evidence of aluminum extrusion through the crimped-on plug into the hollow core. The design of a fixture for holding and moving the heavy closing dies has been completed. The feasibility of sizing 16 inch long cores was demonstrated by sizing an aluminum cup onto a 1.336 inch diameter steel dummy, 16 inches long.

Uniskan

Two proposals for equipment to carry out development studies on Uniskan techniques have been prepared. One proposal utilizes a lathe as the frame and driving spindle with the rolls fixed on the carriage; a second proposal utilizes a hydraulic press for the frame and roll carriage with a motor driven spindle mounted on the upper platen. One or both of these proposals will be implemented as part of a program to develop the Uniskan process.

Pilot Plant Project

The Phase I and Phase II portions of the Fuel Element Pilot Plant were completed during the month and the building was accepted from the lump sum contractor on January 27. Occupancy of the building by technical personnel began on January 31. Movement of equipment from 3730 Building will start in February and be completed by about April 15. The pilot plant project proposal is being revised to defer the semi-works line installation, move the plating equipment from 3706 Building and the pre-irradiation measurement equipment from 305-A Building to the pilot plant, provide office space on the mezzanine floor, relocate the dip canning and machine tool equipment currently in the 3732 and 304 Buildings, and provide fixed development facilities in the pilot plant for experimental fabrication of fuel elements.

FUEL EVALUATION

Thermal Cycling Studies (Woodsplitter)

Preliminary temperature measurements made on an eight-inch cored slug while being thermal cycled in the woodsplitter showed that for a given power input, approximately the same temperature is obtained in either the solid slug or the cored slug. The temperature achieved at the edge of the void in a cored slug was 650 C at 103 KW power input. A maximum temperature of 670 C was measured.

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A comparison of temperature distribution shows that for equal core temperatures the ends of four-inch slugs are considerably hotter than the ends of eight-inch slugs. A difference of 140 C exists with core temperatures of 450 C. This difference is probably due to the design of the heating coil (nine-inches long) and may cause "pimple" failure of four-inch slugs. "Pimple" failures are characterized by a ring of eruptions forming on the flat ends of the test slug, about 1/4-inch from the outside edge.

Induction Heating Expansion Project - IR-184

Design work on the project to provide five work stations in place of the present one for the woodsplitter is 90 percent complete.

Fuel Element Performance

Performance of lead-dip canned normal production slugs (B-lot) continues to be satisfactory. About 1000 tubes have reached an exposure of 600 to 950 MWD/T including 150 to possibly 300 tubes in the 800 to 950 MWD/T range. A total of three failures have occurred including a typical "25-M type" cap failure at 810 MWD/T, and two side failures at 670 and 190 MWD/T. The side failure at 670 MWD/T was a recanned slug (Z-lot) and showed evidence of unusual heat transfer with heavy scale on the slug ends.

Other than the Z-lot failure cited above, three triple-dip canned and four J-slugs failed during January (through 1-27). Two of the triple-dip slugs were uranium cleavage failures at 840 and 850 MWD/T, A-lot and F-lot uranium respectively. The third failed at 910 MWD/T, and is unexamined, being lodged in the process tube. The J-slugs were unbonded, "C-process" canned, and failed at 11.5 to 16.0 percent burnout.

Slug Distortion

Preliminary data have been compiled in a program to study dimensional instability under irradiation of fuel elements with respect to the method of beta heat treatment used. Data was taken on three tubes each of fuel elements, beta heat treated (1) during canning by the past triple-dip process, (2) in rod form before being machined into slugs for canning by the lead-dip process (present standard for the piles), and (3) in slug form after machining from rolled rod for canning by the lead-dip process. Each type of material exhibits its own peculiar profile. Triple-dip material, as also previously measured in PT-10-M, is typified by local bumping which results in an uneven profile. The maximum warp measured was 43 mils at 750 MWD/T. Rod transformed fuel elements show an even surface with local fattening and warp generally exceeding 20 mils and ranging up to 73 mils at 750 MWD/T. Slug transformed material was found to grow in diameter with a maximum fattening at each end. The slug with

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the maximum growth at 1047 MWD/T have an average diameter change of 17 mils with a 31 mil increase in diameter at the ends. Also at this exposure, maximum warp was measured of 57 mils.

In a process tube in an old pile, space for a maximum of 80 mils of warp is available before the edges of the slug contacts the tube.

Twenty thorium slugs which had been irradiated to 1355 MWD/AT were de-jacketed and visually examined. Two of the slugs were bend tested. The slugs showed no surface defects or distortion as a result of irradiation. The bend test produced a ductile failure at loads comparable to those required to break unirradiated uranium (approximately 25 tons). Details of the examination are reported in HW-34471, Post Exposure Examination of Thorium.

TESTING METHODS

Eddy Current Penetration Test

With the new balance units which were received from the shop, MIZ-1 was operated on a process control basis during the month and required not more than one or two re-adjustments per day. This order of stability makes the eddy current penetration detector a suitable production tool. The Model 2 electronic equipment is being used as a process control tool by Manufacturing Department while the Model 1 instrument is being re-built in the shop to make two useable instruments available for operation until production equipment is procured. Some minor difficulty remains with excessive tightening of the traveling teflon tape which is used to absorb wear between the probe and the slug. A new probe suspension and switching system is being built to improve this situation. Existing drawings of Model 2 instrument are being revised and brought up to date so they will be available for design of production equipment.

Core Test Equipment

Out of a wide variety of methods explored for detecting Al-Si in the core of the canned cored slug, a radiographic method has been selected and crude equipment built to perform the test. In this technique a beam from a 13 millicurie Co⁶⁰ source is passed lengthwise through the core and end plugs of the slug and counted for 10 seconds with a scintillation detector, linear amplifier, and scaler. Through an empty cored slug the detector receives about 16,000 counts in 10 seconds. A core one-quarter full of Al-Si reduces this to about 9500 counts per 10 seconds, and a filled core reduces it to around 4000. A crude cask holder and fixture for inserting the slug into the beam has been built and turned over to Manufacturing for use. Cask, source, and electronic equipment were all borrowed from various other organizations on the plant--the electronic equipment from personnel of Physics Development Unit who also assisted in preliminary evaluation of the method.

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Crack and Inclusion Detector

One lot (L-49) of 1200 pieces of untransformed metal was tested with the crack and inclusion detector before construction work in the new 313 Building, where the equipment is installed, forced suspension of operations. By comparison with the last large group of slugs run with similar equipment, of which samples were tested in the woodsplitter, the material from lot L-49 was well on the low quality side; however, the effect of transformation has not yet been determined and this may well be a zero shift which would improve the appearance of the untransformed lot. The next lot run will be rod transformed material. Stability of equipment in test runs was good, and from the standpoint of operability it seems suitable for production use.

Ultrasonic Bond Test

New ultrasonic bond test equipment was checked out and tested. A wide variation of responses from voids of the same size was noted. A study of this phenomenon showed the band width of the new receiver was as wide as that of the receiver with which the test was first developed last May, but the band width transmitted by the pulser was much narrower. The new model was, therefore, returned to the laboratory to broaden the pulser band width.

Sonic Testing

Document HW-33024, A Sonic Test for Preferred Orientation in Hanford Fuel Element Cores, A. A. Ferguson, E. C. Wood, has been submitted to the Technical Information Unit for final preparation. New sonic test equipment to expand operations has been built, but the new driver unit had a resonance too close to the longitudinal resonant frequency of the slugs and as a result introduced a constant error in the determinations. This is being modified.

Mechanical Development

A mapping type recorder for use with scanning tests on slugs has been built and mechanical parts checked out. It consists of a pair of driving rolls in a tank mounted on a lathe bed driven from the lathe spindle which in turn drives a drum of a helix recorder through a variable speed changer. Adjustment of the speed of a slug in synchronism with the rotations of the drum is accomplished with a built in stroboscope. This equipment will be used to record the output of such instruments as the unbond test and the Al-Si penetration test in the form of a map on an electro-sensitive paper so that careful studies of their operation may be made.

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DECLASSIFIEDCOATINGS AND CORROSIONCorrosion of Aluminum Alloys

The first of a group of specially ordered commercial aluminum alloys have been received and given preliminary tests in 350 C distilled water. Of the three alloys exposed only Alloy No. 43 (5 percent Si) survived the test. The other two, 53S (0.7% Si, 1.3% Mg, 0.25% Cr) and 11S (5.5% Cu, 0.5% Pb, 0.5% Bi), were completely oxidized during the 20-hour test period.

Corrosion tests of Al-Si are continuing. The average corrosion rate is two mils/day over a period of two weeks in the temperature range 350-365 C. The corrosion apparently proceeds intergranularly at this temperature as is shown by the presence of metallic aluminum in the corrosion product. However, the rate of corrosion of Al-Si is remarkably uniform in contrast to 24S where rapid penetration of the metal along stringers in the sample may occur even though the rate in selected areas is considerably less than with Al-Si. Samples of Al-Si exposed for similar periods in 300 C distilled water are estimated to have lost less than a mil in the two weeks interval with no apparent intergranular corrosion.

Two samples of Ni-Al alloys (prepared at Argonne by J. E. Draley and co-workers) are being exposed at 350 C. The first sample, 2S Al + 1% Ni chill cast and cold worked, is in good condition after 100 hours. The second, high purity Al + 1% Ni and about 0.5% Si chill cast and cold worked, failed abruptly after 80-100 hours.

Corrosion of Magnesium

Rate studies on the reaction between magnesium and water at 250 C have been made by the use of a small bomb with a corrodible window; e.g., uranium. The sample is placed in the bomb, which in turn is immersed in water inside the autoclave. By use of a suitable thickness of "window", the magnesium-water reaction may be delayed until the autoclave is at the desired reaction temperature. Three determinations give a corrosion rate of 1.5 mil/minute at a nominal 250 C. An appreciable temperature rise in the system is associated with the reaction, which suggests the actual temperature at the magnesium surface may be considerably higher.

Corrosion Tests of KAPL Zirconium-Plated Slugs

Six four-inch slugs coated by the vapor decomposition process were received from KAPL. Two of them were boiled in water to check porosity. They failed by pinholing and blistering of the coat; the first one in three hours, the second one in 72 hours. Two slugs were hot pressed at 600 C, 12 tsi for ten minutes. They were then tested for undercutting resistance by drilling 1/16" holes into the uranium and exposing them to 170 C water. Both slugs failed in less than three hours, showing virtually no undercutting resistance.

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Dual Electroplating

Reactivity tests on 1.380 diameter uranium cores electroplated with one mil of iron followed by 0.1 mil of nickel showed a 105 pile reactivity gain of over 100 inhours when compared to one mil nickel-plated cores of similar diameter or to production (lead-dip) material (1.336 inch diameter). In bond strength, the dual coat appears more than adequate. Six tensile tests between two bonded, plated uranium plugs pressed under identical conditions showed bond strengths in the range of 36,000 to 50,000 psi. Shear test samples with aluminum bonded to the nickel failed in the aluminum. The nickel plate on iron is preferred to copper on iron (which has a slightly lower capture cross-section) not only because stronger bonds can be obtained, but because slightly higher pressing temperatures can be used to produce more effective pressure welded closures.

Nickel Plating and Hot Press Studies

The corrosion protection afforded slugs by coating them with various thicknesses of nickel by electroplating and by wrapping with foil is being determined. The slugs are canned by hot pressing. A small area of the aluminum jacket is then removed by cold caustic and the exposed nickel coat is corrosion tested in water at 170 C. Slugs electroplated with 0.001-inch of nickel fail within a few hours, those with 0.002-inch electroplates on smooth uranium have not failed in 183 hours. One slug wrapped in foil (0.001 inch) prior to canning is being tested and has not failed in 160 hours.

During the course of experimenting with electropolished uranium the nickel plates have often been stripped. Careful observation of the freshly exposed uranium surface during stripping of the nickel plate reveals a rapidly evaporating film of water. If an electropolished nickel-plated slug is allowed to stand three days before stripping, no water is observed but the color of the uranium indicates extensive oxidation of the surface under the nickel, presumably due to reaction with the occluded water.

It has been reported in previous periodic reports that the rate at which a hot-pressed slug undercuts, (or fails after water reaches the uranium core through a 1/16" hole in the jacket and electroplate) is affected by the uranium metal quality. An even more important variable appears to be the temperature at which hot pressing is performed. An undercutting test was run on eleven slugs, five of which were hot press canned at 575 C and six of which were canned at 620 C. In 170 C water all five of the 575 C pieces failed by undercutting in 11 hours or less; five of the six 620 C pieces survived up to 30 hours.

The following preliminary conclusions result from studies of 22 four-inch slugs nickel plated and hot pressed at KAPL:

1. Many of the slugs (6 out of 9 tested) have unbonded areas, particularly near the ends, determined by ultrasonic and chisel tests.

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2. Most of the slugs show good undercutting resistance determined by autoclave tests at 170 C of slugs with 1/16 inch holes drilled through the aluminum and nickel coatings.
3. The resistance of the 0.002-inch nickel coat to corrosion is being studied by removing about four square millimeters of the hot-pressed aluminum jacket with caustic to expose the nickel layer, and then autoclaving the slug in 170 C water. One piece tested in this manner shows no corrosion of the nickel after 183 hours.*
4. The cap-to-can closure was unsatisfactory on one of three slugs checked by removing about 0.015 inch of the slug jackets with caustic. The cap-can interface was uniformly and deeply attacked by the caustic.

Facilities

Shutdown of the Flow Cup Laboratory is almost complete with only a few special samples still being exposed. Some instruments and one trough have been removed. During the next month, the equipment will all be removed and either sent to excess or given to other groups who may need it. One trough will be set up in 189 D for pitting tests; this will operate at low temperature with standard pile water.

The two high pressure autoclaves in Building 326 are now being used for static tests of various alloys at temperatures of 300 C. One medium pressure autoclave is being heated by steam and is used for various corrosion tests in condensed steam or tap water. The high pressure autoclave installation has been completed and is being used principally for testing aluminum alloys at temperatures between 250 and 350 C. Plans have been completed to install an autoclave in 189 D Building to operate at 120 C with pile water at low flow rates. A similar installation at 100 KE will operate at temperatures up to 200 C with modified pile water.

* As-plated KAPL slugs have also been tested at 170 C; they failed after 50 days. (Private Communication), C. Groot.

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PHYSICS RESEARCH SUB-SECTIONLATTICE PHYSICS

In the continuing study of the effect of slug coring on the reactivity of a lattice, the buckling of the 5-3/16" lattice was measured with solid 1.36" (4" Hanford) slugs as fuel and with no water in the cooling annulus. The measurement will be repeated with water in the cooling annulus and then with Hanford slugs that have been cored to give a 1/2" diameter void.

The dry 5-3/16" lattice loaded with solid 1.36" diameter slugs had a buckling of -225 microbucks (10^{-6} cm^{-2}). This is of particular note since it agrees very well (within 5 microbucks) with the value calculated from the equation formulated from earlier exponential measurements and gives added confidence in the equation's reliability even for such a severely undermoderated lattice.

Measurements were made in the Test Pile on the uranium quality used in the various slug sizes of the exponential experiment. This was necessary since the various sizes were obtained at different times from different sources. It was found that the quality was the same for all diameters of metal within 0.005 di/8" slug.

Small source theory is being used to calculate an intracell neutron flux traverse for an exponential pile which can be compared with recent experimental measurements. The reason for the calculation is two-fold: (1) to see if present theory adequately explains the observed traverses; (2) to check small source theory as rigorously as possible to evaluate its use as an interpretive tool for PCTR experiments.

To date preliminary calculations have been carried out for three lattice cell points. The theory predicts accurately the flux relation between two of the points and comes within 10% of the third point. Further refinement of the calculations appears necessary before the theory can be judged for adequacy.

Measurements of the thermal neutron flux transverse across a P-10-A slug, made in connection with a study of neutron flux depressions in neutron absorbing rods, have been completed for a transverse section (1) in the center of a slug and (2) at the end cap of a slug. In terms of the disadvantage factor

$$\left(\text{D.F.} = \frac{\text{flux at the surface}}{\text{average flux inside the slug}} \right) \text{ the results were:}$$

At center of the slug, D.F. = 1.256 ± 0.02

At the end of the slug, D.F. = 1.100 ± 0.02

REACTOR PHYSICS

A further check on the reliability of the equation obtained from exponential experiments for predicting reactor buckling values was obtained from a comparison of the KW startup values with those predicted from the exponential experiments. The greatest uncertainty appeared to be in the actual KW graphite "quality". If Test Pile figures for the "quality" were used, the calculated bucklings were 4-6 microbucks high of the measured values; if KW diffusion length measurement figures were used,

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the discrepancy was less than the assigned uncertainties in the measurement (± 2 microbucks). Therefore, the agreement may be described as fair to excellent depending on the graphite quality. A summary report of the calculation, HW-34643, has been issued and a detailed report is in preparation.

An experiment to determine the neutron blocking effect of the cooling water in a process tube was performed at two pile temperatures during the startup of the KW reactor. The results of these tests are as follows:

$$\delta_{\text{cold}} = \frac{\Delta \phi}{\phi_{\text{slug}}} = 0.355 \pm 0.004 \text{ at } T = 7^{\circ}\text{C}$$

$$\delta_{\text{hot}} = \frac{\Delta \phi}{\phi_{\text{slug}}} = 0.305 \pm 0.005 \text{ at } T = 79^{\circ}\text{C}$$

where $\Delta \phi$ is the change in the thermal flux across the annulus

ϕ_{slug} is the thermal flux at the surface of the slug

T is the temperature of the pile (water and graphite temperature were the same).

From these results, the change in the co-called "blocking" effect with temperature is seen to be

$$\frac{\delta_{\text{hot}} - \delta_{\text{cold}}}{\delta_{\text{cold}}} = -14.1\% \pm 1.8\%$$

$$\text{for } \Delta T = 72^{\circ}\text{C}$$

The concurrent loss of water due to density and volume changes is only 3%.

PROTOTYPE PCTR

Some experiments are being performed to determine the high-temperature behavior of the lead-uranium oxide fuel elements which will be used in the PCTR. Hollow cylinders of lead, with dimensions approximately the same as those of the fuel elements, were placed in a furnace and slowly heated. No effort was made to use clean lead, so that the surface of the slugs was badly oxidized. The results of the tests to date show that the lead begins to melt, as expected at 327°C , and that the hollow cylinders actually collapsed before all of the lead is melted. This indicates that the oxide layer does not prevent the slugs from ultimately collapsing, but under the conditions of the test it is not possible to say whether or not the oxide layer hinders the collapse. Similar tests will be made on slugs of lead-uranium oxide when the method for fabricating such slugs has been determined by the manufacturer.

The PCTR Building has been completed and turned over to the Physics Research Sub-Section.

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NUCLEAR PHYSICS

A 4π beta counter to be used in the measurement of the Th-232 ($n\gamma$) Th-233 cross section has been put into operation and is performing reliably.

The work on the measurement of the energy variation of ν of U-235 reported last month is continuing. It was discovered that the sensitivity of the photocathode of the photomultiplier tube is quite sensitive to the position of incidence of the neutron beam. This could cause systematic errors which tend to invalidate the results obtained to date. Efforts are in progress to overcome this possible source of error.

Re-evaluation of $(1 + \alpha_{25})$

The primary determination of the total absorption to fission ratio for U-235, $(1 + \alpha_{25})$, rests upon certain foil irradiation experiments performed during late 1944 and early 1945. In these experiments foils enriched about two hundred and fifty fold in U-235 were irradiated at Oak Ridge and at Hanford and the U-235 depletion, fissioning fraction, and U-236 buildup were measured at Los Alamos by chemical and mass spectrographic means.

It was suggested to the writer by J. B. Sampson of KAPL that these data and their evaluation were not readily available and that such information would be useful in reactor calculations.

The original reports were located for the Hanford exposures, with the assistance of E. B. Montgomery. The Los Alamos work was found from references in BNL-250. The experimental data were recomputed and special corrections applied with the following discoveries:

1. $(1 + \alpha_{25}) = 1.184 \pm 0.008$ at neutron velocity of 2200 meters/second. This is to be compared with the BNL-250 normalization of 1.193 at the same velocity.
2. BNL-250 contains certain inconsistencies: The value of $(1 + \alpha_{25})$ from the plots of $\sigma_{\text{fission}} \times \text{velocity}$ and $\sigma_{\text{absorption}} \times \text{velocity}$ is 1.193 with over a 2% variation over the thermal neutron energy range, while the room temperature summary charts indicate $(1 + \alpha_{25}) = 1.184 \pm 0.008$, constant over the thermal energy range.
3. Current knowledge of reactor neutron energy spectra is in as poor a condition as current U-235 cross-section knowledge. Improvements in cross sections will not be very useful until spectra are improved equivalently.

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METALLURGY RESEARCH SUB-SECTIONIrradiation Effects

A total of forty-eight specimens of uranium has been examined after irradiation to determine the dimensional instability as a function of degree and type of preferred orientation. In general, an orientation in which the b axis of the uranium unit cell is aligned parallel to the longitudinal axis of the specimen induces an increase in length during irradiation, and an alignment of the a axis in the same direction produces an increase in diameter. Also, although some scatter in the data is present, the changes in dimensions become greater with increasing exposure. X-ray diffraction studies, photomicrographs, and density determinations are to be made on various specimens to assist in the determination of the type of mechanism responsible for the observed instability.

The annealing study of irradiated uranium being conducted with the 400 C annealing temperature has been continued with samples having been annealed up to forty-one hours and hardness values being obtained after each five hours of annealing, from 91 to 85 R_c . The decrease in hardness that was noted between the 15 and 20-hour anneal remained unchanged for the duration of the annealing.

Eight wafers from a uranium powder metal compact slug which distorted appreciably on one end after a pile exposure of 424 MWD/T have been cathodically etched and examined metallographically. The object was to compare the grain size values determined ultrasonically with those determined metallographically. Agreement was reasonably close on the undistorted end of the slug, both methods yielding values in the order of 1/100 mm nominal grain diameter.

At least three categories of structure were revealed in the distorted end of the slug as well as several small cracks. Macro inspection showed grains whose longest dimension approached half a centimeter. Many of these grains tended strongly toward a circular configuration. Higher magnification revealed more circles of micro dimension and in addition, a more general structure of extremely irregular outline. Dimensions of these irregular patterns varied widely, but the nominal 1/10 mm grain size obtained ultrasonically at the distorted end of the slug seemed reasonably close to the true size for this structure. A much finer structure was observed within the larger grains.

Metallurgical Techniques

Three specimens of molybdenum, irradiated at the MTR have been examined by x-ray diffraction to determine the type and extent of irradiation damage occurring in this metal. These samples were exposed to 6.5×10^{17} , 6.5×10^{18} , and 6.0×10^{19} nvt fast flux. A measurement of the (400) diffraction peaks obtained from these samples shows a line width at half height of 0.43° , 0.50° , and 0.55° , respectively. These widths compare with a width of 0.31° , measured at the same point, for an unirradiated sample. In addition, a shift has been measured in the peak intensity of these lines of 0.08° , 0.14° , and 0.17° , respectively. After the completion of further preliminary study, these peak shapes will be given a Fourier analysis to determine the type of radiation damage which has been induced.

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Laboratory metallographic studies involving the use of cathodic vacuum etching, replication, and optical and electron microscopy are continuing. The microstructure of an etched specimen of beta heat treated uranium has been examined before and after vacuum annealing and again after etching. The final microstructure indicates considerable growth of uranium grains, possible recrystallization, and twinning; twins were observed to pass directly through the many subgrains and boundaries which the cathodic vacuum etch has revealed. In addition, phase contrast microscopy indicates extensive surface fissures which also pass through grain boundaries.

The use of liquid NaK as a non-corrosive heat transfer medium for proposed in-pile metallographic studies appears practicable. Polished metallographic specimens immersed in NaK and heated for a period of eighteen days at temperatures of 300 and 500 C, show slight attack of the metallographic surface and only a slight staining of the exposed impurity inclusions present at the surface.

Equipment for measuring tensile properties of irradiated materials is being developed to test irradiated uranium tensile specimens in tension at elevated temperatures. The optical unit for measuring the strain of the specimens has been received from the vendor. Preliminary check runs have shown the optical instrument to operate satisfactorily.

Laboratory investigations on solid state diffusion in the temperature range 200-300 C for the U/Al system is continuing as a basis for the evaluation of the effect of irradiation on such diffusion. Two U/Al couples contained in a Zircaloy-2 capsule have been sent to the MTR for irradiation at a nominal temperature of 350 C (660 F) for eighteen days. A chemically etched and a cathodically vacuum etched U/Al couple have been vacuum annealed simultaneously at 390 C (730 F) for 119 hours in order to establish differences between the diffusion of specimens cleaned by cathodically vacuum etching and that of chemically cleaned specimens. A 50 percent HNO₃ solution was used to clean the uranium while a 20 percent NaOH solution was used to clean the aluminum. The cathodically vacuum etched couple had a diffusion zone approximately 0.027 inch thick; in the chemically cleaned specimen the diffusion zone approached only 0.011 inch with the exception of one 0.026 inch peak which occurred where good metal to metal contact evidently existed prior to the anneal. One cathodically vacuum etched U/Al couple has been annealed in vacuo at 250 C (480 F) for 263 hours; this anneal resulted in a maximum diffusion zone thickness of 0.004 inch.

Fuel Elements

An initial investigation has been made of one method of jacketing fuel elements in type 347 stainless steel. Stainless steel jackets, 1.445" O.D. by 1.385" I.D., were machined from seamless tubing and shrunk-fit on a 1.390" O.D. uranium slug and one steel dummy slug. Weld closures were made on each end of the jacketed slug. The end caps were machined from type 347 stainless steel. The canned pieces are being sectioned for a more detailed examination of the weld area, and additional pieces are being fabricated for flow laboratory tests.

Fuel elements consisting of four-inch uranium slugs, solid and cored, insulated from the aluminum jackets with one to four mils of aluminum oxide and with zirconium wafers on the ends, have been canned using the point closure technique. In-pile testing of these slugs will provide data on the behavior of uranium under irradiation at high

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temperature. A production test is now being circulated for signature, which authorizes irradiation of 12 slugs, with uranium surface temperatures during irradiation from 170 to 460 C and maximum temperatures from 490 to 950 C.

The two four-inch mechanically bonded, point closure canned slugs that were being irradiated in D-Pile were discharged at an exposure of 750 MWD/T. Visual examination of these pieces in the pile basin indicated no preferential corrosion in the "point closure" area of the cap. The uniform film conditions noted on the slug surface indicated that uniform heat transfer existed between slug and jacket during the irradiation.

Unbonded slugs, canned by the room temperature point closure technique, are being irradiated to determine their rupture resistance and to check the hypothesis that an unbonded fuel element should give improved performance under Hanford conditions. Under PT-105-580 A two solid slugs were successfully irradiated to 200 MWD/T tube exposure in C-Pile, the specific powers of the slugs having been 47 kw/ft and 9 kw/ft. The slugs showed no evidence of non-uniform heat transfer as viewed in the basin and are scheduled for radiometallurgy examination as soon as time permits.

Six solid unbonded slugs are operating normally in H-Pile, two in a tube that will be discharged at 400 MWD/T and four in a 675-750 MWD/T tube. Current exposures on these tubes are about 370 MWD/T. A tube charge of 36 unbonded, cored, natural uranium slugs and four unbonded, cored, enriched, uranium (1.75% U-235) slugs were charged in C-Pile January 20. In this tube the enriched slugs will operate at 65-80 kw/ft and the natural slugs up to 56 kw/ft. The tube will be irradiated to rupture of one of the fuel elements.

Fuel Materials

Two prototype uranium-magnesium fuel elements 0.880 inch in diameter and 4.0 inches long were fabricated using uranium shot which packed about 64 volume percent in a magnesium-silicon alloy matrix. These slugs were jacketed by sizing a zircaloy can on them and welding a cap in place. After autoclaving in 100 psi steam for 120 hours, the elements were placed in the MTR on January 7 and subjected to an effective thermal flux of 1.1×10^{14} nv. Heat transfer calculations made on the basis of this flux and a water velocity of 20 feet per second indicated that the maximum axial temperature would be about 500 C. The slugs generate about 45 kw/ft in this flux which corresponds to the power density in a Hanford slug operating at 103 kw/ft. These elements were irradiated in a so-called x-basket which is a vertical ribbed aluminum tube located adjacent to the active lattice of the reactor.

On January 17, after ten days of irradiation, one of the slugs failed with the accumulated exposure being about 280 MWD/T. An exposure of 5000 MWD/T was planned. It has been determined that MTR engineers had placed other capsule experiments in the basket along with the matrix slug experiment. These additional capsules in the tube reduced the flow of water and surface boiling occurred on the elements. The bottom slug, which became the hottest, ruptured and allowed water to come in contact with the matrix fuel material. The slug increased in diameter about 1.5 times and distorted the aluminum basket to such an extent that the slug could not be removed from the basket. The basket and slugs were discharged from the reactor and placed in the MTR canal. Visual examination of the test pieces in the canal showed a blue coloration on the zirconium end caps indicating that high temperatures had occurred (the

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blue oxide forms on zirconium at 300 C). There was no observable change in the unruptured slug except for a brown scale on the surface which is also possibly indicative of high temperatures and probably surface film boiling. There is a good possibility that the magnesium in the core of these slugs was in the molten state. The elements are now being transported to HAP0 where they will be examined more thoroughly. It is planned to remove the basket from the slug and determine the nature of the failure. Attempts will be made to determine the maximum temperatures that existed in the fuel elements by metallographic examination of wafers cut from the slugs. The extent of diffusion of silicon into the uranium particles should also give some indication of the temperatures. Heat transfer calculations will also be re-evaluated when the actual water temperatures, flow and pressure conditions that existed during irradiation are known. The zircaloy caps and cans will also be examined metallographically. Two new matrix-type fuel elements are being fabricated for irradiation in the MTR. The prototype fuel will be slightly larger than the two which were previously charged in the MTR and will have a thicker can-wall of zircaloy. The specimens will begin irradiation on or about February 14.

The irradiation of the 0.50 inch uranium-magnesium capsules is progressing satisfactorily. The four capsules remaining in the MTR have accumulated an exposure of about 8000 MWD/T at this time.

The fabrication and 305 pile testing of HAP0 dimension uranium-magnesium fuel elements has been continued during this report period. Fuel elements containing 36.5 volume percent enriched uranium (1.75% U-235) have been prepared and tested in the 305 Pile. Test pile measurements indicate that the enriched uranium-magnesium matrix slugs have a reactivity approximately six times that of normal solid uranium slugs. Similar tests are in progress on HAP0-size fuel elements prepared from normal uranium chips. Following the 305 Pile tests, these fuel elements will be canned for 105 Pile tests.

As has been discussed in previous reports of this series, an experiment is in progress in which sixteen UO_2 filled zircaloy capsules have been prepared and are awaiting irradiation in the MTR to determine the effect of flux, irradiation time, oxide density, and U-235/U-238 ratio on oxide fuel materials. An analysis of the heat transfer mechanism within the uranium oxide core has been made, based on three recognized modes of behavior of solid system thermal conductivity. These cases are represented by (a) a solid powder with gas phase continuous, (b) a porous solid with solid phase continuous, and (c) a solid of zero porosity. Arbitrary choices of behavior during cross over between these three cases have been made based on observation and known sintering behavior of UO_2 . In this manner the thermal conductivity of the UO_2 cores have been graphically described and, as a result of integration, curves have been prepared relating maximum core temperature to rate of heat generation of the core in the proposed irradiation experiment. The predicted core temperatures of the capsules as prepared group about three temperatures: 1560 C, 1940 C, and 2725 C. The test specimens have been fabricated and are ready for shipment to the MTR.

MTR Fuel Element Testing Facility

During the month attempts were made to remove the ruptured fuel elements from the B-block that was discharged from the MTR during December. This B-block contained three AlSi canned, solid slugs, two of which had longitudinal V notches milled in the surface. The slugs had operated at 80 kw/ft in the MTR and had accumulated an exposure of 130 MWD/T before a rupture occurred. The lower end of the B-block was

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sawed off in the MTR canal to permit pressure to be applied to the slug column in an attempt to remove the slugs. Removal attempts have been unsuccessful thus far, however, and it appears that a remotely-operated saw will have to be fabricated to section the B-block in order to remove the stuck slugs or slug. The difficulty experienced in the attempts to remove these pieces from the present B-block has prompted a re-evaluation of basket-type B-block designs. Use of the basket type block should greatly facilitate removal of stuck slugs and should permit the re-charging of irradiated slugs if desired. Fabrication of the basket of B-block is now in progress.

Zirconium Metallurgy

Samples of arc-melted Bureau of Mines zirconium, fabricated to six initial cold-work levels ranging from 0 to 50 percent reduction in area, have been irradiated in water-cooled central-zone process tubes of a Hanford reactor to exposures of 190, 490, and 780 MWD/AT. The tensile properties, hardness, and microstructure of the material are being determined to gain information on the extent of radiation damage. The hardness and tensile properties after 490 MWD/AT are very nearly the same as those obtained after 190 MWD/AT, indicating saturation of damage at the lowest exposure. One tensile sample of each irradiated pair from the second exposure has been retained for annealing. Annealing studies are being conducted on the "cold" material in order to separate the annealing of radiation effects from that of cold work. One hundred hours at 250 C does not cause any measurable recovery in any of the cold work levels.

Reaction rate studies of zirconium and Zircaloy-2 in dry air at elevated temperatures have been continued using 0.6 inch diameter rolled rods. Weight gains per unit of original area at 500, 600, and 700 C (930, 1110, and 1290 F) substantiate results obtained with sheet specimens. Length increase of sheet specimens, however, is somewhat greater than for rods under identical exposure conditions; at 700 C, for example, Zircaloy-2 sheet specimens after twenty-four hours had increased in length by 1.2 percent, while bars increased by about 0.3 percent. Similar differences have been found at 600 C in reasonable agreement with data obtained in preliminary experiments several months ago.

Zirconium and Zircaloy-2 process tube sections presently undergoing extensive aqueous corrosion tests locally as well as off-site are also being tested in the 100-H "X" test hole for resistance to scaling. One tube section and a group of control strip specimens have been examined visually after three months' exposure to 100-H pile gas at 410 C. All of the specimens are covered with a black oxide, but the amount of reaction product in terms of weight gain per unit area has yet to be determined.

The notched specimen slow bend test is being used to investigate embrittlement in zirconium and other materials in various atmospheres at 200 to 700 C (390 to 1290 F). The present state of development of this testing method permits rapid empirical evaluation of the effect of size factors on test results. Thus, with a few tests the fracture angle and bending moment is determined for any depth of notch or specimen thickness, within reasonable limits. Anything that appears to change the value of these empirically determined constants may be interpreted in terms of an embrittlement parameter. Embrittlement appears to increase the stress at which fracture takes place and to reduce the fracture strain. The bend test data collected on zirconium and Zircaloy-2 indicate that in a plot of embrittlement parameter against stress or

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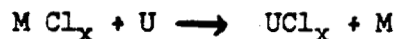
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strain at fracture there will be a pronounced change in slope of this function at some point; this change in slope represents a transition from ductile to brittle type of failure. The embrittlement parameters subject to laboratory control in the bend test are test temperature, triaxiality of stresses, prior strain in the metal microstructure and heat treatment. Triaxiality of stresses are controlled by the angle root radius and depth of the notch. The most pertinent embrittlement parameter is that due to absorbed impurities caused by exposure of zirconium to gaseous and aqueous atmospheres at elevated temperatures. This absorbed gas effect is measured by varying the temperature parameter with various gas parameters until a transition from ductile to brittle fracture occurs. This effect may also be measured by changing triaxial stresses by varying the notch. Eight ppm of hydrogen added to annealed Zircaloy-2 increased the transition temperature about 100 C. By increasing the notch depth in the original specimens 10 percent, its transition temperature was made to coincide with the specimen containing added hydrogen.

Uranium Reduction Studies

The more desirable salt compositions of a uranium electrorefining bath for producing particulate uranium usually contain about 30 percent by weight of uranium ion in either the plus four or plus three state. The concentration is usually achieved by dissolving such compounds as UCl_3 , UCl_4 , UF_4 , or KUF_5 in the molten salt system. The preparation and handling of each of these salts is either hazardous or difficult or must be done in a highly corrosive environment. It would be desirable to eliminate the need for such preparations. An attempt has been made to utilize a reaction of uranium turnings with dissolved metal chlorides to charge such a bath. The anticipated reaction is written as:



Only three metals appear satisfactory from the standpoint of melting point, boiling point, and position in the electrochemical series to serve, namely silver, copper, and possibly zinc. A dry mixture of KCl , $LiCl$, $CuCl$, and uranium turnings was melted in a Pyrex tube under an argon atmosphere. The color of the melt indicated that uranium trichloride had been formed almost as soon as melting occurred. Electrolysis of the molten system proceeded smoothly, yielding a mixture of spongy uranium and crystalline copper at the cathode. Subsequent uranium turnings added to the cell to rest on the bottom of the graphite crucible serving as anode appeared to dissolve anodically. The experiment was terminated due to the excessive corrosion of the tungsten wire serving as an electrical contact to the graphite crucible. Additional experiments are in progress.

The salt, uranium calcium fluoride which can be prepared by precipitation from UNE solutions, has been reduced with calcium as a reductant. Calcium chloride was added to the charge to form a slag of 50 M % $CaCl_2$ in CaF_2 . The charge was fired in a hermetically sealed bomb by raising the temperature to 1000 C and holding for five minutes. The reduced metal had partially sintered but was easily crushed and leached from the slag. The yield of particulate uranium was approximately 50 percent of the theoretical yield.

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DECLASSIFIEDRadiometallurgical Examination

An examination of the slugs and process tubing from Tube 4669 KW was initiated to determine the extent of damage to the tube and charge and to establish the metallurgical reactions resulting from the extreme thermal conditions which existed in the uncooled tube. The entire slug column was received by Radiometallurgy and a visual examination made of all but nine of the slugs.

The prominent processes which affected the slugs were diffusion of uranium into the jacketing material and melting of the uranium. Because of the rapid formation of high-melting compounds of aluminum by the diffusion process, there is some uncertainty as to the amount of actual melting of the jacket material which occurred. Observable damage occurred to the eighth through the 36th slug (numbered from the front face). Melting of the uranium had taken place on slugs 11 through 15, and slugs 16 to 24 along with the process tube had been fused into a continuous shape in which the identities of the slugs and tubing were lost. Partial removal of this section from the graphite was completed. Slugs 25 through 34 had been denuded of their jackets with no observable melting of the uranium. The jackets were misshapened and partially removed from slugs 35 and 36. The last two slugs of the charge, 37 and 38, were not affected.

The initial inspection of the slugs and tubing permits the tentative conclusion that there were three zones within the slug column that received widely different cooling treatments. Slugs 1 through 11 apparently were water-cooled after the pile operated at power levels up to 240 MW. Slugs 12 to 36 were subjected to the maximum power levels without cooling from circulating water. A portion of slug 36 along with slugs 37 and 38 were cooled by stationary water throughout the exposure.

A program to determine the effects of the exposure on the three categories of slugs has been initiated. In addition, work was started to identify the various diffusion products and other materials which resulted from the heating throughout the tube and to establish the significance of heat treating effects seen on the uranium at the borders of the high temperature regions in their relation to heat transfer computations.

X-ray diffraction studies are being made of some of the material obtained from Tube 4669 of 105-KW. A sample taken from the outer portion of fuel element number 28 shows a strong diffraction pattern of UAl_3 . The diffraction peaks are shifted slightly to angles that are higher than are predicted theoretically, indicating a unit cell that is slightly smaller than that of UAl_3 . This could be explained if the silicon atoms which are present in small amounts are forming a solid solution with UAl_3 . However, it is evident from the data that this particular sample is composed almost entirely of UAl_3 compound.

Upstream and downstream sections of Tube 4669-KW were received for examination. Approximately six feet of upstream and eight feet of downstream sections have been examined to date. Holes produced by melting of the tube wall were found in sections approximately 17, 17-1/2, 19, and 31 feet from the front face. A section, 36 feet from the front, showed evidence of melting; however, it was not severe enough to produce a hole in the tube wall. The downstream end of a section 19-1/2 feet from

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the front and one estimated at 27 feet from the front appeared to have undergone extensive melting. No sections of between these two have been received. No evidence of melting was found upstream of 17 feet or downstream of 36 feet. Hardness values of the sections upstream of 17 feet ranged from 72 to 80 Rockwell H and dropped sharply to 52 to 55 downstream of 17 feet. The hardness values of the sections upstream of 35 feet ranged from 50 to 54 and downstream of 35 feet they ranged from 58 to 76.

A cap type failure (Rupture No. 422) was examined and measured. It was discharged from Tube 3584-H on December 29, 1954, after an exposure of 812 MWD/T. This is the first cap type failure since the rash of PT-25M failures during April, May, and June, 1954. The uranium core of this slug is from B lot material (beta heat treated in rod form) and was canned by the lead dip process. The cap assembly was completely detached, and as yet, has not been received for examination. A hemispherical shaped cavity in the cap end of the uranium was approximately 1/4-inch deep and 3/8-inch in diameter and was located slightly off-center. No visible warp could be detected. Core length and dish measurements were made after removing the base from the slug. The core length was measured every 22-1/3 degrees around the periphery and at the same number of points 0.37 inch from the axis. The average peripheral length was 8.366 inches with a maximum of 8.373 and a minimum of 8.360. The average length 0.37 inch from the slug axis was 8.345 inches with a maximum of 8.359 and a minimum of 8.329. In both cases the maximum and minimum values were 180 degrees apart; however, the peripheral maximum and minimum values were 180 degrees out of phase with those 0.37 inch from the axis. The dish in the base end was 24 mils. The cap end dish could not be measured because of the cavity; however, the measurements indicate that it was approximately equal to the dish in the base end. These measurements reveal an average peripheral length increase of 41 mils and a maximum of 48 mils over the specified pre-irradiated lengths of 8.325 ± 0.010 inches.

Fuel elements irradiated at the MTR by GE-ANP are being examined to determine the effect of irradiation times and temperatures on the element stability and oxidation resistance. The fuel elements, which are 1.72 x 0.77 x 0.012 inches thick, consist of a 0.004-inch core with 0.004-inch cladding on each side of the core. One sample with NiCr V cladding and NiCr V-UO₂ core which was irradiated for 100 hours at 1800 F has been examined. The number of oxide stringers per linear inch increased by a factor of approximately three over the number found in fuel sheet subjected to isothermal, unstressed conditions for a corresponding length of time. Very little, if any, loss in cladding occurred. Three partially connected voids were observed in the core material which caused a localized bulge in the cladding. An increase in thickness of five percent or 0.0006-inch was observed at the section where the voids occurred.

The thickness of the weld bead was 60 percent greater than the average fuel element thickness. This is not unusual as agglomeration or uneven build-up of the braze closure may occur.

Radiometallurgy Facilities

A plugged lapmaster waste line necessitated shutdown of the metallographic cell on January 20. Advantage is being taken of this forced shutdown of the cell to effect certain other repairs and installation of new objectives in the remote metallograph. One of the two lapmasters is being converted to gritcloth operation for faster

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coarse grinding of metallurgical specimens. Efforts are also in progress to effect installation of recently received ultrasonic equipment for use in electropolishing, etching, and cleaning metallographic specimens.

The 60,000# tensile machine, which is to be used for high temperature tensile testing, has been installed. The calibration of the machine has been completed and found to be satisfactory.

Work was completed on Cell E, and equipment for the opening and preparation of radioactive samples was moved from Cell D, where this work was formerly done, to the north half of Cell E.

Equipment for electrical resistivity measurements and the scintillation scanner have been installed in the south half of Cell E.

Modifications of the existing x-ray diffraction unit in the 327 Building are being made on the target tube assembly, the sample holder, and the crystal holder.

Separation Plant Corrosion

A program to determine the corrosivity of 2WW-Purex waste acid concentrate by quantitative, semiquantitative, and qualitative methods upon type 304L, 347, and 312 stainless steel and type A55 titanium under heat-transfer conditions is in progress. Preliminary data of semiquantitative nature, on the effect of corroding surface temperature upon the corrosion rate of five, extruded-type 304L stainless steel, bayonet heat exchangers exposed to boiling synthetic 2WW-Purex waste acid concentrate, have been collected. These data are in good agreement with semiquantitative data reported in previous monthly reports. The total of the semiquantitative data relative to 304L bayonets, collected to date, indicates that the corrosion rate of these bayonets has become constant with time at any specific temperature within the range of 115 C to 155 C after 530 hours' exposure under heat-transfer conditions to boiling-2WW waste concentrate. However, the steam temperature inside the 304L bayonet, within 115 C and 155 C, does affect the magnitude of the corrosion rate. At steam temperatures of 115 C to 125 C, the average corrosion rate was 0.0013 inch penetration per month while at steam temperatures of 135 C to 155 C, the average corrosion rate was 0.0032 inch penetration per month. A sixth bayonet of type 329 stainless steel, exposed under heat-transfer conditions to boiling-2WW-acid concentrate simultaneously with the type 304L stainless steel bayonets, shows little corrosive attack except in the heat affected zones and fusion zones of the welds where corrosion appeared severe. The average steam temperature inside the 329 bayonet was 148 C.

A failure occurred in the No. 20 calcining pot used in the conversion of 100 percent UNH to UO_3 in the 224-U Building after about 750 hours' service. The No. 20 calciner is a gas-fired pot, formed from 5/8-inch type 347 stainless steel plate with a forged, dished bottom. Visual examination of the pot before decontamination operations were completed showed that the failure occurred in the area directly beneath the agitator shaft. The failure was characterized by some buckling and severe general thermal stress cracking in this area. It appears that the area directly beneath the agitator shaft is subject to high stress and a temperature differential accompanied by, or due to, the formation of a hard cake composed of UO_3 and U_3O_8 . As soon as decontamination operations are completed, the section in which the

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failure occurred will be removed, and a detailed metallurgical examination will be made to determine the nature and cause of the failure.

Visual examination was made of two Redox facilities for the purpose of determining the extent of corrosion. A 100,000-gallon cylindrical stainless steel tank which has been used to store 70 percent aluminum nitrate nonahydrate at approximately 60 C for approximately three years was inspected visually and found to be free from any indications of corrosive attack. An attempt was made to determine the extent of the corrosion of the Redox exhaust fume duct liner by using a periscope inserted through the concrete shielding. The high vapor velocities and poor lighting prevented an accurate assessment of the corrosion damage, but several areas of the liner appear to be corroded through, exposing the concrete. Other areas of the liner appear to have suffered appreciable corrosive attack in and adjacent to the welds. Recommendations were made that a larger access port be made so that adequate lighting could be provided and possibly cameras could be employed to record the appearance of the duct so that a more accurate evaluation of the corrosion problem could be made.

Plutonium Metallurgy

A mechanically bonded 0.505-inch diameter tensile test specimen with a strength of 4,375 psi was fabricated using uranium and unalloyed plutonium components. The uranium was anodically roughened and cathodically etched, and the plutonium was mechanically cleaned just prior to bonding. The pieces were bonded with a pressure of 100,000 psi at a temperature of 350 C. A cooling rate of 1-1/2 degrees per minute was used with the pressure maintained during cooling. The plutonium contracted only 0.016 inch in diameter when the pressure was applied during cooling, as against an expected 0.035 inch without it. The specimen was given a cold treatment in a mixture of CO₂ and acetone after it was bonded, but before testing. This treatment increased the density of the plutonium from 17.43 as cast to 19.18 ± 0.01, allowing the material to be tested at near the alpha condition.

A bonding trial was made by vacuum casting unalloyed plutonium on a flat edge-relieved uranium specimen. The plutonium was poured at 1000 C under a vacuum of 5×10^{-4} mm Hg. The mold was preheated to 450 C prior to, and held for two hours after, pouring the plutonium. An uninterrupted slow cool was maintained from 450 C to 25 C. After the mold and excess metal were removed, the assembly was given a super cooling treatment in a dry ice-acetone mixture for two hours. The assembly was then tested in tension. The bond withstood a load of 340 pounds or an overall bond strength on the quarter-inch section of 6800 psi. Examination of the fracture showed that none of the flat cross sectional area had bonded. This portion of the specimen was heavily oxidized indicating that the assembly had apparently parted while still at a high temperature. The small annular ring formed by the relieved area was therefore supporting the entire load. Measurement of the fractured annular ring indicated that the area of this ring was only about 15% of the area of the quarter-inch diameter specimen. The strength of the bond actually resisting the load was approximately 40,000 psi. The density of the plutonium portion of the assembly was found to be 18.10 g/cc.

The method used in diffusion bonding delta-stabilized plutonium to uranium was applied to unalloyed-plutonium and uranium with partial success. A plutonium wafer was pressed into a uranium surface having concentric grooves at 225 C and 20,000 psi.

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The specimen was heated to 350 C, with a pressure of 10,000 psi applied for 15 minutes and of less than 5,000 psi for another 60 minutes. On cooling from the bonding temperature, the pressure was gradually increased from 5,000 psi at 350 C to 35,000 psi at 50 C, in steps of 5,000 psi each 50 C. The wafer bonded to only one of the opposing uranium surfaces. This bond had a strength of 500 psi. The outer half of the fractured surface was oxidized, showing that most likely only a small portion of the area contributed to the bond strength. The density of the plutonium measured after fracture indicated at least 17% to be alpha phase.

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CONTACT ENGINEERING UNIT

Project Representation

Project CA-512-R

Revised cost estimates on changes in Beckman circuitry deemed necessary to comply with process specifications indicate costs of about \$20,000 will be incurred rather than the \$12,000 previous estimate. Efforts will be made to expedite installation as much as possible.

Project CG-558

Scope has been completed. During the month the last scope item was settled by a decision to install new nozzle and pigtail assemblies as recommended by the Design Section.

Detailed design is now 51 percent complete and 61 percent of the purchase requisitions have been issued.

Project CG-600 (C Area portion of CG-558)

Original scope for C Area did not contemplate changes to the 190 pumping plant. Recent experiences at 190-C indicate the desired flows cannot be maintained without overheating the motor windings. Possible solutions include:

1. One additional pump set.
2. Additional motor cooling capacity.
3. Rewinding the motors.
4. Changing pump impellers.

A study to determine the most desirable alternative is now underway.

Process Studies

Studies continued on the definition and exploration of expected pressure drop versus flow characteristics for two phase coolant flow. These relationships and others were used to formulate informal recommendations for further experimental studies by the Heat Transfer Unit.

Special Assignment

During the latter part of the month considerable effort was expended in direct support of Pile Technology activities in connection with the 105-KW incident of January 5. Document HW-34461, a preliminary report of the incident, was issued on January 17.

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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 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.

<u>Inventors</u>	<u>Title</u>
E. C. Pitzer Y. B. Katayama R. E. Starke	Modified Iron Plated Uranium Slug
E. C. Pitzer	Preparation of Basic Compounds of Nickel
A. T. Taylor D. E. Johnson	The Technique of Fabricating Thin Wall, Metallic Tubular Sections
D. E. Johnson A. T. Taylor	Machine for Cold Roll-Forming Thin Wall Tubing from Heavy Wall Blanks

O. H. Greager
Manager - Pile Technology
ENGINEERING DEPARTMENT

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Separations Technology Section

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VISITORS AND BUSINESS TRIPS

W. Lindsey, AEC Office of Production, Washington, D.C., visited Hanford on 1/28/55 to discuss TBP plant capacity and waste scavenging.

W. S. Knecht and R. S. Summers of Mallinckrodt Chemical Company, St. Louis, Missouri, visited Hanford on 1/7/55 for process consultations on continuous calcination.

C. M. Slansky of the Phillips Petroleum Company, Arco, Idaho, visited Hanford on 1/7/55 to discuss solvent extraction process problems.

G. W. Watt of the University of Texas, Austin, Texas visited Hanford on 1/18/55 for consultations on separations problems.

Aikman Armstrong and George Banerian of Aerojet-General Corporation of Azusa, California visited Hanford on 1/10/55 to obtain information on pumps.

B. S. Johnson, du Pont Co., Savannah River visited Hanford on 1/27/55 for process consultations concerning Purex process.

C. H. Ice and J. L. Hyde du Pont, Savannah River visited Hanford on 1/25/55 to discuss in-line instrumentation.

J. W. Conley, B. C. Wing, ANP Department, G.E. Co., Idaho Falls, Idaho visited Hanford on 1/26/55 to discuss in-line sample installation and protective coatings.

R. C. Regier, Phillips Petroleum Co., Idaho Falls, Idaho visited Hanford on 1/31/55 to hold analytical consultation on over-all separations processes.

B. T. Stark of Hanford visited the General Engineering Laboratory, Schenectady on 1/7/55 for employment interview.

K. H. Hammill visited Standard Cycle and Supply, Spokane, Washington on 1/13/55 to obtain information on electric crane.

R. E. Burns visited the University of Minnesota, Minneapolis on 1/17/55 to recruit technical personnel. Mr. Burns also visited South Dakota State, Brookings, S.D. and the University of Nebraska, Lincoln, Nebraska for the same purpose.

W. H. Reas visited the Argonne National Laboratory, Lemont, Illinois on 1/18/55 to attend symposium on high temperature fuel processing.

F. A. Scott visited Knolls Atomic Power Laboratory, Schenectady on 1/24/55 to discuss analytical thorex and purex problems.

R. J. Brouns visited the Ames Laboratory, Ames, Iowa, to discuss analytical chemistry problems concerning over-all separations.

F. J. Leitz visited Reed College, Portland, Oregon on 1/28/55 for the purpose of recruiting technical personnel.

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F. P. Brauer, visited ANP, Cincinnati, Ohio on 1/10/55 to discuss radiochemical methods for burn-up studies.

E. P. Galbraith visited the Research Laboratories, Schenectady, New York on 1/25/55 to attend the Research Laboratory Technical Conference and the General Engineering Laboratories, Schenectady, New York on 1/26/55 to discuss analytical techniques and analytical equipment, and the Knolls Atomic Power Laboratory, Schenectady, New York on 1/27/55 to discuss analytical development problems.

R. B. Richards visited the Argonne National Laboratory, Lemont, Illinois on 1/24/55 through 1/28/55 to discuss Reactor Handbook revisions.

ORGANIZATION AND PERSONNEL

	<u>December</u>	<u>January</u>
Separations Technology General	2	2
Plant Processes Sub-Section	49	46
Chemical Development Sub-Section	83	82
Chemical Research Sub-Section	65	64
Contact Engineering Unit	4	4
Analytical Laboratories Unit	32	32
Technical Shops Unit	29	29
Total	264	259

Plant Processes Sub-Section: R. E. Cotner, Supv. Anal. IV terminated, "Leave of Absence - illness" on 1-5-55.

R. R. Dickerson, Stenographer transferred from the Sub-Section to the Design Section, Instrument Design on 1/3/55.

L. J. Nielson, Engineering Assistant transferred from the Sub-Section to the Manufacturing Department, Separations on 1/3/55.

Chemical Development Sub-Section: Doris A. Dean, Lab. Asst. A, terminated on 1/28/55 to "return to school".

Chemical Research Sub-Section: B. T. Stark, Engineer II, transferred to the General Engineering Laboratory, Schenectady effective 1/31/55.

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Separations Technology Section

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PLANT PROCESSES SUB-SECTION,

REDOX PROCESS TECHNOLOGY

Summary

The Redox Plant was operated until January 7 with permanganate Head-End oxidation of IAF and three Uranium and three Plutonium Cycles, employing one-stage backcycle. Uranium and plutonium decontamination and recoveries continued to excel. Since January 7, the process was shut down in order to: (a) clean the plant equipment for the changeover from high to low MWD/T plutonium processing; and (b) change equipment which had failed or would limit the instantaneous production rate below ten tons uranium per day. The modifications were essentially complete at month end.

Dissolver Solution Preparation

The dissolvers were charged with uranium having an average pile exposure of 587 (394 to 732) MWD/T and "cooled" an average of 95 (69 to 169) days, and this metal was processed prior to the January 7 shutdown. The metal heels in the dissolvers were also removed and processed. On January 7 and 8, all three dissolvers were flushed with three per cent HF-20 per cent HNO₃ in order to remove siliceous materials which were partially responsible for the IA Column flooding experienced during the recent months. Since the cleanout, the dissolvers have been charged with uranium having an average pile exposure of 194 (189 to 200) MWD/T and "cooled" 101 (97 to 104) days.

The permanganate Head-End treatment procedure was employed for most IAF batches. Two IAF batches were oxidized with sodium dichromate and processed to produce uranium product solution for Tail-End ozonization development work at the Hot Semiworks. Manganese dioxide scavenging was not employed from December 20 to 30 in order to evaluate its effect on the radio-ruthenium content of the ventilation air (emission from the H-1 IAF Make-Up Tank during receipt of centrifuge supernate). Because of concurrent large emissions of ruthenium during H-4 Oxidizer pressurization, conclusive data were not obtained. However, since the technological bases for emission during scavenging are sound, scavenging will be discontinued in an effort to reduce the ruthenium content of ventilation air.

Pressurization of H-4 Oxidizer occurred frequently during the month because of an inadequate vacuum, primarily the result of a leaky vapor line. The secondary cause of the low vacuum was a partial plug (presumed to be oxides of ruthenium) in the H-4 tower packing. Two series of chemical flushes (caustic-permanganate, acid peroxide) were unsuccessful in improving the condition. Thus, replacement of both the tower and the vapor line were required.

Solvent Extraction Performance

Uranium and plutonium decontamination factors representative of those achieved during use of the permanganate Head-End process are summarized below:

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Cycle	Gamma Decontamination Factors (dF)	
	Uranium	Plutonium
Head-End - First Cycle	4.2	4.3
Second Cycles	2.5	2.1
Third Cycles	0.3	1.1
Over-all	7.0	7.5

The over-all uranium and plutonium decontamination factors for the IAF oxidized by sodium dichromate were 6.4 and 6.7, respectively. Uranium and plutonium recoveries were generally 99.7 and 99.5 per cent, respectively, except that the plutonium recovery during processing of the dichromate oxidized IAF decreased to approximately 98.5 per cent.

Flooding of the IA Column required that processing rates be gradually reduced until at shutdown time on January 7, the processing rate was five tons uranium per day. During the shutdown, the IA, 2D, 3D, 2A, and 3A Columns were all water flushed, and the IA and 3A Columns were flushed with 40 per cent HNO_3 . In addition, the IA Column was flushed with series of five per cent NaOH -1.5 per cent H_2O_2 , followed by 40 per cent HNO_3 . Also, the Plutonium Cycle tanks were flushed with nitric acid in the program of cleanout for the low MWD/T production. A total of only 50 units of plutonium was discarded as a result of the flushes.

Permanent instrumentation has now been installed for the IA, 2D, 3D, and 3A Columns for control of the interfaces automatically in the upper portion of the scrub section. Evaluation of the effect of lowered IA and 3A Column interfaces will be made shortly after startup.

Uranium Cycle Flowsheets

The flowsheet in use at month-end is summarized below. Backcycle of 3DW and 3AW to the 2DFS was continued.

(1) Flow Ratios (Relative to IAF = 100)

IAF:IAA:IAX:IBX:IBS:ICX = 100:115:400:30:100:140
 2DFS:2DA:2DX:2EX = 147:25:300:120
 3DF:3DS:3DA:3DX:3EX = 82:50:20:300:120

(2) Solution Specifications

IAF	2 M UNH , 0.2 M HNO_3 -deficient, 0.1 M $\text{Na}_2\text{Cr}_2\text{O}_7$, Pu
IAA	2 M $\text{Al}(\text{NO}_3)_3$, 0.2 M HNO_3 -deficient, 0.01 M $\text{Na}_2\text{Cr}_2\text{O}_7$
IAX, 2DX, 3DX	Neutral hexone
IBX	1.3 M $\text{Al}(\text{NO}_3)_3$, 0.05 M HNO_3 , 0.05 M $\text{NH}_2\text{SO}_3\text{H}$, 0.05 M $\text{Fe}(\text{NH}_4\text{SO}_4)$
IBS	0.075 M HNO_3 in hexone
ICX, 2EX, 3EX, 3DA, IOX	Demineralized water
2DFS	1.3 M UNH , 1.2 M $\text{Al}(\text{NO}_3)_3$, backcycled, 0.2 M HNO_3 -deficient 0.003 M $\text{Fe}(\text{NH}_4\text{SO}_4)$

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2DA	0.5 M HNO_3 , 0.01 M $\text{NH}_2\text{SO}_3\text{H}$, 0.01 M $\text{Fe}(\text{NH}_4\text{SO}_4)_2$
3DF	2.5 M UNH_3 , 0.2 M HNO_3 -deficient
3DS	2.5 M $\text{Al}(\text{NO}_3)_3$, 0.3 M HNO_3 -deficient, 0.005 M $\text{NH}_2\text{SO}_3\text{H}$, 0.003 M $\text{Fe}(\text{NH}_4\text{SO}_4)_2$

Plutonium Cycle Flowsheets

The flowsheets used for normal IAF are summarized below. Adjustments in flow ratios were frequently made to compensate for high 2AF plutonium concentrations or flow ratio caused by the addition of recycle.

(1) Flow Ratios (Relative to IAF = 100)

2AF:2AS:2AX:2BX:2BP Butt	= 32:20:35.7:7.1:7.8
3AF:3AS:3AX:3BX	= 14.9:14.9:23.9:9

(2) Solution Specifications

2AF	1.3 M $\text{Al}(\text{NO}_3)_3$, 0.1 M HNO_3 , 0.02 M $\text{Na}_2\text{Cr}_2\text{O}_7$, Pu
2AS, 3AS	1.3 M $\text{Al}(\text{NO}_3)_3$
2AX, 3AX	0.5 M HNO_3 in hexone
2BX, 3BX	0.04 M HNO_3
2BP Butt	2.5 M $\text{Al}(\text{NO}_3)_3$

241-SX Waste Storage Tank Farm

Minor short-lived pressure buildups occurred in Tank 241-SX-101 on January 15 and January 24. The pressure on both occasions rose by 1.5 to 2.0 inches of water in the tank, vapor header, and vent header. The condensate flow rose rapidly from zero to eight gallons per minute on the 15th and to ten gallons per minute on the 24th, then gradually dropped off to the normal two gallons per minute rate. Both surges occurred after the transfer of (thermally) cold waste to the tank and the subsequent six to eight hour periods of non-boiling in Tank 101. It appears that the pressurizations were caused by sudden and violent breaking into a boil by superheated supernate. They differed thus from the more intense "bumping" in Tank 241-S-101 which has been ascribed to flashing of vapor due to mixing of hot sludge with boiling supernate.

The temperature at the bottom of Tank 241-SX-101 has continued to increase. The average temperature of nine points on the tank bottom rose from 287 F (range 280 to 294) on December 20, 1954, to 323 F (range 302 to 342) on January 13. Between January 17 and 24, the average temperature remained at 317 to 318 F (range 307 to 341).

The inlet to the test tank in Tank 241-SX-101 was closed January 7. Since that time, the temperature of the sludge layer has been climbing. The temperature at the bottom of the tank rose from 247 F on January 7 to 280 F on January 23. The supernate temperature has remained steady at 222 F.

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Equipment Changes

The following equipment was installed to remove known limitations below an instantaneous production rate of ten tons uranium per day:

- (1) F-8 pump and jumpers to permit operation of the IS Column as a IA Column;
- (2) 1.5 gallons per minute 2AF rotameter;
- (3) New 3A Column overflow vent jumper; and
- (4) 3450 (vice 1740) rpm motors on organic feed pumps to columns.

The following equipment changes were required because of failure or for an improvement in reliability:

- (1) D-12 Waste Concentrator No. 6 replaced with the repaired No. 5 unit;
- (2) J-6 Cendenser Vent Filter replaced with a unit packed as follows with 115-K Fiberglas;

<u>Bed Depth, Inches</u>	<u>Density, lb/cu ft</u>
10	1.5
6	3.0
15.5	7.1

No AA Fiberglas was used because of its lack of resistance to moisture in these vent gases. The vent gases are now routed to the Sand Filter (vice directly to the stack).

- (3) E-7 Crossover Oxidizer Pump (failed January 9 after three years of service) replaced with a 25 gallon per minute jet;
- (4) G-3 Organic Still tube bundle gasket leaks temporarily repaired;
- (5) G-5 Centrifuge Feed Tank to H-2 Centrifuge jet replaced with parallel jets; and
- (6) D-12 Waste Concentrator feed jet jumper, H-2 Centrifuge to H-4 Oxidizer jet jumper, H-5 Scrubber recirculation jumper, and H-6 Condenser thermohm and vent jumpers replaced.

URANIUM RECOVERY PROCESS TECHNOLOGY

Metal Removal

Three tank farms were operated to produce about 95 per cent of the gross feed uranium to the TBP solvent extraction plant. A net 5230 gallons of stored waste,

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with the volume increased 6900 gallons by the addition of sluicing water, were removed by standard sluicing operations, for each ton of new uranium processed. A summary of feed source, age, and irradiation history is given below:

<u>Tank</u>	<u>Fraction</u>	<u>Age</u> ^(a)	<u>Ave. MWD/T</u> ^(b)
104-105-BX	0.331	41	371
111-112-BY ^(c)	0.140	32	582
104-TX	0.164	40	459
107-TX	0.325	29	582
204-C	0.040	84	201

- (a) Estimated minimum age since pile discharge, months.
 (b) The average MWD represents the weighted average pile exposure for the metal in the cascade.
 (c) The 111-112-BY supernatant was processed through tank 104-C.

The tank farm production was limited by the ability of the 221-U Building feed evaporators to concentrate the low uranium concentration dilute feed caused by cleanout of tanks 104 and 105-BX.

Feed Preparation

Routine acidification, followed by an average 55 volume per cent boil-off, gave 2.6 M titratable nitric acid in tank farm feed, using about 14,730 pounds of 100 per cent nitric acid per ton of uranium. A high differential pressure across the Section 6 evaporator tower and condenser caused a reduction in the average boil-off from about 70 to 55 volume per cent. The cause of the high differential pressure in Section 6 has not been determined.

Routine concentration and continuous acidification of the RCU, to 1.35 M U and 2.0 M HNO_3 , respectively, for RDF, were continued using Section 8 as an evaporator-stripper combination, and Tank 14-2 for continuous acid addition. Waste losses from the stripper tower (T-8-4) averaged about 2.1 per cent of the new feed uranium. A test, using water to flood the top two plates of T-8-4 with a flow of up to 1.5 gallons per minute, failed to give a satisfactory reduction in the stripper uranium waste loss (average 1.5 versus 2.1 for month).

Further recommendations for reduction of the T-8-4 uranium loss include: (a) lowering the feed point from the tenth to the eighth plate; and (b) installing lines to drain the top four plates to the feed plate.

Waste Handling

Scavenged waste amounting to approximately 15,800 gallons per ton of feed uranium at an average pH of 8.9 was returned to storage for settling in 107 and 110-BY. Tank 110-BY contains scavenged waste produced from two cycle operation containing about 0.009 M Fe and 0.1 M PO_4 , and processed using continuous nickel sulfate addition to Tank 11-6 (Waste Neutralizer). Tank 107-BY is being processed with batch addition of nickel sulfate to Tank 11-6. Preliminary data do not show any significant differences between the two methods of nickel sulfate addition.

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About 21,300 gallons of low activity waste containing 2.17 per cent of the new feed uranium were routinely cribbed for each ton of new uranium processed.

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 as follows:

Cycle	RAF, RDF	RAS, RDS	RAIS, RDIS	RAX, RDX	REX	RIOS, RIIOS	RIOOS, RIIOOS
First	115 to 250	125 to 150	100	115 to 135	60 to 70	100 to 150	100
Second	75 to 110	100	100	115 to 125	90	100 to 150	100.

Other departures from flowsheet conditions included the use of RCX and REX heated to 55 C, 0.4 M sulfamic acid in the RDIS to improve the waste scavenging process, and two stage in-tank solvent washing using three weight per cent sodium carbonate.

The average composition of the concentrated first cycle feed was:

	Composition, M					Per Cent ANU Gamma	RAW K 1/2NO ₃ , M
	U	PO ₄ (1)	Na	H ⁺ (2)	Na/U		
Plant Feed	0.14	0.15	2.1	2.5	15	4.9 x 10 ⁶	4.0 to 6.6
Waste Contaminated Feed (3)	0.11	0.24	3.8	2.4	35	7.9 x 10 ⁶	5.3
HW No. 6	0.27	0.27	4.1	2.7	15	-----	5.5

- (1) Sulfate molarity is approximately equal to phosphate.
- (2) "Titratable" acid.
- (3) This feed contained about equal amounts of acidified metal waste and neutralized, scavenged, pooled waste.

Average steady-state solvent extraction performance is summarized briefly as follows:

RAW	Waste Losses			REW	Log Decontamination Factors	
	RCW	RDW (1)			First Cycle	Second Cycle
0.2	0.1	<0.1		0.03	3.7 (2)	1.5 (3)

- (1) Is recycled to first cycle as acid scrub (RAIS).
- (2) This value compares favorably with the 4.0 to 4.5 obtained in one cycle, parallel operation, when allowances are made for decreases in (a) the disengaging time allowed before RCU samples are taken, (b) RAU uranium saturation, and (c) RA Column acidity..
- (3) Limit of detection, giving REU gamma activity with an average of 57 per cent of aged natural uranium.

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The nitric acid concentration of the RCU averaged 0.17 pounds per pound of uranium. In order to decrease the RCU acidity and extend the life of the intercycle evaporator, the RAF acidity was decreased, the RAS (water scrub) flow increased to 150 per cent of flowsheet, and the RAX rate set as low as possible. Comparable data obtained from the EB-1 224-U concentrator indicate that corrosion becomes serious whenever the nitric acid to uranium ratio exceeds ca. 0.1. The REU nitric acid concentration averaged 0.08 pounds per pound of uranium.

Equipment

Major equipment failures resulting in production curtailment included the loss of the WR 001, Waste Receiver, Tank by external pressurization from waste solution routed to the vault through a failed jumper, and an electrical failure of the RA Column, 17-8, pulse generator. Additional production limitations were imposed by the scheduled shutdown of feed evaporator, Section 7, for corrosion protection, and by the lower than design boil-off rates experienced in feed evaporator, Section 6. Modified seal pots and condenser drain lines are being provided for both evaporator sections to minimize recurrence of in-cell corrosion due to vapor blows and to provide additional condensate drainage capacity to prevent high operating condenser pressure drop due to flooding, with water entrainment to the blower.

URANIUM CONVERSION PROCESS TECHNOLOGY

Summary

Uranium processed during the report period originated from Redox (64 per cent) and from initial TBP two cycle operation (36 per cent). Total metallic impurities, fission product gamma activity, and plutonium in product UO_3 averaged 226 parts per million parts of uranium, 69 per cent of aged natural uranium gamma, and 4 parts per billion parts of uranium, respectively. The average reactivity was 1.12, using 0.05 weight per cent sulfamic acid as the additive. Higher than usual product impurities were attributed to (a) blending of 300 Area UO_3 powder and 60 per cent UNH into the UO_3 Plant process, and (b) impurities in the REU due to initial startup of the two cycle TBP Plant.

Initial processing of REU from the revised two cycle TBP Plant helped to decrease pot radiation. Increased impurities and acid in the TBP product gave rise to high impurities in the UO_3 powder; however, specifications were met on all carloads.

Reactivity

Reactivity improvement tests continued with sulfuric acid as the experimental additive. Concentrations of sulfate (as sulfuric acid) used were 0.015, 0.03, and 0.05 weight per cent. No serious caking was evident at the two lower values, and, at 0.05 weight per cent sulfuric acid, the caking was no different from caking experienced using 0.05 weight per cent sulfamic acid. At 0.015 weight per cent sulfuric acid, the reactivity ratio was 1.16; no other results are available at this writing.

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Reactivity ratios during the month continued to be lower than ratios experienced during the months of October and November of 1954 (1.12 as compared to 1.18). Redox feed was investigated as a possible cause; however, without additive, the feed gave a nominal reactivity ratio, 1.00 or better. Lower than normal sulfate/uranium ratios and blending of low reactivity powder from 300 Area were contributing factors.

Equipment

Two serious equipment failures occurred during January. One was the stress cracking of the Luckey gas-fired pot, No. 20, similar to that experienced by the other Luckey pot, No. 19. Approximately 210 tons of uranium were processed through Pot 20, as compared to 80 tons through Pot 19 before the failures occurred. The reason that Pot 20 lasted longer than Pot 19 is believed due to the more rigid limitations established for Pot 20, i.e., pot skin temperature could not exceed 725 C. Pot 19 has been repaired, equipped with pot skin thermocouples and appropriate instrumentation, and should be ready for operation by the first of February.

The 100 per cent UNH pump, P-X-19, failed after 428 days of service. On examination, it was discovered that the glass bearings had disintegrated. A replacement pump employing all pile graphite bearings failed almost immediately. Another pump was rebuilt, using all glass bearings except for the top bearing (graphitar), and this pump is now in use. Serious pit corrosion was noted on the housing of the pump that had been in service 428 days.

Absorber Tests

Evaluation of the 53 per cent absorber test program was hampered by low rates and frequent startups and shutdowns. At present, the gas cooler nitric acid is being fed to the sixth plate. Results thus far indicate that the sixth plate may be the optimum feed introduction point, but steady state data are required before verification can be made. A document, HW-34434, summarizing test data to date was issued during the month.

Nitric acid recovery operations, using the 53 per cent test arrangement, led to recovery of ca. 1102 pounds of 100 per cent acid per ton of uranium calcined. The ca. 43 per cent acid was returned, along with 0.88 per cent of the uranium calcined, to tank farm blending operations.

BISMUTH PHOSPHATE PROCESS TECHNOLOGY

Dissolver Operation

With the charging of five buckets (210 slugs per bucket) to the dissolver instead of the nominal four buckets, metal solution output was increased about 22 per cent. Production Test 221-T-19, "Reduction of Time Cycle in Dissolver Section", HW-34253, was used in processing runs T-55-01-62 through 78. Evaluation of dissolving time cycles have not yet been completed. Waste losses in the extraction step were high (0.87 to 9.04 per cent), apparently due to high nitric acid concentrations (1.2 to 1.5 M) at the precipitation step. On the other hand, extrapolation of the data to lower acidities indicate that at about 0.8 M nitric acid, waste losses (ca. 1.5 per cent) comparable to those obtained by the present flowsheet are possible.

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Process Changes - Concentration Cycle

The time cycle in E and B cells was reduced 38 minutes by increasing the product cake centrifugation rate from 60 pounds per minute to 80 pounds per minute. Average waste loss increased from 0.30 to 0.50 per cent.

Authorization on a test basis was written to eliminate the 30 minute digestion period after the lanthanum addition, providing the addition rate was lowered from six to four pounds per minute. An average of 25 runs showed the waste losses to be reduced from 0.50 to 0.23 per cent.

Waste Scavenging

Coating waste and first cycle waste are being segregated and stored separately. First cycle waste is being scavenged with nickel ferrocyanide. Data are unavailable at this writing on the efficiency of Sr^{90} and Cs^{137} removal from this scavenged waste. It has been calculated by analytical personnel that the major contribution to the strontium activity is Sr^{89} (54 day half-life) which, because of its relative short half-life, should be cribbable.

Silver Reactor

The silver reactor in dissolver section 3-5L was replaced on January 27. The permeability of the old reactor increased until the air flow through the system was not capable of transferring the heat energy from the heaters to the silver reactor.

IN-LINE INSTRUMENTATION

A preliminary shakedown test of the automatic pH control system was conducted at the Metal Recovery Plant for the purpose of establishing instrument settings and observing caustic-control-valve response to variations in pH. The response curves of caustic flow and pH showed rapid damping with a maximum pH variation of ± 0.4 unit. Automatic shutdown after stoppage of acid-waste flow resulted in an override of two pH units.

Installation of the demand-type, two point pH buffering system was essentially completed during the report period. Service tests were initiated on an improved pH probe, which utilizes the internal calomel element from a Beckman standard reference electrode.

Fabrication of newly designed, all stainless steel, lead shielded polarograph sensing units for uranium analysis of Metal Recovery Plant aqueous wastes approached 80 per cent completion in the Technical Shops. These units will utilize a replaceable DME-calomel electrode-salt bridge assembly in the form of a unitized probe.

Brief investigation of the feasibility of in-line beta monitoring for detection of excessive amounts of Sr-Y^{90} activity in scavenged waste supernatant prior to cribbing has shown that available techniques are inadequate, since an increase in strontium activity from 0.2 to 0.4 microcuries per milliliter (200 to 400 per cent

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of current cribbing limits) would be reflected by only a thirteen per cent increase in gross beta activity.

The Cs-Ba¹³⁷ gamma source probe for the UO₃ Plant gamma absorption photometer was received from Oak Ridge, and fabrication of the test stand and piping for calibration of the instrument was completed during the month.

Z PLANT PROCESS TECHNOLOGY (ISOLATION, PURIFICATION, AND FABRICATION)

Isolation Building (Task I)

The hydrogen ion concentration of AT solution has been reduced from about eleven normal to about ten normal. This was accomplished by reducing the amount of 60 per cent nitric acid added for second cycle peroxide cake dissolution from 2.73 Kg to 2.05 Kg. Since the new specifications establish a minimum $\frac{\text{Pu g/l}}{\text{H ion N}}$ ratio, the lower hydrogen ion concentration makes it possible to accept solutions of lower plutonium concentrations.

Concurrent with laboratory studies to determine the feasibility of concentrating Redox III BP solution for off-site shipment (see below, 234-5 Development), literature research has been conducted to determine the feasibility of shipping concentrated first peroxide cycle cake solution made from F-10-P solution. Production Test 234-3 demonstrated that the hydrofluorination and reduction of the second cycle peroxide cake produces acceptable plutonium metal and, since Rocky Flats makes a peroxide strike on AT solution prior to dry chemistry processing, elimination of one peroxide cycle at HAPO should be possible without deleterious effects on metal quality.

Hydrofluorination (Task II)

Based upon fluoride color, 56 per cent of the runs entering Task II required rehydrofluorination. This compares to 26.1, 40.5, and 38.6 per cent for October, November, and December, respectively. Double batches accounted for 90 per cent of the runs processed during December and January.

The cause for the increased rehydrofluorination rate has not been established. On the other hand, the data available indicate that since the first half of calendar 1954, two significant increases have occurred which correspond to operating changes. During the first half of calendar 1954, the average rehydrofluorination rate was about 13 per cent, whereas during the third quarter it jumped to about 25 per cent, and during the fourth quarter it jumped to about 40 per cent. The first increase seemed to accompany the increased batch size resulting from putting two 231 Building batches in a filter boat. The second increase seemed to accompany a change in the filtering technique which does not permit the ready detection of plugged filter frits.

Another factor which may contribute to the high hydrofluorination rates has been brought forth by tests which have shown that the present boats leak around the

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liners causing hydrofluorination of occur primarily by diffusion. To circumvent this, the liners of two filter boats have been gold soldered to the boat and will be put into service when operation is resumed. These boats will assure that the majority of the process gases will pass directly through the product cakes and, therefore, hydrofluorination should be more rapid and complete.

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234-5 DEVELOPMENT

Evaporation of Redox PR Solution

The film tube evaporator which was included in the Task I prototype hood was used for the concentration of 14 batches of Redox PR solution. Twelve of the batches were evaporated smoothly to the concentration of AT solution. Evaluation of the quality of the concentrated product, including identification of any solids which may have precipitated on cooling, is incomplete and will await the use of these solutions as feed for future development work in the Task I and continuous Task II prototypes. The evaporation of the remaining solutions, which were the last produced in the course of flushing the high MWD/T plutonium out of the Redox plant was hampered by the unusually high solid content of the solution and by serious foaming difficulties.

Recuplex Development

Laboratory studies in countercurrent equipment have shown a 25 per cent decrease in distribution ratios (E_{R}) in the concentrated end of the Recuplex stripping column (organic phase, plutonium concentrations greater than 0.05 gram per liter) when the CCX is heated to 50 C from 25 C. No change was noted at lower plutonium concentrations, presumably because the stability of the plutonium-DBP complex is not greatly affected by this temperature change. Consequently, heating the Recuplex C column might allow a concentration factor increase, but will not reduce waste losses significantly.

Laboratory studies were made of the use of York demister, glass-stainless steel packing (0.006 SS 304 FG) to deentrain Recuplex solvent (15 per cent TBP in CCl_4) from simulated CAFS and CCP. At an amplitude-frequency product of 30 inches per minute countercurrent flooding velocities were found to be only about 25 gallons per hour per square foot. Thus, although deentrainment was accomplished, at the flow rates planned for these columns, provision would be required for allowing the deentrainment organic to settle from and be decanted from the aqueous phase which return of the organic phase to the system.

A proposed uranium-plutonium partition flowsheet, for use in the Recuplex H-1 and H-2 columns, was satisfactorily demonstrated in a batch, countercurrent, solvent extraction run. The results indicate that the necessary partition in Recuplex, which will be infrequent and will involve small volumes of solution, can also be carried out batch-wise, in the solvent treatment system, much more simply than in the columns.

RECUPLEX CONSTRUCTION

Construction of the Recuplex facilities in Rooms 221 and 337 of the 234-5 Building is approximately 90 per cent complete. Replacement of the dissolver condensers with more compact shell and tube units has been completed. Installation of the Eastern centrifugal pumps has commenced.

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Directive No. HW-279, Modification No. 8, authorizing the total expenditure of \$1,928,000 for the Recuplex installation, was issued by the Atomic Energy Commission on December 31, 1954.

Estimated beneficial use dates for the three main process hoods, Reception-and-Blending, Slag-and-Crucible, and Solvent Extraction, are February 4, 11, and 25, 1955, respectively. The estimated physical completion date for the total installation is March 31, 1955.

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CHEMICAL DEVELOPMENT SUB-SECTION,

PUREX DEVELOPMENT

On January 25, the preparation of the Purex Technical Manual was approximately 71% complete.

Chemical Engineering Development

Pulse-Column Studies. Three-inch-diameter pulse-column studies, using "cold" uranium, have shown it feasible to increase the uranium concentration in the feed to the A-type columns from the 1.35 M specified in Purex Chemical Flowsheet HW #3 to 2.0 M with unimpaired column throughput capacity and extraction effectiveness. The increased feed uranium concentrations entail (through a 33% reduction in feed volume per ton of uranium processed) a 20% reduction in A-type-column waste-stream volumes (at any given uranium tonnage rate) and thereby a corresponding reduction in the evaporation load on the No. 2 Acid Concentrator, a potentially capacity-limiting equipment piece in the Purex Plant. The tests were made in both simple and dual-purpose columns. The range of superficial throughput rates used in the extraction-effectiveness tests corresponded to 3 to 25 tons U/day in a Purex-Plant-size (24-in.-diameter-extraction-section) A-type column. A 30 to 40°C. feed temperature was employed, to prevent freezing of the solution. (The 2 M URE, 2 M HNO₃ feed solution has a freezing point of approximately 21°C. Omission of the acid from the feed solution, to lower its freezing point -- to -7°C.-- proved an unsatisfactory expedient: it reduced the stable throughput capacity of the extraction section to the 24-in.-diameter-column equivalent of 16 tons U/day.)

Equipment Development

Pulse Generator Development. The Purex-Plant pulse generator installed on the 321 Building prototype HA Column (equipped with "standard-cartridge" sieve plates) has accumulated 611 hr. of operation at various pulse frequencies. Operation has been smooth and quiet throughout, and piston leakage rates obtained after 422 hr. were almost identical with those obtained after 125 hr. (HW-34332). Inspection of the ACA variable-speed motor indicates that the brushes will have to be replaced every 400 hr.

A spare Purex-Plant agitator installed in the 321 Building Tank Farm has been operating for 1847 hr. on 60% nitric acid. The operating period includes 39 cycles of draining and refilling the tank. Operation continues to be smooth as long as the lower paddles are immersed and there appears to be less shaft whip now than when the agitator was initially installed.

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A Purex Plant "Flower Pot" (head-upon-orifice flow meter) intended for measuring pulse generator leakage was installed on the 321 Building prototype HA Column. Neither a manometer nor a snubbed Republic transmitter appeared to be satisfactory for indicating the height of liquid in the pot. Preliminary tests showed that a capacitance probe gave a good indication of the liquid height.

A letter was transmitted to Project Section outlining the necessary minor revisions (involving a third column-to-interface chamber piping connection) for reliable 2A Column interface control, on the basis of the results of recently completed tests.

Materials Testing

Flexural Testing of Irradiated Kel-F. Kel-F coupons, irradiated to 2.6×10^7 to 2.6×10^8 rads, have undergone without failure 5×10^8 cycles of flexing at a maximum fiber stress of 75 lb./sq.in. which is at least twice as high as will be encountered in the Purex-Plant pulse columns.

HOT SEMIWORKS PUREX STUDIES

Conversion to Purex

All Purex conversion work, including the waste self-concentrator, has been completed by Minor Construction forces, except the installation of the remote sampler. Miscellaneous maintenance work and minor equipment modifications in connection with shake-down testing of the semiworks equipment is in progress.

Operational preparations for start-up of the Purex test program have included completion of calibration of the pulse generators, an acid recovery test in the converted equipment, and adjustment of the demineralized water equipment.

Hot Semiworks Purex-process operating procedures have been drafted.

REDOX DEVELOPMENT

Process Chemistry

Intercycle Treatment. A sample of plant 2DF was butted with ANN (to make 2DFS) and then was made 0.02 M in sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$). After a 1-hour digestion at 75°C ., 2D-2E batch extraction experiments showed a 14-fold improvement in Ru D.F. as compared with a similar 2DFS which was untreated. The precipitate was carried out in the 2DW. When the feed solution was centrifuged to remove the precipitate before extraction, the Ru D.F. was improved by a factor of approximately 16.

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De-Entrainment in U Cycle Organic Streams. Two extended (72 hours each) continuous runs were made in the laboratory, in which synthetic 2DU-H₂O emulsions were passed through the stainless steel-glass fiber Yorkmesh coalescer and phase separator. (The mixed mesh actually consisted primarily of glass fibers, with some loose stainless-steel wire mesh interspersed with the glass to impart desired mechanical strength.) Following separation of the phases, they were re-combined and re-cycled continuously by means of a pump which provided the necessary agitation for re-emulsification. The efficiency of the mixed Yorkmesh remained at 100% throughout the runs. An attempt to achieve the same results with an all-stainless-steel mesh, heated in its chamber by an external jacket, failed to produce more than 20% separation.

HOT SEMIWORKS REDOX STUDIES

Establishment of the feasibility of continuous tail-end ozonization of Redox uranium product and of favorable operating conditions for this process brought to completion the Hot Semiworks tail-end ozonization studies. A series of 14 runs demonstrated the feasibility of decontaminating Redox 3EU solution from radioruthenium by a factor of 5 to 10 using continuous counter-current contacting with ozone. The contactor used for these tests was the Hot Semiworks acid fractionator which is an 11-plate bubble-cap column, operated completely "flooded", i.e., with the liquid phase continuous throughout the column.

URANIUM RECOVERY DEVELOPMENT

Continuous Calcination

The following specification letter outlining the salient requirements for a plant-scale continuous calciner was issued to the Design Section as the basis for the current UO₃ Plant expansion project:

HW-34313 "Continuous Denitration - Design Specification Letter No. 1", by M. J. Szulinski and R. G. Geier, January 4, 1955.

The progress of the continuous calcination work in the 16-in.-diameter by 8-ft.-long reactor up to January 12 was summarized in:

HW-34470 "Continuous Denitration - Status of Development, January 12, 1955", by M. J. Szulinski, January 14, 1955.

Following the period covered in the aforementioned document, some difficulties due to reactor shell warpage were encountered. Warpage changed the location of the agitator paddles with respect to the shell wall and permitted the formation of hot spots which reduced the capacity of the unit. Studies on the control of warpage by proper adjustment of process variables is now under way, and consideration is being given to the best design for a more rigid shell.

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MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENTProcess Studies

Thorex: Radioactivity of Irradiated Thorium. At the present time, consideration is being given to irradiating thorium slugs in the Hanford piles for extended periods to produce U-233 concentrations as high as 4000 g. U-233/ton of thorium. As the U-233 builds up in the thorium slugs and begins fissioning, U-232 builds up in the slug as a result of a series of nuclear reactions. Since this 70-year half-life U-232, its 1.9-year half-life daughter Th-228, and other nuclides in the decay chain contribute activity to the thorium and U-233 products recovered from solvent-extraction operations, a study has been made to determine the variation in U-232 concentration in irradiated slugs with increased irradiation levels. The results of this study are presented in Document HW-34510, "Some Comments on the Gamma Activity of Thorium and Uranium Products from Hanford Irradiated Metal," by A. M. Platt. At the higher irradiation levels the recovered thorium would be many times more radioactive than natural thorium and natural uranium. For example, for thorium slugs irradiated to a 4000 g. U-233/ton of Th level in a Hanford pile and "cooled" 300 days, the gamma activity of the thorium after decontamination from fission products would be approximately 130 and 18 times greater than natural uranium and natural thorium, respectively, due to the contribution of Th-228 and its daughters. By reducing the irradiation level from 4000 to 2000 g. U-233 per ton, the Th-228 activity of the slugs is significantly reduced, with recovered thorium gamma activity still approximately 19 and 3 times greater than those of natural uranium and thorium, respectively.

The gamma activity of the U-233 product is dependent upon both the irradiation level of the slugs and the time elapsed after solvent extraction. During solvent extraction, the Th-228 present in the slugs goes along with the thorium product, while the thorium-228 daughters are routed into the solvent-extraction wastes. The U-233 product activity quickly grows in as the 70-year half-life U-232 decays to form Th-228 and its daughters. For example, for 4000-g./ton U-233 36 days after solvent extraction the gamma activity would be 55 times greater than that of typical Redox-Plant-produced plutonium when it is made into shapes. (The exact gamma activity of decontaminated plutonium depends largely on fission product remaining unremoved.) One year after solvent extraction, the gamma activity of the U-233 product would still be increasing. At that time, the U-233 shape would be approximately 500 fold "hotter" than the plutonium shapes currently produced.

Thorex Flowsheets. Thorex No. 9 and No. 10 Study Flowsheets have been prepared and informally transmitted to the Design Section for use in preparing estimates of the capital investment required to provide a "streamlined", low-capacity, single-purpose Thorex Plant.

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Separations Technology Section

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CHEMICAL RESEARCH SUB-SECTION,

PUREX

Continued equilibrium study of ruthenium volatilization in Purex nitric acid recovery indicates that an initial nitrite concentration of ca. 0.05 M is required to achieve ruthenium decontamination factors in the distillate of $> 5 \times 10^3$ for a period up to 36 hours. In general, the ruthenium content in the distillate from 8 M HNO_3 - 1.5 M NaNO_2 bottoms increases with time; however, the rate of increase is inversely proportional to the initial nitrite concentration in the still. For example, the decontamination factor drops from 11×10^3 to 5×10^3 in 20 hours with an initial 0.03 M nitrite; from 20×10^3 to 9×10^3 in 70 hours with an initial 0.07 M nitrite.

Ruthenium volatilization during continuous distillation is currently under investigation, employing nitrogen dioxide gas as a convenient substitute for nitrite addition. Nitric oxide gas will also be tested, as soon as it is available. In further study of urea as an alternate ruthenium volatilization suppressant, difficulty with frothing was experienced.

The radiation resistance of 30% TBP in Shell Spray Base is being evaluated in various single and two phase systems, at different temperatures, and with and without stirring. On the basis of "C" contact experiments several conclusions can be drawn, namely: (1) solvent quality is significantly decreased with increasing temperature and/or with stirring; temperature is tentatively believed to be the more important factor, (2) urea partially inhibits solvent damage at the elevated temperatures, and (3) the presence of uranium or nitric acid in solvent irradiated at ambient temperatures does not appear to enhance solvent damage. This work is being extended to include other solvents to provide a basis for choosing a Purex diluent most resistant to radiation damage.

Spectrophotometric examination of various diluents exposed to dissolver solution has shown the generation of color to be due largely to reaction products of the aromatic fraction of the diluent. "Aromatic-free" Shell Spray Base and Soltrol 170 showed little color as compared with "normal" Spray Base for periods up to 1000 hours. In all cases, however, solvent stability was noted to decrease markedly after 300 hours.

The chemical resistance of pure TBP and of TBP in diluent mixtures to nitric acid attack is being investigated. TBP was found to be quite resistant to 6 M HNO_3 - 0.05 M NaNO_2 at 71 C for 240 hours, as contrasted to the significant diluent deterioration previously observed under less severe conditions. Although the presence of uranium was found to contribute to some deterioration, as evidenced by color formation and changing "C" contact values, the effect is not large enough to be of process significance.

Vapor-liquid equilibria for the chloride-nitric acid system are being determined to understand the path of chloride in the Purex acid recovery system. An Othmer type equilibrium still was constructed, and eight runs were made at atmospheric pressure to check the operation of the still. Analyses thus far obtained indicate excellent behavior of the still, and derived chloride vapor-liquid equilibrium constants have been found to be in substantial agreement with previously

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published data (TID-5146) with the exception of the low nitric acid region in which fivefold lower constants were found. The new data in the low acid region are believed to be more reliable due to use of a better analytical technique (Nephelometer). The significance of the lower equilibrium constants is reflected in a tendency for slightly greater chloride reflux from the top of the atmospheric absorber than would be predicted by the old data.

Attempts to operate the Othmer still at reduced pressure (100 mm) failed due to severe bumping. As bumping in equilibrium stills prevents accurate equilibrium data from being obtained, a Gillespie (percolator) type still was fabricated and found to operate well under reduced pressure. Results of the reduced pressure runs are not currently available.

REDOX

Investigation has been completed on a "reverse strike" head-end treatment applied to full-level dissolver solution (4 weeks old) and its effect on subsequent ruthenium decontamination in Redox solvent extraction. The reverse strike procedure consisted of precipitation of 0.02 M manganese dioxide by addition of alkaline permanganate to 0.3 M acid-deficient dissolver solution containing 25 percent excess manganous nitrate at 60 C. The solution was then cooled to 30 C, and the acidity adjusted to 0.1 M acid to facilitate centrifugation of the manganese dioxide. A batch extraction-scrub (one extraction, three scrubs) was then performed on the head-ended solution. Logarithmic decontamination factors for ruthenium, zirconium and niobium achieved in the head-end and solvent extraction were determined and compared with those obtained in a forward strike head-ended control experiment (HW-34058). Only minor differences in solvent extraction decontamination were obtained. The reverse strike did give substantially higher head-end decontamination factors for zirconium and niobium. Although the head-end ruthenium decontamination by the reverse strike is lower by an order of magnitude, this is primarily the result of suppression of objectionable ruthenium volatilization. The forward strike's decontamination is virtually entirely due to such volatilization, whereas in the reverse strike only ca. 0.001 percent of the ruthenium volatilized. However, since the required increase in solvent extraction decontamination of ruthenium was not obtained in the reverse strike case, no further study is planned.

WASTE TREATMENT

The addition of polyphosphates (pyro- and tripoly-) to acidic Uranium Recovery Process aqueous waste reduced markedly the settled volume of the solids formed on subsequent neutralization and nickel ferrocyanide scavenging of the waste. At final pH's of eight and nine, the solid volume was reduced by factors of 2.5 to three when one gram of the polyphosphate was added to 100 ml of the acidic waste; at pH 10, the effect on settled solid volume was small. Smaller amounts of the polyphosphates had a diminishing effect on sludge volumes. Similar results were obtained whether iron present in the waste was as ferrous or as ferric. The presence of polyphosphates had no effect on scavenging of cesium but did reduce seriously the removal of strontium.

The addition of polyphosphates to simulated acidic Bismuth Phosphate Process first cycle waste under conditions similar to the above had little or no effect on settled sludge volumes.

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In a recent plant production test on the scavenging of Bismuth Phosphate Process first cycle and coating removal wastes the strontium content of the resulting supernatant liquid was relatively high (2-8 uc/ml). It should be noted that, in wastes as young as those involved, most of the strontium activity is contributed by Sr-89 (half-life, 54 days). Release of this isotope into the ground should represent little greater hazard than the release of other short-lived isotopes. The analytical problem of distinguishing between Sr-89 and the more hazardous, long-lived Sr-90, while difficult, does not appear to be insurmountable. It should also be noted that the presence of Sr-89 will become a problem in scavenging Uranium Recovery Process wastes if and when material of age less than one year is processed.

It has been suggested that a significant reduction in Bismuth Phosphate Process metal waste storage volume could be realized if the waste were neutralized with sodium hydroxide only instead of the presently used combination of sodium hydroxide and sodium carbonate, and if the supernatant liquid, after settling of the uranium-bearing solids, could be scavenged and discarded. A preliminary study of the settling properties of the solids produced by sodium hydroxide neutralization versus final pH was made. Uranium molarity in the settled solids obtained varied from 0.5 to 0.75 (2000 to 1340 gallons per ton of uranium, respectively) at pH's from seven to 12+. Percent uranium losses to the supernatant liquid increased from about 5×10^{-4} at pH 7 to a maximum of 0.71 at pH 11 and decreased to 0.04 at pH's >12. Sulfate, phosphate, nitrate and sodium contents of the sludges were obtained to permit an economic comparison of the procedure with the present neutralization and subsequent uranium recovery process.

THOREX

The problem of radiation-induced dissolution of manganese dioxide which occurs when scavenging protactinium from full level, short-cooled Thorex dissolver solution (3200 g U-233/ton Th, 90-100 day cooling) has been the subject of intensive investigation. With such material, the protactinium decontamination factor passes through a maximum after four hours' contact time with 0.05 M MnO_2 at a value of 20 which is only marginally acceptable and much lower than attained in tracer experiments.

Among the possible solutions to this problem, multiple manganese dioxide scavenging has been most investigated and appears very effective. Three successive reverse strikes employing 0.05 M MnO_2 yielded cumulative logarithmic decontamination factors of 3.0, 1.6, 1.8, and 0.3 for protactinium, gross gamma, zirconium-niobium, and ruthenium, respectively.

The use of a holding oxidant to minimize manganese dioxide dissolution was also considered; lead dioxide appeared to be the only attractive possibility. Precipitation of 10 g/l PbO_2 (0.04 M, by oxidation of lead nitrate with sodium bismuthate) gave a protactinium decontamination factor of 68; preformed lead dioxide was much less effective. The coformed lead dioxide centrifuged to a smaller volume than did manganese dioxide, gave a cleaner supernate, and was readily dissolved by nitrite or peroxide. Its relative radiation stability has yet to be determined.

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The use of reagents which destroy nitrite or peroxide was investigated on the hypothesis that these may be the radiation-produced intermediates responsible for manganese dioxide dissolution. No suitable peroxide reactant was found; ferric ion is slow in its action and any resulting ferrous would dissolve manganese dioxide, dichromate is fast but the product chromic ion also dissolves manganese dioxide. The use of a heterogeneous catalyst, such as platinum black, to promote peroxide decomposition has not yet been tried. Two nitrite reactants, urea and sulfamic acid, have been preliminarily investigated and show some promise of significantly reducing the rate of manganese dioxide dissolution when used alone or in conjunction with lead dioxide.

Finally, a number of "insoluble" scavenging agents have been tested for their protactinium scavenging ability. Of these, Silene, Fuller's earth, Attaclay and Super Filtrol were most effective. However, they gave protactinium decontamination factors of only 5 to 30, and, at least with Super Filtrol, these factors decreased rapidly with solution concentrations above 1 M Th or in the presence of free nitric acid.

Batch extraction and scrub studies have been made on the foregoing full level, short-cooled Thorex feed, both with and without head-end protactinium scavenging. Preliminary analytical results indicate promising decontamination in simulated TA column solvent extraction.

The effect of high dibutylphosphate concentrations (to 30 g/l) on the distribution coefficient of protactinium in Thorex solvent extraction systems has been determined. The distribution of protactinium into the organic phase increased with DBP concentration, decreases with thorium concentration, and increases with nitric acid concentration. Of greatest interest is the fact that addition of but 0.05 M phosphate decreases protactinium extraction to suitably low values (< 0.05) even in the presence of DBP concentrations a hundredfold higher than expected in process systems. Thus, no significant change in protactinium behavior is expected due to DBP formation in the Thorex process.

ISOTOPE SEPARATIONS

Isotopic analyses have been obtained that indicate a separation of uranium isotopes was achieved in a thermal diffusion run employing an aqueous solution of uranyl nitrate as feed. The separation (expressed as the ratio of U-235 in the product to the U-235 in the feed) increased with time of operation from 1.0042 (5 to 10 days) to 1.0089 (12 to 13 days), with a production rate of approximately one hundred milligrams per day. The run was terminated by plugging of the bottom of the column with precipitated uranyl nitrate; the uranyl nitrate separated from water in the column during the run in accordance with the Soret effect. A repeat run is being made with modifications to partially alleviate the concentration changes within the column. A check on the column behavior was made using butanol as feed. Operation of the column for ten days gave a depletion of two percent in the carbon-13 content of the product. Translation of this result to the column operating with uranium feeds corresponds to a U-235 separation factor of 1.0078, essentially in agreement with the actual uranium experiment.

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Several runs using uranyl nitrate hexahydrate as the charge in the new thermal zone melting apparatus have been made. The runs had to be terminated because of equipment failures caused by thermal stresses. Product samples were salvaged from one run; although gamma energy analysis of the uranium from the front end sample showed a small depletion of U-235 (~1%), mass spectrographic analytical data did not indicate any isotope separation. Equipment is being redesigned and fabricated to permit runs of longer duration.

HEAVY ELEMENT CHEMISTRY

Two preparations and pile irradiations of Np-239 for cross-section measurements have been completed. Peroxide formation arising from the intense beta activity of macroquantities of neptunium has complicated the required chemical separations. Further, the production of Np-240 by irradiation of Np-239 has been observed in the two runs because of the presence of intense chlorine.

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The application of uranium photometry to in-line monitoring of the recovered nitric acid in the UO_3 Plant is being investigated. The iron and chromium do not interfere at the concentration levels expected, assuming all the chromium is in the trivalent form, and the uranium can be determined in the expected range of 6 to 18 g/l. A commercially available instrument appears to be applicable to this monitoring problem. A nitric acid monitoring device for this same sample based on solution conductance was tested, but it proved to be too insensitive. Other devices considered to be applicable are relatively expensive, and a further survey is being made.

In order to shorten the time cycle for the final product cake dissolution step in the Bismuth Phosphate plants, the application of an in-line turbidimeter is being studied. Working at the desired limit of 0.3 g/l $BiPO_4$ in suspension, the transmittance of the solution can be measured by photometry to ± 10 percent with a sensing unit that measures the ratio of reflected to transmitted light.

During the month, a production test of automatic neutralization of first cycle waste in the Metal Recovery Plant was tested. Based on approximately a one-hour test, the control of neutralization was excellent, and a full-scale test is planned. The control instrumentation was in accordance with the recommendations in HW-33948.

In response to a need for continuous monitoring of oxygen in pile gas, several instrumental methods are under study. Monitoring with either a mass spectrometer or with a recently published method utilizing dew point measurement is feasible. However, a somewhat less expensive device has been assembled which can determine the oxygen in the desired range by measuring the solution potential at a dropping mercury electrode while the pile gas sample is continuously bubbled through the solution. The results of laboratory tests are quite promising, and a field test is being planned.

Other activities of importance in the in-line analysis program include the beginning of a project to isolate the americium-241 from a stock of aged plutonium in order to use the former isotope for gamma photometry, the completion of the shielding designs for the Purex in-line gamma and pH monitor plumbing, and the beginning of a study of cadmium sulfide photocells for in-line photometer applications.

ANALYTICAL DEVELOPMENT

A search is being made for a reliable method of determining the free nitric acid content of thorium nitrate solutions, particularly at low acidities, and the effect of several thorium precipitants and complexing agents has been studied. For moderate and high acid concentrations, the usual oxalate complexing method is most successful, but at low acidities, no complexing agent was found to be satisfactory. Therefore, several non-aqueous systems have been studied, and the titration of the nitric acid by aniline in an ethylene glycol-isopropanol mixture has been quite successful. Recoveries of from 95 to 105 percent were obtained for samples with a molar ratio of thorium to nitric acid as high as four to one. The method will be tested on all Thorex process streams, and some work with uranium and aluminum system is also contemplated.

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A study of factors affecting the precision and sensitivity of the fluorimetric determination of uranium was begun again during the month. It has been found that the instruments used at present are a much smaller factor in over-all precision than the sample preparation methods. Variables affecting sample preparation which are under study are the melt composition, atmosphere over the melt, and the annealing or cooling time. Annealing and melt atmosphere are significant variables. Working in the low range (about 6×10^{-3} micrograms of U), a slow cooling of melts yields clearer buttons and increased sensitivity. Surrounding the melt by a gas flame during fusion and cooling results in translucent, uniformly fluorescent buttons and even greater sensitivity. This phenomenon is not understood since these results cannot be reproduced with any combination of atmospheres containing carbon dioxide, water vapor, air, and inert gases. The two melt compositions in general use are pure sodium fluoride and sodium fluoride-sodium carbonate mixtures. The addition of carbonate results in a greater sensitivity to annealing conditions and to atmospheric humidity. Therefore, a pure sodium fluoride melt seems to be preferable.

The potassium bromide pellet method of preparation of solid samples is a new and important technique for infrared absorption studies. The method was set up in this laboratory during the month and extended to cesium bromide as well as potassium bromide. With specimens and instrument optics of the former material, the range of infrared work is extended to at least 35 microns rather than the 25 micron limit of potassium bromide. Sample preparation consists of intimately grinding the solid sample with a weighed amount of cesium bromide crystals at a sample concentration of a few tenths of a percent by weight. The powder is then placed in a one-half inch die and compressed for 20 minutes at 60,000 pounds per square inch pressure (in vacuum). The result is an optically clear pellet of the salt containing a known percentage of the sample, and the pellet can be used for quantitative infrared absorption measurements. When this method was applied to samples of aluminum oxide, it was found that the α -monohydrate and the α - Al_2O_3 are distinguishable by means of their infrared absorption patterns, but no absorption bands were obtained from a sample thought to be χ - Al_2O_3 .

Technical assistance was given on the recalibration of the x-ray photometer in the 234-5 laboratory after a change to higher operating voltages was made in order to increase sensitivity, and assistance was given to the Analytical Laboratories Unit in setting up a method for the valence states of plutonium; currently a study of the determination of plutonium(V) in the presence of other valence states is under way. Two samples of lubricating oil submitted from the Redox plant were compared by infrared spectroscopy, and six samples of uranium were analyzed isotopically by the gamma count method in support of the isotopic enrichment program.

Miscellaneous analytical and instrumental design activities included reassembly of the hollow cathode source and vacuum system for some spectrographic investigations, inspection and acceptance of the first two of nine light scattering microphotometers being fabricated for 100 Area water control laboratories based on a Chemical Research design, and successful demonstration of a unique, miniature current integrator based on coulometric principles and valuable as a device to measure the accumulated usage of dry batteries and to give a visible warning prior to failure of the batteries in portable instruments.

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The standard sample program included 56 determinations in 100, 200, and 300 Area service laboratories. The x-ray absorption method for uranium at 222-S showed excellent recovery and precision. Recovery of plutonium, at 234-5, by this method was likewise good, but further work is indicated. Spectrochemical determination of low amounts of iron in uranium was good in both the 200 and 300 Areas. River water analysis continued uniformly satisfactory.

LABORATORY SERVICES

Activities of Laboratory Services for the month of January may be summarized as follows:

One million gallons of "retention" level waste were processed to ground in the 300 Area.

Sixty thousand gallons of "cribbing" level waste were transported to 200 West Area for discharge to 200 SL cribs. Average gross beta analysis was 4.0×10^{-2} uc/ml; average plutonium analysis was 8.0×10^{-5} uc/ml.

A slug cut-off "gunk catcher" and a cell trap filter from the Radiometallurgy Building was concreted in the 300 North Burial Ground pipes. Survey readings on each of these units was about 500 rads/hour at surface.

Work was started at the 300 North (Technical) burial ground to cover radioactive waste in the pit with about 18 inches of dirt, and to stabilize the bank with additional fill to provide for easier dumping. High radiation readings at the edge of the pit, potential fire hazards, and difficulty in carrying out dumping operations made this necessary. Ten pipes (10 feet long and one foot in diameter) are being set vertically in the ground to be used for the disposal of "gunk catchers" and other high level waste.

Four 55-gallon barrels, containing waste exceeding "crib" limits mixed with concrete, were taken to the 300 North Burial Ground for discard.

In the interest of economy it was decided to concrete less dry waste in barrels. Dry waste is bulky and uses up barrel capacity quickly. Certain high level cartons are now stored in a special room. These cartons are placed in the "load lugger" just prior to its movement to the burial ground. This system should save about one-third of the total barrel capacity without an increase in radiation hazards to personnel.

The solvents contained in the storage shed east of 3706 Building were moved into the new solvent storage building adjacent to the Radiochemistry Building.

All other decontamination, laundry and building service functions were completed in a routine manner.

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CONTACT ENGINEERING UNIT,

Specifications for a continuous denitration unit to augment the H.A.P.O. uranium oxide capacity were transmitted to the Design Section. The continuous equipment was approved for the oxide expansion program and detailed design has started.

Other activities of the Contact Engineering Unit consisted of routine liaison with the Design and Project Sections and the Manufacturing Department concerning active approved separations projects or projects still in the study stages.

TECHNICAL SHOPS UNIT

MECHANICAL SHOPS

Total productive man-hours for the month was 7793 with an estimated backlog of 3600 hours. Major jobs encountered during the month included: (1) Additional development work on the calciner which was constructed for 321 Building. (2) Equipment required in the rehabilitation of 100-KW reactor. (3) Special 3-way valves with teflon bodies and stainless steel seats and stems for Chemical Research. (4) Solid die inserts used in hot press canning for Fuel Technology. (5) Twelve place anodizing tank complete with individual rocking fixtures for Fuel Technology. (6) Equipment required in the Lattice Test Reactor for Mechanical Development-Pile Technology. (7) Machining experimental uranium slugs and test samples.

Overtime hours worked totaled 150 hours.

A survey was conducted during the month to determine the cold graphite machining requirements for FY-1956. The requirements as developed by the survey (an estimated 5000 man-hours) are of sufficient magnitude to warrant an investigation into the possibility of establishing a cold graphite machining facility in 300 Area in conjunction with the Technical Shops.

BUILDINGS AND GROUNDS

Laboratory Area

During this period the changes in building responsibilities arising from the building management consolidation of December 27, 1954, became more apparent. As the building management responsibility became more limited, the individual tenants assumed more responsibility for the maintenance of their assigned space.

Contact Engineering

Project CA-441, Solvent Storage Building - The physical completion notice was issued January 10, 1955 and the building was put into use on January 15, 1955.

Project CG-576, Laboratory Area Improvements - The modification of Room 42-B in 326 Building was completed January 21, 1955. Design is being continued on other parts of the project work.

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Project CG-592, Laboratory Stores - The Technology Sections withdrew their request for continuance of this project on January 10, 1955. This item, however, is being retained in the budget in case the present substitute arrangement proves unsatisfactory.

DRAFTING AND DESIGN

Total productive man-hours for the month was 2464 with an estimated backlog of 560 hours. Major design jobs for the month were as follows: MTR Cask - Plug Pressure Tester - Core Borer - Test Head for Penetration Detector - Micro Switch MT - Automatic Roll Conveyor - Underwater Rupture Removal Saw - 170# Qt. Size Pit - Welding Shed (321 Bldg.) - PCTR (Sk drawings 70% complete) - Stirring Filament Tongs - Ram for Solid Dies - Die Turn Stile - Sizing Die Assembly - Double Crystal Neutron Spectrometer - Purex Manual Drawings (90% complete). A total of 527 black and white prints were run through the Bruning Machine.

GLASS SHOP

Total productive man-hours for the month was 1150 with practically no existing backlog. A total of 129 jobs were completed with no major or outstanding jobs being processed.

PHOTO LABORATORY

Work requests received from the Technology Sections were as follows:

	<u>Orders</u>	<u>No. of Prints</u>
Separations Technology	6	21
Pile Technology	39	2240

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Separations Technology Section

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ANALYTICAL LABORATORIES,

General Chemical Laboratory

Hanford interest in a Thorex process has resulted in increased emphasis on thorium analyses. A limited investigation of thorium in both aqueous and organic solution was undertaken to ascertain the accuracy of the analytical methods employed and the reliability of liquid-liquid extractions used in the laboratory.

Using an assay method, ignition of samples to ThO_2 , as a control the following were deduced from data obtained. Analyses by X-ray absorption on aqueous, organic (TBP in Amsco solvent) and extracted organic (TBP in Amsco or TBP in carbontetrachloride) solutions, containing 25 g/l to 250 g/l thorium, were accurate to about $\pm 1\%$. Versene titration of like solutions was accurate to about $\pm 3\%$.

Satisfactory extraction procedures were developed and evaluated for extraction by water or dilute nitric acid. However, it was demonstrated that thorium solutions of 30% TBP in Shell Spray Base that had aged for six to eight months could not be completely stripped of thorium with normal extraction procedures. This failure suggested the possibility of dibutylphosphate (DBP) interference, since the concentration of DBP in TBP solutions is known to increase with age. Addition of 1.0 g/l DBP to fresh organic solvent followed by immediate extraction did not indicate thorium retention in the organic phase. The limited investigation indicates factors other than normal DBP build up, are responsible for the retention of thorium by aged organic solvents.

Radiochemical Laboratory

"Burnout" measurements made and previously reported on fuel element specimens for the Aircraft Nuclear Propulsion project were not in agreement with similar measurements made by Argonne National Laboratory and Oak Ridge National Laboratory. Cesium mounts produced in the course of the analyses were formerly compared with ORNL Cs^{137} standards by beta counting, a comparison recommended by ORNL. The discrepancies are now resolved since gamma counting the cesium mounts and comparing with ANL Cs^{137} standards. The previous discrepancies must have been due to the capricious nature of beta counting and/or errors and uncertainties about the original cesium standards.

The gamma spectrometer was extensively employed to follow protactinium (Pa^{233}) and fission products for Pa^{233} scavenging studies. In other Thorex studies, thorium was assayed by X-ray absorption and thoron complexing, nitric acid assay in thorium streams by oxalate complexing, phosphate by ammonium molybdate complexing and absorption spectroscopy and uranium (U^{233}) by hexone extraction and alpha counting. All methods worked satisfactorily.

Spectrochemical

A one piece insulator shield for the arc-spark source enclosure, for radioactive samples, was fabricated from "Scotch Cast No. 1" plastic. This shield has replaced a previous model which failed when subjected to operating voltage and current requirements. The electrical insulation properties of the new shield appear to be satisfactory from rough preliminary tests. Thermal qualities remain to be checked after final assembly of the unit.

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Mass Spectrometry Laboratory

The General Electric Analytical Mass Spectrometer is not yet operative. Trouble was encountered with the emission regulator, low sensitivities and a pin hole leak in the system. At month's end it appeared that the leak had been found and the emission regulator repaired. Work is now proceeding towards bringing the sensitivities up and recalibrating.

Other mass spectrometers functioned satisfactorily during the month.

Water Quality Laboratory

A quick and practical method for determining the saturation point of silica jell was established. The method consists of passing air at a constant rate, and saturated with water through a tower containing silica jell. A tube containing commercial indicating Dryrite at the exit end of the tower indicates when the saturation point is reached. The silica jell tower is then weighed and the water up-take and elapsed time determined.

Work volume statistics for the Analytical Laboratories are as follows:

	December*		January	
	<u>Number of Samples</u>	<u>Number of Detn's.</u>	<u>Number of Samples</u>	<u>Number of Detn's.</u>
<u>Research & Development</u>				
Pile Technology				
Metallurgy Research			35	217
Pile Material			200	752
Fuel Technology			38	823
Separations Technology				
Chemical Research			754	1599
Chemical Development			457	580
Plant Processes			3	6
<u>Process Technology</u>			49	233
<u>Other Customers</u>			49	485
Total	2045	5405	2744	4695

* Note: Individual component statistics not available due to reorganization of the Technical Section during the month of December 1954.

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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.

<u>Inventor(s)</u>	<u>Title</u>
G. B. Barton, Chemical Research Sub-Section	The Conversion of Graphite to Diamond under the Influence of Radiation.
H. T. Hahn and W. N. Carson Chemical Research Sub-Section	Thermal Diffusion Column Construction
H. T. Hahn Chemical Research Sub-Section	Separations of the Isotopes of Heavy Elements
T. R. Cartmell Chemical Research Sub-Section	A Cheap Running Time Indicator for Dry Battery Operated Devices to Give a Warning Prior to Battery Failure

R. B. Richards

Manager, Separations Technology
ENGINEERING DEPARTMENT

RB Richards:khs

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MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

R. L. Cleveland of Panellit, Incorporated, Skokie, Illinois visited Hanford January 3rd through 31st for consultation on Pressure and Temperature Monitor Regulation.

C. S. Slenning and F. K. Akerson of Minneapolis-Honeywell Regulator Company, Portland, Oregon and Richland, Washington, visited Hanford January 6, 1955 to assist Plant forces in making adjustments to a Brown Recorder.

O. O. Akerland of Panellit, Incorporated, Skokie, Illinois visited Hanford January 12th through 31st to investigate Temperature and Pressure Monitor troubles.

C. S. Slenning of the Minneapolis-Honeywell Regulator Company, Richland, Washington visited Hanford January 17th and 18th to work on test hole facility instruments.

B. J. Kulakowski and L. J. Pianowski of the Udyllite Corporation, Detroit, Michigan, visited Hanford January 28, 1955 to discuss anodizing machines and racks.

J. L. Hyde of the E. I. DuPont deNemours & Company, visited Hanford January 24th through 26th to discuss in-line instrumentation.

E. B. Lavelle visited the Southwestern Engineering Company, Los Angeles, California, January 5th through 8th to provide engineering assistance on a welding fabrication problem.

W. A. Richards visited Panellit, Incorporated, Skokie, Illinois on January 6th through 12th and the Haller Meter Company, Cleveland, Ohio on January 11th and 12th

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E. L. Armstrong visited New York, N. Y. on January 27th through 29th to attend the American Physical Society meeting.

W. J. Love and J. H. Snyder visited the General Electric Company, Schenectady, New York, January 31st for consultation on reactor design.

ORGANIZATION AND PERSONNEL

Personnel Statistics:

	<u>DECEMBER 31</u>			<u>JANUARY 31</u>		
	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Design Management	1	1	2	1	1	2
Process Engineering Sub-Section	70	13	83	71	13	84
Design Planning Unit	16	13	29	16	13	29
Design Engineering Sub-Section	84	10	94	85	11	96
Design Drafting Unit	8	86	94	8	86	94
	—	—	—	—	—	—
Total Section Personnel	179	123	302	181	124	305
Technical Graduates (Rotational)	—	4	4	—	4	4
	—	—	—	—	—	—
TOTAL	179	127	306	181	128	309
Accessions	—	9				
Separations	—	6				

GENERAL

Design Section engineering and drafting effort for January was distributed approximately as follows:

	<u>Engineering Man Months Expended</u>	<u>Drafting Man Months Expended</u>	<u>% of Section Effort</u>
1952 Expansion Program	27.7	16.8	17.3
Reactor Plant Modification for Increased Production	25.5	20.2	17.8
4X Program	17.3	13.9	12.1
Design Development	53.3	7.0	24.3
1706-KER Recirculation Facilities	7.4	5.8	5.0
Other Projects and Design Orders	35.7	25.7	23.5
	—	—	—
	166.9*	89.4*	100.0

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*Equivalent man months expended includes 4.3 months of engineering and 0.4 man months of drafting overtime, which represents approximately 7% of the Section on a six-day week basis. The overtime effort was principally applied to design field liaison in support of the 100-K Reactor and Water Plant Construction Program and preparation of the FY 1957 Plant and Equipment Budget.

The Design Drafting Unit production for the month was 239 new drawings, 27 charts and graphs and 322 drawing revisions for an equivalent of 5.3 man days per drawing.

DESIGN DEVELOPMENT

Statistics:

The total number of engineering and drafting man months applied to design development activities during January were as follows:

	<u>ENGINEERING</u>		<u>DRAFTING</u>	
	<u>Man Months</u>	<u>% Of Total</u>	<u>Man Months</u>	<u>% Of Total</u>
Metallurgical Design Development	2.5	4.7	-	-
Reactor Plant Design Development	24.6	46.2	3.3	47.1
Separations Plant Design Development	23.1	43.3	2.9	41.4
Chemical Processing and Reduction Design Development	1.7	3.2	.2	2.8
234-5 Design Development	1.4	2.6	.6	8.7
	<u>53.3</u>	<u>100.0</u>	<u>7.0</u>	<u>100.0</u>

Metallurgical Design Development

The report on a proposed design development program for point closure fuel element preparation was completed. Specifications and preliminary scope drawings for an automatic press and special finishing machine for the point closure process were prepared as the first step in developing estimated costs and schedules of prototype equipment.

Reactor Plant Design Development

An analysis is being made of present reactor shielding information including results of experimental tests with high density concrete and construction application in the biological shields for the 100-K reactors. The object of this study will be to develop more efficient and improved shielding materials and methods for application to new reactor designs.

A study is being made of a water wall concept as a means of transferring coolant in and out of a reactor. This study will cover the design, fabrication and feasi-

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bility aspects of comparable water-wall and cross-header piping systems for reactors. Designs and test procedures for nozzles and fittings required for a water-wall design have been developed for test at an early date.

Further study was made of the design effects of positive neutron temperature coefficient associated with long-exposure fuel elements. A review was made of horizontal and vertical control system to determine maximum reactor control required under such conditions. Also under study is an improved gas system for simplified and more efficient reactor cooling and drying.

Experimental tests using ultrasonics for the decontamination of fuel element dummies continued. Tests were made with water and with non-corrosive chemical solutions for decontamination. Results to date indicate a need for further development in the area of optimum frequency, power levels and crystal arrangement. Other development studies included consideration of: process tube removal equipment; mechanical handling, sorting and conveying of slugs and dummies in the reactor discharge area and storage basin; and ruptured slug detection equipment.

Separations Plant Design Development

Work continued on study of the Redox Plant contamination problem. Items under consideration for the control of the ruthenium contamination problem include in-cell ozonization facilities, outside ozonization facilities, removal and disposal of contaminated equipment, ventilation increases, canyon clean-up facilities, pre-filter condenser on the condenser vent system and improvements in the vessel vent system. Preliminary scope for the first item of the Redox Contamination Control Project, In-Cell Ozonization was completed and a project proposal for the initiation of the entire project was issued.

Preliminary scope was completed for Inert Gas Blanketing of Redox process vessels and a project proposal is being prepared. This project will include improvements to the Redox Plant inert-gas system to provide for delivery of substantial quantities of inert gas individually to all vessels considered to be critical from the standpoint of hexone explosion hazards.

A preliminary study of feasibility and cost of conversion of the TBP Plant to a thorium separations facility was completed. This study was based on a process flow-sheet which included provisions for recovery of acid from wastes and for recovery of source material. Alternate studies are being made on the basis of revised flowsheets which (a) exclude acid recovery and (b) exclude acid and source material discovery.

Preliminary tests were completed on the in-line alpha monitor and the instrument was installed in the Hot Semiworks in anticipation of start-up. Further functional tests will be conducted in the interim period until start-up of the Hot Semiworks.

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Chemical Processing and Reduction Design Development

Preliminary designs were prepared for a new pressure vessel to permit reduction-casting of two different models in new Task III equipment.

Shop fabrication was continued on a vertical replacement type hydrofluorination furnace for Task II.

234-5 Design Development

Design was completed on study drawings delineating two alternate methods for improving the present RMA Line Conveyor System. Work was started on the design of special lathe tools and attachments for Task V remote machining.

Engineering Standards and Materials Development

Cost to date for development of engineering standards for the current fiscal year is \$49,477.

The following standards were completed and issued during the month:

SDC - 7.1	Standard Electrical Design Criteria - General
SDC - 7.5	Standard Electrical Design Criteria - Interior Power and Lighting Systems
SDC - 7.7	Standard Electrical Design Criteria - Plant Telephone System
SDC - 7.8	Standard Electrical Design Criteria - Fire Alarm Systems
SDC - 7.9	Standard Electrical Design Criteria - Auxiliary Signaling and Communication Systems
E-5-28a	Chain Barricade
C-5-32a	Personnel and Office Nameplates
HWS-5766-S	Standard Specification for Radiographic Spot Examination of Welded Joints
HWS-8000-S	Standard Specification for Motor Control Centers
B-3-3	Piping Systems, Standard Identification Code, Rev. 3
S-1-2	HAPC Approved Codes, Rev. 3
C-4-3	Steel Ladder Cage, Rev. 3
C-5-2	Stairway Construction, Rev. 1

Work on standards and studies during the month is as follows:

- The preparation of a new standard specification for austenitic stainless steel pipe was advanced to 70% complete.
- Revisions to existing standard specifications for austenitic stainless steels continued and reached 80% complete.
- Paint tests were started to determine the protective coating which should be used on the steel retention basins and effluent line from the 105 Buildings to the 107 Retention Basins.

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Engineering and drafting effort of the Section on projects for the month of January was expended in the following categories:

	<u>ENGINEERING</u>		<u>DRAFTING</u>	
	<u>Man Months</u>	<u>% Of Total</u>	<u>Man Months</u>	<u>% Of Total</u>
1952 Expansion on Program	27.7	24.4	16.8	20.4
4X Program	17.3	15.2	13.9	16.9
Reactor Plant Modification for Increased Production	25.5	22.4	20.2	24.5
1706-KER Recirculation Facilities	7.4	6.5	5.8	7.0
Other Design Projects	8.3	7.3	4.4	5.3
Miscellaneous Design Orders	27.4	24.2	21.3	25.9
	<hr/>	<hr/>	<hr/>	<hr/>
TOTAL	113.6	100.0	82.4	100.0

CA-512 - 100-K Area Facilities

Principal effort for the month included design assistance in the rehabilitation of the "KW" Reactor. Designs were provided for special graphite removal tools and for cutting tools for breaching the biological and thermal shields. In addition, plans were prepared for a graphite replacement stringer and biological shield repair plug. Design field liaison activity in support of operability tests for the "KE" Reactor accelerated during the month. The as-built drawing program advanced to 65% complete.

Preliminary design was initiated for a gamma water monitor system for the "K" reactors.

Design of the 1706-KER facility moved ahead on the basis of the modified scope which principally involves a reduction in installed pumping capacity plus a change in operating philosophy for the test facility. Detail design is 86% complete and is being expedited in an attempt to complete design on schedule. A new design criteria and eight revised scope drawings were completed.

CA-513 - Purex Separations Facility

Limited design activity was devoted to the review of a specification for Purex spare concentrators and design of disposal facilities for failed Purex equipment.

CA-514 - 300 Area Expansion

Design revisions to the ultrasonic bond test equipment is approximately 95% com-

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plete. Several alternate designs for proposed changes to the material handling system in the 313 Building have been prepared. The most feasible design will be selected after receipt of vendor drawings for the automatic sleeve gaging equipment.

CA-539 - Additional Waste Storage Facilities

Design was completed on revisions to the vapor manifold system for the Redox 241-SX Tank Farm. This completes the lump sum bid package for the condensor and manifold system for nine 241-SX tanks. Work was started on the remaining design which includes the emergency water system and special jumpers.

CG-558 - Reactor Plant Modification for Increased Production

Total design advanced on schedule to 58% complete an increase of 3.6% during the month. Design scope is 100% complete and detailed design advanced 4.3% to 52% complete.

The major design effort during the month included the preparation of bid packages for Phase I contracts for the 190-B Building annex and for the 190-D Building annex. Design for the 190 Buildings is proceeding on the basis of revised vendor information on the pumps, drive units and crane.

Further design progress was made on the 181, 183 and 105 Buildings and on the effluent systems. Requisitions were issued for control centers and miscellaneous electrical equipment for the 105 Buildings and for modification parts for the switchgear to be installed at the 183 Buildings. Specifications and requisitions for the pressure monitoring systems were revised to provide for the mounting of new type gages in existing 105 Building instrument panels.

CG-574 - Hanford 3X Program - Irradiation

Design is 100% complete including the preparation of nine drawings for fabrication of buckets and handling equipment.

CG-578 - Effluent Water Monitoring Improvements. 100-D, E, DR, F and H Areas

Detail design progressed 13% during the month to 87% complete. All requisitions have been prepared and 59 of a total of 68 drawings have been approved. Vendor drawings for the Gamma Monitor Spectrometer were reviewed and approved.

CG-579 - Effluent Water Monitoring Improvements. 100-C Area

Detail design is 58% complete an advance of 33% during the month. Of a total of 25 drawings, six have been approved, six are issued for comment, and five are in the check print stage. Of a total of 10 requisitions contemplated, seven are 100% complete.

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CA-586 - First Capacity Increase - 230 KV System

Detail design for additions to the 230 KV system is 5% complete. Preliminary surveys of the line route were started. Purchase specifications for the substation additions, including an oil circuit breaker and disconnect switches are being prepared. Twenty-six drawings have been scheduled for the project.

CG-587 - TBP Waste Scavenging

Revision No. 1 which authorized four additional waste cribs was received from the AEC. The site plan for location of the additional cribs in the BY Tank Farm area has been completed and approved.

CG-598 - Purex Vacuum Fractionator

A purchase contract for a "design and fabricate" package for the fractionator and associated components was placed during the month. Process calculations and preliminary equipment designs were received from the vendor for design review.

CG-599 - Hanford 4X Program - 100 Areas

A design scope drawing for underwater slug storage in the Redox Plant was prepared. Scope work on the slug transportation requirements was held in abeyance pending receipt of basic requirements on bucket loadings expected early in February.

CG-600 - 100-C Alterations

Detail design was advanced 16% during the month to 66% complete. Scheduled design work has been reduced by the deletion of the filtered water sampling system in 183 Building. Design for electrical modifications for the 181 and 183 Buildings, including nine drawings, was completed. Design studies are in progress to investigate the problem of overheating of 190 Building process pumps under certain operating conditions.

CG-603 - Hanford 4X Program - Bismuth Phosphate Plants

Scope design was advanced to 98% complete and detail design progressed to 46% complete, an advance of 14%. Design scope for Part II of this project including such major items as waste scavenging facilities, laboratory and sampling equipment, stack air sampling facilities and equipment replacement for "B" Plant in addition to modifications to the F-10 tank facility and stack sampling facilities for "T" Plant was completed, for approval, during the month.

Approximately 50% of the required detail drawings for the project have been completed on schedule and advance ordering of critical equipment is essentially complete.

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CA-612 - Alteration of Building 713 for Electronic Data Processing Machine

Detail design progressed to 98% complete. All drawings have been completed with the exception of final instrument panel locations and cable trench layouts. Specifications and requisitions for engineered material are 90% complete.

CG-613 - Hanford 4X Program - Metal Conversion Plant

Design scope for the expansion of UO₂ Plant advanced 23% to 73% complete during the month. A directive was received from the AEC instructing that Project CG-613 include provisions for product segregation. Scope revisions to include this feature have been completed. Design schedules and estimates were prepared and detail design started with the exception of design for the continuous calciners which is awaiting establishment of firm process equipment criteria.

CG-614 - Hanford 4X Program - 300 Area

Design scope reached 85% complete, an advance of 15% during the month. Design criteria and scope drawings for the 313 Building process equipment were completed and approved. Design criteria for the 3707-D Change House have been completed but not approved. Purchase specifications were completed for required major process equipment.

CG-616 - Installation of Acid Feed Equipment 100-B, C, D, DE, F & H Areas

A directive was received from the AEC authorizing the preparation of design scope and the initiation of detailed design. Scope drawings and design criteria are being prepared and are scheduled for completion during February. Project proposal preparation is being continued concurrently with scope preparation.

D. O. 100754 - Modification of the 189-D Process Tube Mock-up

Detail plans and specifications were completed in December. Present activity is limited to review of vendor drawings and interpretation of design drawings for construction purposes.

D. O. 100757 - "As-Built" Area Maps

Design drafting on the revisions of HAPO Project Maps to bring them up-to-date advanced to 76% complete. Of a total of 400 drawings, 314 drawings have been started and 303 issued for comment.

D. O. 100890 - Yakima River Pump Station and Feeder Line

Design was advanced 25% during the month to 100% complete. One structural drawing and two electrical drawings plus associated specifications and a test procedure were approved.

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D. O. 100946 - Foxboro Dewcel Moisture Monitoring System (CG-583)

Detail design of a moisture detection system for the reactors was advanced 10% during the month to 80% complete. Seven drawings have been approved for the dewcell installation in 105-B, D and F. Five drawings for 105-DR have been issued for comment.

D. O. 101015 - Dejacketing and Ultrasonic Equipment, 105-C Building (CG-589)

Design of a slug stripper and ultrasonic grain size determinator was advanced to 100% complete, an increase of 20% during the month. Thirty-eight required drawings have been issued for comment and purchase specifications were completed for all major equipment items.

D. O. 101036 - Moisture Monitoring System, 105-C Building (CG-584)

Design for installation of the Foxboro dewcells in the 105-C Building advanced 10% during the month to 80% complete. Five required instrument drawings have been issued for comment.

D. O. 101045 - Discharge Area Television Viewer, 105-B Building (CG-593)

Design was inactive on this project during January. Design progress remained at 56% complete, with further design dependent on receipt of vendor information for the monorail equipment and for the closed circuit television chain.

D. O. 101062 - Nitric Acid Decontamination Facilities, 100 Areas

Work continued on the preparation of a project proposal for the 100 Area facilities which will permit the use of nitric acid as the decontamination agent for dummy decontamination. The scope is being revised to include facilities for the 100-K Areas and to provide for dummy quantities in accordance with production forecasts.

D. O. 101063 - Alum-Activated Silica Water Treatment Facility, Phase II - Project Proposal

Work was started on the preparation of design scope and the project proposal. Current design activity includes a study to establish economic and operational basis for performing the proposed Phase II work.

D. O. 101102 - Induction Heating Fuel Testing Facility - 314 Building

Design of the test facility advanced 15% during the month to 95%. Of six scheduled electrical drawings, two were approved and four have been issued for comment.

D. O. 101117 - Installation of Additional Generating Capacity, 189-D Building

Procurement drawings and a purchase specification were prepared and issued for the 22,500 ampere electrical bus for the high-pressure loop in the 189-D Building.

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D. O. 101145 - Phase II Particle Problem Animal Exposure Equipment (CG-572)

Detail design for alterations to the 141-F Building advanced to 40% complete. Three drawings have been issued for comment.

D. O. 101147 - FY 1956 and FY 1957 Plant and Equipment Budget

Preparation of the Plant and Equipment Budget for projects to be managed by the Engineering Department received priority attention during the month. A preliminary draft of the budget submission was issued to responsible Departments for review and comment. The final draft is scheduled for issue to the Financial Department, February 11, 1955. Preparation of required budget data sheets progressed to 50% complete. The scheduled date for issue of approved budget data sheets to the Financial Department is February 25, 1955.

D. O. 101148 - Dissolvers for Recuplex Installation

The two equipment drawings required for the Recuplex extractor columns were completed and design advanced to 100% complete.

D. O. 101153 - Redox Railroad Tunnel Covers Project Proposal

The preparation of a project proposal was completed for the design, procurement, and installation of a ventilation barrier (horizontal sliding door-type) between the Redox railroad tunnel and the canyon.

D. O. 101190 - Irradiation Facility - HTRE Fuel Tests

Preparation of an engineering feasibility report covering the installation of a gas-cooled irradiation test facility for the GE-ANP fuel element testing program was started. The work is scheduled for completion by the end of February.

D. O. 101195 - Replacement of Existing 313 Building Roof (CG-610)

Design was initiated for the replacing of a section of the 313 Building wooden roof with a steel deck section.

D. O. 101198 - Additional Waste Tanks, 200-W

Work was started on the preparation of a project proposal to provide additional waste storage capacity in the 200-W Area. Conferences were held during the month with Manufacturing Department representatives to discuss preliminary project information.

D. O. 101218 - General Improvements to Laboratory Area Buildings (CG-576)

Funds were authorized for design late in the month. Progress during January was restricted to the preparation of a preliminary design schedule for the 19 items of work included in the project.

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D. O. 101230 - Irradiation Facility - WAPD Fuel Test Program

Authorization was received from the AEC for the preparation of an engineering feasibility report to include the installation of a pressurized water-cooled irradiation test facility for the Westinghouse Atomic Power Division. Preparation of a scope schedule was started.

Design Work Completed During January

D. O. 100384	Design of Three Jumpers for D-9 to D-8 Pump, 202-S Building
D. O. 100841	Work Laboratory Area
D. O. 100930	Graphite Hot Shop and Storage Facility
D. O. 100963	Floor Loading Stress Survey, 325 Building
D. O. 101051	Carbon Dioxide System, 234-5 Building - Project Proposal
D. O. 101101	New VSR Test Tower
D. O. 101115	Redesign H6 Vent Thermohm
D. O. 101127	Decontamination Cart, 221-T Building
D. O. 101128	Redox As-Built Drawings
D. O. 101141	Drawings and Specification for Evaporators
D. O. 101144	Trench Jumper, 221-T Building
D. O. 101155	Fuel Element Pilot Plant
D. O. 101156	Trench Jumpers, 221-T Building
D. O. 101159	ZDU Cooler - Separator Unit
D. O. 101160	Stockpiling Special Materials for Emergency Replacement
D. O. 101161	PR Can Modification, 231 Building
D. O. 101166	Redesign Jumpers, 221-U Building
D. O. 101167	Container Print, 271-U Building
D. O. 101173	Trench Jumper, 221-T Building
D. O. 101175	Jumpers, 154 UX Diversion Box
D. O. 101176	Jumper, 153-T Diversion Box
D. O. 101179	306 Building Offices, Second Floor
D. O. 101185	TBP Plant Jumper Design
D. O. 101189	Redox Plant Service Facilities, Space Study
D. O. 101205	Redox Plant Stock Sampler - Detail Design

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.

W. H. Beston
Manager, Design
ENGINEERING DEPARTMENT

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DESIGN SECTION WORK STATUS

ENGINEERING MAN MONTHS

PROCESS ENGINEERING SUB-SECTION

Description	Work Time		Backlog Start of Mo.	Sch'd Dur. Mo.	Spent Dur. Mo.	% of Total Effort Month	Backlog End of Month						Bal FY'56 And Later	Total
	Mo.	Mo.					Feb.	Mar.	Apr.	May	Jun.	Jul.		
1952 Exp. Program*	71.3	15.0	13.6	19.7	72.7	13	12	10	9	8	7	7	13.7	72.7
CG-558	16.4	10.0	4.1	6.0	22.3	4	3	2	2	2	2	2	7.3	22.3
4-X Program	38.0		2.1	3.0	35.9	4	4	4	4	3	2	2	14.9	35.9
Reactor Des. & Dev.	155.7	20.0	20.0	29.0	135.7	20	22	23	23	24	25	25	287***	424.0
Sep. Des. & Dev.	107.4	18.0	18.0	26.1	89.4	18	18	19	19	19	19	19	221***	333.0
Met. Des. & Dev.	10.4	2.2	2.2	3.2	8.2	2	2	2	2	2	2	2	28***	40.0
234-5 Des. & Dev.	13.1	.8	.8	1.2	12.3	1	1	1	1	1	1	1	17***	23.0
Weapons Des. & Dev.	6.9	.8	.8	1.2	6.1	1	1	1	1	1	1	1	11***	17.0
Other Projects & Misc.	24.5	7.3	7.3	10.6	17.2	6	6	6	5	5	5	5	55**	88.0
Anticipated Future Work							1	2	4	5	6	6	114	132.0
TOTALS	443.7	25.0	68.9	100.0	399.8	69.0	70.0	70.0	70.0	70.0	70.0	70.0	768.7	1187.9

DESIGN ENGINEERING SUB-SECTION

1952 Exp. Program*	131.9	18.1	23.2	113.8	17	16	15	13	12	11	29.8	113.8
CG-558 & 600	259.3	19.2	24.6	240.1	19	19	19	19	19	18	127.1	240.1
CG-578 & 579	12.9	1.7	2.2	11.2	2	2	2	1	1	1	2.2	11.2
CG-586	19.6	.9	1.2	18.7	2	2	3	2	2	2	5.7	18.7
CG-598	23.3	.1	.1	23.2	2	3	4	4	4	3	3.2	23.2
4-X Program	97.5	12.0	13.3	17.1	16	17	14	12	10	8	19.2	96.2
Des & Dev. Programs	71.3	8.6	11.0	62.7	9	10	10	11	12	13	155.0***	220.0
Other Major, Minor, Misc.	84.7	23.0	16.1	91.6	13	11	10	10	10	10	137.6**	201.6
Anticipated Future Work					2	5	10	10	12	16	410.0	455.0
TOTALS	700.4	35.0	78.0	657.5	80.0	82.0	82.0	82.0	82.0	82.0	889.8	1379.8

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	165	88	253
Mechanical	297	144	441
Electrical	151	75	226
Instrument	229	107	336
Standards	83	41	124
TOTALS	925	455	1380

*Includes 1706-KER Recirculation Facilities

**Includes Minor Projects & Miscellaneous Work for FY 1956

***Budgeted FY 1956 Design & Development Funds

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MONTHLY NARRATIVE REPORT - JANUARY, 1955

PROJECT SECTION

I. SUMMARY

A. ORGANIZATION AND PERSONNEL

Following is a summary of personnel changes in Project Section during the month:

	<u>December 31, 1954</u>	<u>January 31, 1955</u>	<u>Net Change</u>
Employees on Payroll	391	379	-12
Tech. Grad. - Rotational	5	3	-2

The end-of-month status involved these changes:

	<u>Project Section</u>	<u>Tech. Grad. - Rotational</u>
Payroll Additions	3	1
Payroll Removals	4	
Transfers into Section	4	
Transfers from Section	15	3
Transfers within Section	14	

B. SCOPE OF ACTIVITIES

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

<u>Project No.</u>	<u>Title</u>	<u>Completion Scheduled</u>	<u>Actual</u>
CG-496	Recuplex	91%	91%
CA-512	100-K Area Facilities		
	KW - Water Plant	100	99.9
	Reactor and Building	100	99.9
	KE - Water Plant	100	99.8
	Reactor and Building	100	99.2
	General Facilities	100	99.6
CA-513-A	Purex Facilities, Part "A"	100	95.9
CA-514	300 Area Expansion	61*	61*
CG-535	Redox Capacity Increase, Phase II	95	91
CA-546	Fuel Element Pilot Plant	50	50
CG-558	Reactor Plant Modifications	4	3
CA-603	Hanford 4X - Bismuth Phosphate Plants	3	3

* Percentages according to latest revision of project proposal.

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C. CRAFT LABOR

A work stoppage occurred on Purex project from January 7 - 19 when construction millwrights refused to work without a foreman. The stoppage was concluded when the construction contractor appointed a foreman. A jurisdictional dispute at Purex developed between construction boilermakers and plumbers during the last week of January. The dispute concerned one vessel, and it hindered work without causing a total stoppage.

D. SAFETY AND SECURITY

Eight regular meetings for discussion of safety, security, and health topics were attended by about 260 persons. Four Monday morning tool-box meetings and three mass safety meetings were conducted in the field for service contractor personnel. Six special hazards orientations were given for a total of 140 new and re-hired construction employees. The 9½-year record of Project Section without a major injury was broken on January 31 by the hospitalization of an employee who cut her hand on paper during the workday of January 28.

E. HIGHLIGHTS

Project Auxiliaries Sub-Section

Sub-Section personnel completed summaries of construction progress during 1954 for use of the General Manager and for the annual report, "1954 at Hanford". Reproduction output decreased about 15% to a total of 274,286 for the period of 19 working days. Engineering Files distributed 118,816 prints during the same period. There was an increase in number of prints sent off-site to other General Electric activities. Estimating completed 19 estimates, of which six were for project proposals. Field Surveys completed precision control work on realignment of a pump unit in 190-C Building and also lease survey location of three substations which are to be leased to Bonneville Power Administration.

Inspection Sub-Section

Inspection was completed on 257 orders, which with 125 newly assigned orders leaves the total number requiring inspection at 393. Evaluations under the Corrosion Testing Program decreased by about 17% to a total of 155 samples. The multi-sampling technique of Huey testing has been approved by Technical, thus reducing the cost of corrosion testing from \$7.00 to \$4.25 per sample.

The workload for inspection apparently has stabilized in all areas of the United States. With the rapid close-out of construction orders, there has been a gradual increase of operations orders from H.A.P.O. Inspection personnel have spent considerable time during the month consulting on three or four vendors' claims against construction contractors.

Minor Construction Sub-Section

The Sub-Section completed assigned work on 14 work orders and three projects, Building for Prototype Physical Constants Test Reactor, General Improvements to Laboratory Area, and Alterations to 100-C. Newly assigned work consisted of 11 work orders and portions of CG-543, Sanitary Tile Field - 200-West. Minor Construction has authorized funds of \$7,443,496, of which \$4,592,035 has been expended or committed. Forces of the labor

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service contractor increased by about 17% to a total of about 680. As of January 22, 1955 Minor Construction contractor forces completed 634 days without a lost time injury. Work experience in SWP zones continued on an excellent level.

Project Engineering Sub-Section

Work was done on 43 project items, three informal requests, and miscellaneous engineering requests. The Sub-Section completed assigned work on Building for Prototype PCTR; Oxidizer Off-Gas Treatment - Redox; Laboratory Supply Space - 300 Area; and Additional Generating Capacity - 189-D. Initial work was accepted on CG-617, Additional Air-Drying Facilities - Building 234-5; and two engineering requests. During the month, agreement was reached with A.E.C., Hanford Operations Office, regarding the Company's functions and responsibilities in connection with A.E.C. fixed-price contractors. This agreement was confirmed by a letter from A.E.C. on January 27, 1955. Procedures for application in the field are being prepared in collaboration with Hanford Operations Office.

Reactor Projects Sub-Section

Extensive work was done toward rehabilitation of 105-KW Reactor. Penetration through the biological and thermal shielding was completed January 20, and Pile Technology Section assumed responsibility for removing the graphite stringer. On January 27, Project Section assumed responsibility for re-assembling the reactor. The 100-KE Water Plant buildings were accepted for operation on January 28, with specific exceptions. Beneficial use of 105-KE Reactor was expected between February 5-9, 1955. Over-all completion of acceptance testing was about 90%, and 60% of the acceptance tests have been signed. Adjustments and calibrations are being made, and punch list items are being cleared. At Building 1706-K, acceptance tests were started on electrical systems and pumps. Progress at 1706-KEE consisted of placing forms, steel, and concrete for walls and roof slabs.

Separations Projects Sub-Section

Negotiations were continued with Electric Boat Company on engineering features of the two spare Purex concentrators. The design change rework of concentrators in 202-A Building was completed. All major operational equipment was on site, and 87 pieces have been processed through 272-E Mock-Up. The canyon equipment remaining in Mock-Up Shop consisted of 14 pieces and the "L" Cell package. Major equipment installation was completed in Cells "A", "B", "C", "D", "F-2" and "M", making over-all installation of vessels and engineered equipment about 87% complete. Process jumper fabrication progressed to about 93% complete, and installation was over 50% complete. These portions of Purex Facility, Part "A", were considered complete: 203-A Storage; 211-A Chemical Tank Farm; 216 - 240-A Waste Disposal; 272-E Mock-Up; 291-A Stack; General Outside Utilities; 283-E Filter Plant Addition; 241-A Tank Farm; and the Aqueous Make-Up and the Laboratory in 202-A Building.

F. MONTHLY REPORT OF INVENTIONS AND DISCOVERIES

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

NONE

January 31, 1955

J. S. McMahon
J. S. McMahon, Manager - Projects

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II. STATISTICAL AND GENERAL

A. SIGNIFICANT ASSIGNMENTS

1. Initial Reporting

CG-617 - Additional Air-Drying Facilities - Building 234-5

Scoping and design are being managed by the Design Section. The Work Authority for this project was received during late January 1955, and the amount of authorized funds was \$42,000.

ER A-3114 - Relocate Oxide Burner North of Building 314

This request included scoping and preparation of the Project Proposal. The Engineering Department has requested postponement until further notice.

ER A-3115 - Prepare Scope Design and Estimate for Offices - Fuel Element Pilot Plant

This request was for \$1,000 to cover scoping and preliminary design. Five alternate sketches have been completed and reviewed by the Engineering Department - Technical Section. High spot estimates were prepared according to the first four sketches in amounts from \$100,000 down to \$45,000. A detailed estimate is being prepared according to the fifth sketch.

2. Final Reporting

CA-566 - Building for Prototype Physical Constants Test Reactor

Construction progressed 2% to completion on January 28, 1955, with exceptions. Information for the Physical Completion Notice has been assembled.

CG-585 - Oxidizer Off-Gas Treatment, Redox

This project was completed during late December 1954, except for two work orders. Information for the Physical Completion Notice has been assembled.

CG-592 - Laboratory Supply Space, 3706 Building

The request for preparation of a project proposal has been withdrawn. Another method of operation, using a display room with a special delivery schedule from Central Stores, has proved adequate.

CG-605 - Installation of Additional Generating Capacity - 189-D

Construction progressed 1% to completion. The Physical Completion Notice was issued on January 26, 1955.

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ER A-2751 - Removal of Task I and II R.G. Line

With the project proposal about 65% complete, the Manufacturing Department cancelled this request.

3. Current Projects

CG-496 - Recuplex Installation - 234-5 Building

Design had been completed previously; over-all construction progressed 4% to a total of 91%. All vessel modifications have been made and the vessels re-installed. Piping tie-ins are being completed. All lucite panels on the R. and B. hood have been installed, and the remaining glove ports are being installed.

Beneficial use of the facility is being attained as major components are completed. The Cold Chemical Addition Hoods were scheduled for completion on February 1, 1955, and the remaining eight stages were scheduled for completion by March 31, 1955.

CA-512 - 100-K Reactor Facilities

100-KW and 100-KE Water Plants

Over-all design of water plants remained at 99.8% complete. The construction completion status of KW remained at 99.9%; KE progressed .5% to a total of 99.8%; General Facilities were 99.6% complete.

Work at KW Water Plant consisted of revisions to dichromate injection and process water sampling systems, acceptance testing, and completion of punch list items. Work was started on installation of insulated thrust bearings in the 181-KW river pump motors.

The buildings for KE Water Plant were accepted for operation on January 28, 1955, with specific exceptions. Work was started at the 181-KE Building on revised cooling water piping to provide freeze protection. Repairs to the 183.2-KE Basin #4 were completed. Acceptance testing was completed with minor exceptions on the River Pump House, raw and filtered water system, and electrical systems. Other acceptance tests were partially performed. The vendor's representative made a study and took data to determine the source of unusual noises in secondary pump drive #5 in 190-KE Building.

Work was continued on acceptance testing of fire alarm systems, general area evacuation system, and blackout system. Good progress was made on general area grading, roads, fences, and walkways.

At Building 1706-K, acceptance tests were started on electrical systems and several pumps. Installation work was continued on piping, instruments, and electrical equipment. Equipment is being assembled in the laboratories.

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Construction progress at 1706-KER Building consisted of placing forms, steel, and concrete for walls and roof slabs. The construction contractor completed work on heating and ventilating equipment. A meeting of the Project Committee was held January 25, and the revised design criteria were approved. The revisions consisted of the following: (1) reducing the number of pumps in each loop from three to two; (2) specifying pumps with a differential pressure of 150 psi instead of 450 psi; (3) eliminating the motor generator sets containing flywheels to provide inertia during power outages; (4) addition of a small laboratory.

100-KW and 100-KE Reactor Facilities

Construction of KW Reactor remained at 99.9%. Extensive work was directed toward rehabilitation. Drilling through the biological and thermal shielding was completed on January 20. Personnel of the Pile Technology Section assumed supervision of work in removing the graphite stringer. On January 27, Project Section assumed the responsibility for re-assembling the reactor, which can be accomplished after the vertical rod slots have been cleaned.

Construction of the KE Reactor progressed .9% to a total of 98.9%. Acceptance testing was conducted on instrumentation, electrical, and control systems. Many small adjustments and repairs are being made, and punch list items are being completed. The Unit Gas Test (ATP-1301) was completed on January 23 with a final average leakage rate of about 35 cubic feet per hour at 10 inches water pressure. The normal high flow of water through the process unit is to be reached at the end of the month. About three days have been scheduled for repairs to process piping and fittings, after which the process tubes will be dried out. Beneficial use of the KE Reactor was estimated to be attained between February 5 and 9, 1955.

CA-513-A - Purex Facility

Although design had been completed previously, design changes are pending or in progress on about sixteen items of the Purex Facility. The design change rework of the concentrators in 202-A Building was completed during the last week of January. Two major Work Authorities were received to accomplish the procurement of two additional spare concentrators for Purex and the extension of the 202-A Railroad Tunnel.

Construction for the over-all project progressed 3.5% to a total of 95.9%. Completed portions of the project now include: 202-A Storage, 211-A Chemical Tank Farm, 216-A and 240-A Hot Waste Lines and Cribs, 272-E Mock-Up Shop, 291-A Stack, 283-E Filter Plant Addition, 241-A Tank Farm, and general project utilities. All major operational equipment pieces are on the project.

The Aqueous Make-Up and the Laboratory Section of the Service Area were accepted with exceptions on January 28, 1955. Painting was continued throughout 202-A Building, and general clean-up work was being accomplished. Flushing and testing piping was approaching completion, and insulation is being placed on piping in the Pipe and Operating Galleries. Heating and ventilating systems were essentially completed, and calibration of the panel-mounted instruments was started. Final electrical installations and connections are being made.

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Fabrication of process pipe jumpers progressed to the following totals: fabricated 1130, framed and balanced 1124, and tested 1103. Work was continued on installation and testing of sampler jumpers in the Sample Galleries.

Installation of major equipment was about 88% complete. Installation of major pieces has been completed in Cells "A", "B", "C", "D", "F-2", and "M". The "L" Cell package and 14 other pieces of equipment remain to be processed through the Mock-Up Shop.

During the month, studies were made of the feasibility of turning over work to Minor Construction forces and Plant Forces. The construction contractor withdrew its personnel from certain portions of the building during the last week of the month. The punch lists for all work to be done by Minor Construction have been completed.

CA-514 - 300 Area Expansion Program - Production Facilities

Design progressed 1% to completion; construction completion status was revised downward to 61% complete. This revision followed the revised project proposal for a total estimated cost of \$6,200,000.

The lump sum contract for heating and ventilating control systems has been completed. Manufacturing Department moved into the new canning area on January 19, and Minor Construction forces began demolition of the old canning area on January 20.

Additional study was given to the rack coatings for the penetration etch machines, and teflon or "Kel-F" materials are the only ones to withstand tests. The pneumatic tube system was installed, and the slug recovery centrifuge has been installed for trial runs.

The supporting facilities for the process have been completed except for modification of the methanol still.

Work was continued on all phases of renovation of 3706 Building. The demolition work was completed. All materials for the 3719 Building have been received, and the conversion of this facility was scheduled to begin when the First Aid Facility has been removed.

Engineers from UdyLite Corporation have conferred with project representatives concerning reconditioning of certain machinery. The Detroit office will send a letter stating any opinions and offers of rectification.

CG-535 - Redox Capacity Increase, Phase II

Over-all design had been completed previously; construction progressed 1% to a total of 91%. The 211-S Facility has been completed and the 233-S Facility was essentially completed. Work was continued on the 205-S Building.

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The fabrication of certain equipment for the Silica Gel Facility and for spare parts is behind schedule; however, according to promises from the vendor, delivery dates have been advanced from May 11 to March 25, 1955. This delivery date is within the construction schedule.

CA-546 - Fuel Element Pilot Plant

The status of design was revised downward to 46% complete; construction progressed 5% to a total of 50%. Design progressed on the material storage racks and the de-ionized water system. Work on the lump sum contract was essentially completed; the acceptance tests have been completed, and the contractor is now working on the punch list items.

CG-558 - Reactor Plant Modification for Increased Production

Construction remained at 3% complete. Good progress was made on preparatory work such as relocating lines, installing temporary service, and relocation of transformers. Fabrication and testing of special construction tools and equipment for the horizontal rod shut-down is about 95% complete.

A claim presented by the ASCO Sintering Company was discussed during the month. Project Section participated in a recommendation for settlement of \$24,000.

CG-603 - Hanford 4X Program - Bismuth Phosphate Plants

Scoping and design are being managed by the Design Section. Construction was about 1% complete. Current authorization for this project was \$3,500,000.

Advance ordering of materials was continued. A decision was made for Minor Construction forces to fabricate jumpers for the "B" Plant. Minor Construction forces have continued re-gasketing of canyon, trench, and cell jumpers.

B. OTHER ASSIGNMENTS

CG-187-D-II - Redox Production Plant

Design had been completed previously; construction progressed 1% to a total of 28%. On January 15, 1955 work was completed on the Sample Gallery ventilation improvement. The physical completion date has been extended to June 1, 1955.

CA-187-D-III - Redox Cooling Water Disposal Basin

Both design and construction have been completed. The project is being held open to observe operation of the cribs for several months. Following initial inspection, a small amount of work was performed on the chemical waste trench to insure proper flow.

CA-431-C - Metal Examination Facility - 105-C

Design had been completed previously; construction progressed 13% to a total of 82%. The revised arrangement of equipment in Basin #4 has been approved. In-

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stallation was scheduled for early February 1955.

CA-532 - Fiscal Year 1954 Water Tank Replacements

Design had been completed previously; construction progressed 12% to a total of 93%. The 2902-E Tank was completed except for bands and bracing rods for the frost box, and a second coat of paint. The 2902-W Tank has been painted inside and a prime coat on the outside. The 1902-D Tank has been leak-checked and tested. Painters are beginning work. The 1902-F Tank is being welded.

CA-533 - Hanford Works Official Telephone Exchange

Design had been completed previously; over-all construction progressed 48% to a total of 75%. The equipment is being modified as follows: relocation of the meter cabinet, replacement of main-power fuses with a circuit breaker, and relocation of the top row of jack circuits in both the annex and toll test position proper. Very satisfactory progress was made on the fabrication and erection of the main frame and rack. The vendor is considering overtime work in order to complete the contract on schedule. The subcontractor for cable installation has made good progress, and the workmanship was considered very good.

CA-539 - Additional Waste Storage Facilities for Redox

Design progressed to a total of 92% complete; no construction has been started on the additional work. The design completion percentage represents about two-thirds of the work required for the vapor manifold system. Decision was made for Minor Construction forces to fabricate the jumpers. Procurement was about 75% complete.

CG-543 - Replace Sanitary Tile Field 200-West Administration Area

With design completed, the Directive was issued by the AEC. A work release has been issued to the field, and work was scheduled to begin during early February 1955.

CA-544 - Central Distribution Headquarters

It now appears that requirements of the Electrical Utility Section can be met by use of space within 2101 Building. The extent of work to be done has not been determined.

CA-548 - Reactivate Project Proposal for New VSR Test Tower

With scoping and preliminary design completed, the project proposal is being prepared for signature during early February 1955.

CG-549 - Activate Task I, RMA Line - Building 234-5

Design had been completed previously; construction progressed 20% to a total of 83%. Revision No. 2 of the construction progress schedule was prepared during the month. Hood 9WD and Section 7 of Hood #6 have been installed. The transverse drive mechanism of Hood #9 has been relocated. All work has been completed on the Filter Boat Cleaning and Testing Hood.

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CG-551 - Expansion of 234-5 Building Facilities

Design had been completed previously; construction progressed 8% to a total of 86%. The removal and burial of contaminated Task III hoods and the supporting items were achieved well ahead of schedule. Plant Maintenance forces are placing the new Task III hoods and valve cabinets. The hoods are being reassembled and connected to necessary services. Minor Construction has completed the painting of the Final Inspection Facility except for minor items.

CA-555 - Graphite Hot Shop and Storage Building

With design complete, a revised project proposal is being circulated for approval. The revision was required by increased project costs based upon final design.

CG-562 - Waste Metal Recovery Plant Modifications

Design had been completed previously; construction remained at 74% complete because of some trouble which developed in the intercycle concentrating tower. Neither extent nor cause of the trouble has been determined; the expected capacity cannot be obtained through the tower. Installation of solvent segregation facilities may be determined by operating experience in the near future.

CG-572 - Particle Problem Animal Exposure Equipment

The current status of final design was 61% complete. One architectural drawing has been issued for comments, and the electrical and mechanical phases have been started. Over-all construction progressed 1% to a total of 32%. The construction work for Phase I has been completed.

CG-574 - Irradiation

Scoping and design are being managed by the Design Section. Construction progressed 8% to a total of 18% complete. Some work on the storage basin doors is being delayed by higher priorities; however, work has been resumed on the "J" casks. Piping for the air mask system in 105-H was about 85% complete. All of the bucket inserts and outriggers have been fabricated. All orders for off-site work have been placed.

CG-576 - General Improvements to Laboratory Area - 300 Area

Design progressed 2% to a total of 27%; construction progressed 4% to a total of 29%. Some phases of design are awaiting completion of design criteria. A design order for \$6,000 has been issued to the Design Section. Minor Construction forces have completed work in Room 42-B. Work order requests have been issued to 300 Area

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Plant Forces for modification and installation work in cells of 327 Building, and for installation of supplementary cathodic protection for the crib waste line of 325 Building.

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 about 2% to a total of 3%. Material installed in 100-H has performed satisfactorily, and the vendor has been requested to proceed with the remainder of the order without modifications to the turret. Plant forces have mocked up a typical DR and H turret installation and are fabricating tubing and piping.

CG-579 - Effluent Water Monitoring Improvements - 100-C Area

Material installed in 100-C has performed satisfactorily, and the vendor has been requested to proceed with the remainder of the order without modifications to the turret.

CA-586 - First Capacity Increase - 230-KV System

Design was progressing under the management of the Design Section.

CG-587 - TBP Waste Scavenging

Scoping and design are being managed by Design Section; construction progressed 1% to a total of 99%. These percentages represent current work; the A.E.C. has issued a revised Directive authorizing the construction of four additional cribs. Emergency requisitions for pipe, flanges, and other components are being processed to obtain the use of one crib before April 1, 1955.

CG-588 - Ammonia Scrubbers, Redox

Design is being managed by Design Section. Manufacturing Department has continued its observations of operating results from jet vents to the Redox stack breeching.

CG-589 - Dejacketing and Ultrasonic Equipment - 105-C Building

Design progressed 4% to a total of 99%. A new design schedule has been prepared and submitted for approval. The semi-trailer to be used for transporting caustic and acid has been slightly modified for use with operations trucks. No other work was accomplished.

CA-590 - Fly Ash Collection Equipment, Building 384

With preliminary design completed, the revised project proposal is being circulated for approvals within General Electric Company.

CA-595 - Car Pullers 184 Building Coal Yard - 100-B, D, F and H Areas

Design had been completed previously. The construction bids were opened on January 25, 1955, and the apparent low bid was being considered. The decontaminated work site is being marked by appropriate signs.

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CA-596 - Central Mask Washing Station, Building 2723-W

Detailed design was essentially completed by Design Section.

CG-599 - Hanford 4X Program - 100 Area

This project is proceeding under authorized funds of \$300,000. The vendor had promised delivery of 400 buckets during early February 1955. Other work on the well car is awaiting final instructions from the Manufacturing Department.

CG-600 - 100-C Alterations

Scoping and design are being managed by Design Section. Present work amounting to .3% has been completed; the project is scheduled for continuation in July 1955.

CA-601 - 300 Area General Improvement Program

With preliminary design 85% complete, the revised project proposal is being routed for signatures.

CG-602 - Remote Sampling - Hot Semiworks

Design had been completed previously; construction progressed 35% to a total of 85%. The hood has been delivered to the area and is being installed. Field piping was about 90% complete. The ventilation duct has been fabricated.

CG-608 - Redox Crane Viewing Room

Design was completed by Design Section; construction progressed 19% to a total of 20%. Shop work and fabrication of the mock-up forms were completed. Installation was scheduled according to Redox operations which will permit entry during early February 1955.

CG-610 - Replacement of 313 Building Roof

The design order has been issued to Design Section for preparation of detailed design. The tentative starting date for construction was established as June 1, 1955, and this depends upon related construction work for CA-514.

CG-611 - Mobile Laboratory

After consideration for about two months, the A.E.C. returned the project proposal unapproved. Final disposition of the project has not been determined.

CA-612 - Alteration of 713 Building for Electronic Data Processing Machine

Scoping and design are being managed by Design Section. All comment drawings and specifications except those for instrumentation have been received. Procurement and construction funds have not been authorized. The Hanford Operations Office has

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decided to request immediate approval of procurement funds from the A.E.C. in order to avoid possible delays, one item of which would be \$25,000 per month rental for one IBM machine.

CG-613 - Hanford 4X Program - Metal Conversion Plant

Scoping and design are being managed by Design Section. Preliminary construction schedules are being prepared; however, no requisitions have been processed,

GG-614 - Hanford 4X Program - 300 Area

Scoping and design are being managed by Design Section, which is also preparing the project proposal. The process scope, HW-34184, was approved by the project representative on January 11, and was reviewed by the Design Council during late January. Requests for purchases have been issued for the following items: 4 welders and transformers, 4 slug buffing machines, 8 autoclaves, and 48 autoclave baskets.

CA-615 - Mechanical Maintenance Shop Centralization - 100 Areas

The project proposal for a total estimated cost of \$90,000 was submitted to the A.E.C. on January 12.

CA-619 - (ER A-1217) - Alterations to 186-D Building

The project proposal for \$32,000 was being routed for approval signatures.

CG-620 - Melt Plant Modifications - 314 Building

The project proposal for \$24,000 was being routed for final approvals by the Company.

IR-181 - Temperature Control Improvement - 108-F Building

Design had been completed previously; construction progressed 28% to a total of 98%. All work was completed except for painting.

IR-183 - Study of Classified Scrap Disposal Problem - 300 Area Library

With preliminary design completed, a design order has been issued to Design Section; however, final design work must await testing of the pulping machine. The order has been placed for the pulping machine.

IR-184 - Tocco Induction Heating Unit, 314 Building - 300 Area

Design progressed 5% to a total of 95%. "Comment prints" of the detailed design have been issued. All of the engineered items have been purchased; however, because of the complicated assembly additional time is being requested.

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The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month.

ER A-761 - Decontamination Facilities, First Aid Station - 100-H and 200-W Areas

A scoping estimate in the amount of \$40,000 has been issued as a cost basis for 100-H and 200-W Areas. Since the Medical Section is not ready to submit a project proposal, an interim report has been prepared to contain pertinent comments and recommendations.

ER A-764 - Fire Station Addition

The work order has been written for performance of necessary work on the fire station; so the request for a project proposal may be withdrawn.

ER A-765 - Painting Water Plant Structures - 100-DR Area

The study report has been completed and transmitted to the Reactor Section.

ER A-1220 - Minor Construction Fabrication Shops Modifications

Although this request was closed out during December 1954, it has been reopened because of increased scope of work. A Work Authority has been received requesting preparation of a project proposal based on the original study.

ER A-2749 - Sheltered Welding Manifolds - 200 Areas

With scoping 60% complete, preparation of the project proposal was delayed because of a change in scope. The scope requirements are now being established.

ER A-2756 - FY-1955 Water Tank Replacements - 100-200 Areas

With scoping 90% complete, work was continued toward preparation of a project proposal to be submitted during March 1955.

ER A-3113 - Development of Independent Water Supply Source - 300 Area

Scoping was about 50% complete. The Estimating Unit has been requested to prepare a project estimate.

C. RELATED FUNCTIONS

A sharp reduction in number of inspection orders was effected during the month by completion of 257 orders. The receipt of 125 new orders left a total of 393 orders requiring inspection. It now appears that the work load for off-site inspectors has stabilized. Of the total orders being inspected, 169 are for operations equipment and material. The workload for the Corrosion Testing Program has decreased to a total of 155 evaluations, of which 111 were made on the East coast by the Lukens Laboratory. The multi-sampling technique of Huey testing has been approved

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by the Technical Sections, and this reduces the cost of corrosion testing from \$7 to \$4.25 per sample.

The major inspection workload now for construction equipment consisted of spares for 100-K Area and the Purex facility. Also, preliminary work was done on the materials and equipment for the Reactor Plant Modification Program.

Following is a resume of inspection activities during the month:

<u>Item</u>	<u>Number</u>
Total orders on hand requiring inspection	393
Cumulative number of orders assigned to inspectors	344
Number of orders assigned to inspectors this month	132
New orders received by Inspection during the month	125
Orders completed	257
Total requisitions for engineered equipment transmitted for Expansion Program	59
Total orders of engineered equipment placed for Expansion Program	35

At the end of January there had been transmitted 3328 Expansion Program requisitions for engineered equipment, and 3263 orders placed. The money value of the 344 orders assigned to inspectors was \$11,268,188.

Reproduction output decreased during the 19 working days to a total of 274,286 square feet, as compared with 325,610 square feet for December 1954. The largest orders processed during the month were 2892 prints for 100-K Area, 2239 prints for 1706-KER, and 1285 prints for the Reactor Plant Modification Program.

Estimating completed 19 estimates during the month. The completed estimates comprised the following: project proposal - 6, fair cost - 1, and scope - 12.

Field Surveys completed work on realignment of a pump unit in 190-C Building, and also lease survey location of 3 substations which are to be released to the Bonneville Power Administration. This group began preliminary work on a survey of the proposed transmission line from 100-K Area to the existing B.P.A. substation, as well as continuing assistance with the survey of Richland, Washington.

D. CRAFT LABOR

A 12-day work stoppage occurred on the Purex project when millwrights refused to work without a foreman. The construction contractor had notified one foreman of a reduction of force, and later appointed another to replace him. The craftsmen reported to work each day but did not work because the newly-appointed foreman did not accept the work. The issue was settled on January 19 when a new foreman was appointed and was accepted by the millwrights.

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A jurisdictional dispute hindered work in the 272-E Mock-Up Building during the latter part of January. The issue was between boilermakers and plumbers, and it centered on one vessel. However, the craftsmen continued work on other vessels.

Voluntary terminations by construction contractor personnel remained about level compared with preceding months. Kaiser Engineers and associated subcontractors lost about 1%; while Blaw-Knox and associated subcontractors lost about 4%. The loss by J. A. Jones and associated subcontractors was about 1%.

REPORT OF VISITORS

To Hanford

J. G. Johnson and Don Jacobson of the Pacific Oerlikon Company, Tacoma, Washington, visited D. A. Hoover on January 2 to confer on Horizontal Rod Assemblies for the Reactor Plant Modification Program.

Messrs. McIntyre and Holt of Electric Boat Div., General Dynamics Corporation, Groton, Connecticut, visited W. B. Webster on January 5 for design consultation on Purex concentrators.

J. C. Finley, Aluminum Company of America, Seattle, Washington, visited D. A. Hoover on January 18 to confer on Horizontal Rod Assemblies for the Reactor Plant Modification Program.

F. H. Oliver, Clyde Equipment Company, Seattle, Washington, visited J. T. Hall on January 19 to discuss a Sauerman Scraper.

L. P. Sharts of L. H. Butcher Company, Seattle, Washington; B. Kulakowski, L. J. Pionowski and H. Palm of Udylite Corporation, Seattle, Washington; and R. H. Bobilin of Davies Supply & Manufacturing Company, St. Louis, Missouri, visited P. J. O'Neil and R. J. Cavanaugh January 25 through January 28 to discuss operating problems on the Udylite machines.

John C. Glasson and Marv Lederman of Merco Centrifugal Co., San Francisco, California, visited P. J. O'Neil and D. L. Ballard from January 24 through January 28 to perform operational tests on slug recovery centrifuge.

Official Trips to Other Installations during January, 1955

D. A. Hoover visited Huntington Rubber Mills, Portland, Oregon, on January 7 to expedite procurement of materials for the Reactor Plant Modification Program.

J. M. Heffner visited ASCO Sintering Company, Los Angeles, California, on January 12 to 14 to negotiate the settlement of a claim filed on materials for the Reactor Plant Modification Program.

P. A. Hesselgrave and G. B. McDonald visited General Electric Company, Schenectady, New York, from January 5 to 8 to be interviewed for possible transfer.

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F. C. Fisher visited U. S. Bureau of Reclamation at Ephrata and Grand Coulee, Washington, on January 14 and 15 to procure a Sullivan diamond core drill.

D. E. Newby visited the following companies from January 3 to 7 for a review of corrosion testing procedures: Lukens Steel, Coatesville, Pennsylvania; G. O. Carlson, Thorndale, Pennsylvania; U. S. Steel Co., Pittsburgh; Homestead Works, Homestead, Pennsylvania; Allegheny-Ludlum Co., Brackenridge, Pennsylvania; and Babcock & Wilcox Co., Beaver Falls, Pennsylvania.

J. C. Hamilton visited the following locations from January 17 through January 20 for coordination of inspection activities: Panellit Corp. & Crane Company, Chicago, Illinois; C. L. Gougler Co., Kent and Akron, Ohio; Foster Wheeler, Carteret, New Jersey; Alloy Fabricators, Perth Amboy, New Jersey; Steel & Alloy Tank Co., Newark, New Jersey.

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1955

MONTHLY REPORT

ADVANCE ENGINEERING SECTION

JANUARY, 1955

A study of the incentives and deterrents for cooling future Hanford-type reactors with sodium instead of with high temperature water has been initiated.

A study of a proposal by Carbide and Carbon Company that Hanford piles be fueled exclusively with highly enriched uranium and with diffusion plant tailings has been completed.

Studies indicate that if present limitations on high uranium irradiation (slug rupture, Pu-240 formation) were removed, a limiting exposure of about 2000 MWD/ton would exist because of economic considerations.

The Hanford Atomic Products Operation Annual Report is in final stages of preparation.

W. R. Woods

ADVANCE ENGINEERING
ENGINEERING DEPARTMENT

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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SUMMARY - JANUARY, 1955

PERSONNEL PRACTICES SECTION

The number of applicants interviewed in January was 2,146 as compared with 1,800 for December. In addition, 197 new applicants applied by mail. Open, nonexempt, non-technical requisitions decreased from 656 at the beginning of the month to 620 at month end. One hundred and two employees were added to the roll and 74 removed during the month. Separations rate decreased from .72% for fiscal month of December to .67% for fiscal month of January. These rates when converted to annual basis are 7.51% and 8.74% respectively. During January, 58 new requests for transfer to other type work were received by Employment, and 25 transfers were effected. Attendance recognition awards were distributed to 251 employees in January, including 92 who qualified for four-year awards.

Four employees retired during the month and two employees died. One hundred and eighty-nine visits were made to employees confined to Kadlec Hospital, and 64 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98.2%, in the Insurance Plan 99.3%, and the Employees Savings and Stock Bonus Plan 50.7%. At month end there were 875 registered under Selective Service and 584 military reservists were on the roll. Since August 1, 1950, 386 employees have terminated to enter military service, of which 135 have returned, 25 have not claimed re-employment rights, leaving 226 still in military-leave status.

Seventy-three adopted suggestions were approved for awards in January, resulting in cash awards totaling \$2,025 with a total net savings of \$15,257.15.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION

The News Bureau issued 40 news releases during the month, 10 of which were especially planned for national publicity purposes and were sent to the Schenectady News Bureau. Four manuscripts were approved for publication and nine papers received all required approvals. Arrangements were made for six speeches to be delivered before public groups. The Community Newsletter was written and distributed to community leaders in Pasco, Kennewick and Richland. Three Management News Bulletins were developed and distributed to all exempt personnel during the month.

A LIFE magazine photographer and writer visited Hanford January 24 and 25 to secure pictures and stories on homely devices our Engineers have adapted to perform atomic jobs.

J. D. Morton, who handles Atomic Products Division publicity in the Schenectady News Bureau, and represents Hanford in contacts with national magazines and other media, visited Hanford January 10 through 14 to discuss national publicity plans and problems at Hanford.

A total of 266 photographic assignments were completed for the month, and 17,774 prints were produced.

Employee and Public Relations Summary

SALARY AND WAGE ADMINISTRATION SECTION

Wage analysts are engaged in an intensive review of all nonexempt jobs and job descriptions. Supervisory personnel have been assigned by Section Managers to participate in this review along with the wage analysts.

A special survey relating to drafting and design rates was begun by visiting 14 architectural and engineering concerns in the Northwest. The results of a limited salary survey conducted in the Northwest during November and December were compiled and documented.

UNION RELATIONS SECTION

There are no new developments in the efforts of the Chemical Workers (HAMTC) to organize laboratory personnel in the Manufacturing Department, but we are continuing to communicate with these employees in order that they might have complete and accurate facts on which to base a decision regarding whether they do or do not need union representation.

The Hanford Guards Union has notified the Company of the desire to arbitrate a grievance alleging violation of the call-in procedure.

No further negotiation meetings have been scheduled with the Material Expeditors and Take-Off Men who gained bargaining rights in the October 1 representation election.

EDUCATION AND TRAINING SECTION

Three Rotational Trainees were permanently placed during the month of January and three new graduates reported on the Program during the month.

A survey is underway to develop suitable working assignments for a small number of college professors and graduate students during this coming summer. This type of program is becoming quite wide-spread in industry. Several schools in the western section of the country will be represented on this proposed program.

HEALTH AND SAFETY SECTION

Dr. Norwood attended the AEC Industrial Physician and Bio-Medical Directors meeting in Rochester, New York, and the Annual Congress on Industrial Health of the Council on Industrial Health of the American Medical Association.

Sickness absenteeism was 1.76% as compared with 1.58% for December, while total absenteeism was 2.42% as compared with 2.24%.

The operation group sustained two major injuries and one sub-major injury.

The average daily census increased from 60.6 to 74.0 as compared with 77.9 a year ago, in the Kadlec Hospital.

Employee and Public Relations Summary

AUXILIARY OPERATIONS AND PLANT PROTECTION

Effective January 29, 1955, the 3000 Area was reclassified from "Limited" to a "Controlled" area. This change permits elimination of patrol coverage of this area amounting to three patrolmen and one receptionist.

The Fire Protection Unit experienced its best month with only six fire alarms. Four of these alarms were false due to trouble in alarm circuits. The two bona fide calls resulted from (1) burned out ballast on fluorescent fixture causing smoke and odor, and (2) overheated brake band on a truck. There was no fire loss in either case.

Installation of equipment in the 700 Area official telephone exchange by Stromberg-Carlson Company is now under way and progressing satisfactorily. Because of delay in getting this job started, it now appears that the exchange may not be placed in service until about June 3, 1955. The original date was estimated to be April 29.

COMMUNITY SECTION

Letters were sent to 14 commercial and 2 non-commercial North Richland lessees advising them of their termination dates in connection with their respective operations. Several lessees have indicated that they desire to remain in operation beyond these termination dates. The Commission has indicated that they will be receptive to such requests provided a performance bond is posted that assures site restoration no later than June 30 of this year.

Richland received first place in the nation for class 5 cities, 20,000 to 50,000 population, in the National Fire Prevention Association's Fire Prevention Week contest.

Richland also placed first in the state of Washington, competing against all size cities, and seventh in the Grand Sweepstakes competition against all cities in the United States, Canada and United States possessions. There were 339 cities entered in this competition. A total of 1,668 entries were in the over-all contest.

ORGANIZATION AND PERSONNEL

Total on roll January 1, 1955	1784
Accessions	16
Separations	26
Total on roll January 31, 1955	1774

*Total includes 37 Rotational Trainees.

Employee and Public Relations

PERSONNEL PRACTICES

Employment

	<u>December, 1954</u>	<u>January, 1955</u>
Applicants interviewed	1,800	2,146

511 of the applicants interviewed during January were individuals who applied for employment with the Company for the first time. In addition, 197 applications were received through the mail.

	<u>December, 1954</u>	<u>January, 1955</u>
Open Requisitions		
Exempt	---	---
Nonexempt	656	620

Of the 656 open, nonexempt, nontechnical requisitions at the beginning of the month, 346 were covered by interim commitments. Of the 620 open, nonexempt, nontechnical requisitions at month end, 336 were covered by interim commitments. During January, 90 new requisitions were received requesting the employment of 120 nonexempt, non-technical employees.

	<u>December, 1954</u>	<u>January, 1955</u>
Employees added to the rolls	103	102
Employees removed from the rolls	<u>72</u>	<u>74</u>
NET GAIN OR LOSS	+ 31	+ 28

Separation Rate:

<u>Fiscal Month</u> <u>December, 1954</u>		<u>Fiscal Month</u> <u>January, 1955</u>	
<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
.44%	1.98%	.30%	2.39%

Over-all Separation Rate:

<u>Fiscal Month</u> <u>December, 1954</u>	<u>Fiscal Month</u> <u>January, 1955</u>
.72%	.67%

During January, 2 employees left voluntarily to accept other employment, 1 left for business for self, and 8 left to enter military service.

Employee and Public Relations

PERSONNEL PRACTICES

Transfer Data

Accumulative total of requests for transfer received since 1-1-55	58
Number of requests for transfer received during January	58
Number interviewed in January, including promotional transfers	54
Transfers effected in January, including promotional transfers	25
Transfers effected since 1-1-55, including promotional transfers	25
Transfers effected in January for employees being laid off	--
Number of stenographers transferred out of steno pool in January	--
Transfer requests active at month end	292

ADDITIONS TO THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
New Hires	2	84	2	88
Re-engaged	-	--	-	--
Reactivates	-	13	-	13
Transfers	<u>1</u>	<u>--</u>	<u>-</u>	<u>1</u>
TOTAL ADDITIONS	3	97	2	102

TERMINATIONS FROM THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
Actual Terminations	11	30	-	41
Removals from rolls(deactivates)	4	23	-	27
Transfers	<u>5</u>	<u>1</u>	<u>-</u>	<u>6</u>
TOTAL TERMINATIONS	20	54	-	74

GENERAL

	<u>12-1954</u>	<u>1-1955</u>
Photographs taken	203	253
Fingerprint impressions	155	140

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	<u>12-1954</u>	<u>1-1955</u>
General Electric cases	193	217
Facility cases	<u>16</u>	<u>18</u>
TOTAL	209	235

Of the seven exempt employees in the Project Section who received notices of lay-off effective 1-31-55, four were placed on other jobs within the Plant, one on an exempt position and the remaining three on non-exempt jobs; one has his time extended and the remaining two terminated.

Employee and Public Relations

PERSONNEL PRACTICES

We contacted G. E. Security who in turn requested that the Commission expedite approval of "L" clearances for Separations Utility Operators and Lab. Assistants "D" for the Separations Section. Approval was received from the Atomic Energy Commission on January 31, 1955. These "L" clearances have averaged approximately 30 days to obtain so far; however, the procedure has not been loaded as yet and no doubt it will require a longer period of time to obtain these clearances in the future.

Personnel Records and Investigations

<u>INVESTIGATION STATISTICS</u>	<u>12-1954</u>	<u>1-1955</u>
Cases received during the month	294	295
Cases closed	94	215
Cases found satisfactory for employment	142	305
Cases found unsatisfactory for employment	43	66
Cases closed before investigation completed	32	68
Special investigation conducted	17	14

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	4971
One-year awards made in January for those qualifying in December	51
Total two-year awards to date since January 1, 1950	2666
Two-year awards made in January for those qualifying in December	61
Total three-year awards to date	1405
Three-year awards made in January for those qualifying in December	47
Total four-year awards to date	540
Four-year awards made in January for those qualifying in December	92

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	4362
Five-year Service Recognition Pins presented during January to exempt personnel	2
Five-year Service Recognition Pins presented during January to non-exempt personnel	16

During January, 9 people whose continuity of service was broken while in an inactive status were so informed by letter.

PERSONNEL PRACTICES

Employee Services

The following contacts were made with employees during the month:

Employee contacts made at Kadlec Hospital	189
Salary checks delivered to employees at Kadlec Hospital	50
Salary checks delivered to employees at home	14

At month end, participation in the Benefit Plans was as follows as compared with last month's participation:

	<u>December</u>	<u>January</u>
Pension Plan	98.1%	98.2%
Insurance Plan	99.4%	99.3%
Savings and Stock Bonus Plan	49.5%	50.7%

Eighteen letters were written concerning deceased employees and their families during January, regarding payment of monies from the Company and answering questions.

Two employees died during the month, namely:

1-17-55	Manufacturing
1-10-55	Employee and Public Relations

Since September 1, 1946, 161 life insurance claims have been paid totaling \$19,000.

Four employees retired during the month of January, namely:

John Rodda	W-4551	Normal Retirement
Carl J. Olson	W-6689	Normal Retirement
Robert E. Moore	W-9331	Optional Retirement
Ethel M. Perry	W-5646	Optional Retirement

During January 44 letters were written concerning retirement and retired employees, providing information of a general or specific nature. To date 331 employees have retired at Hanford, of which 171 are continuing their residence in this vicinity.

A total of 88 new employees attended Orientation Programs given by members of this group during the month of January. Of this number 98.8% have signed to participate in the Pension Plan, 100% have signed to participate in the Insurance Plan and 77.4% have signed to participate in the Good Neighbor Fund.

Military Reserve and Selective Service

Statistics with respect to employees who are members of the military reserve are as follows:

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Service

Number of reservists on the rolls		584
Number of Reservists classified in Category A	85	
Number of Reservists classified in Category B	65	
Number of Reservists classified in Category C	45	
Number of Reservists classified in Category D	389	
Number of Reservists for whom delays have been requested		45
Number of Reservists classified in Category B	3	
Number of Reservists classified in Category C	2	
Number of Reservists classified in Category D	40	
Delays requested (including renewal requests)		114
Delays Granted		106
Delays pending		0
Delays denied		5
Delays requested recalled		3

The statistics with respect to employees registered under Selective Service are as follows:

Number of employees under 26 registered		875
Employees registered who are veterans		350
Employees registered who are non-veterans		525
Deferments requested to date (including renewals)		1423
Deferments granted		1144
Number of employees for which deferments have been requested		110
Number of employees classified in Category B	0	
Number of employees classified in Category C	1	
Number of employees classified in Category D	109	
Deferments denied and appealed at state levels		6
Deferments denied and appealed at local levels		0
Deferments denied and held pending appeal at national level		2
Deferments denied by local board and not appealed		18
Deferments denied by state board and not appealed		58
Deferments denied at national level (by Gen. Hershey's office)		2
Deferments denied at national level (by President)		5
Deferments pending		28

Military terminations since 8-1-1950 are as follows:

Reservists		122
Selective Service System		259
Female Employees Enlisted		5
	TOTAL	386

Employees returned from military service:

Reservists		64
Selective Service		71
	TOTAL	135

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Service

Known number not claiming reemployment rights	25
Number of employees still in military-leave status	226

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

<u>Suggestion Plan</u>	<u>December</u>	<u>January</u>	<u>Total Since 7-15-47</u>
Suggestions Received	272	267	15888
Acknowledgements to Suggesters	309	263	
Suggestions Pending Acknowledgement	36	40	
Suggestions Referred to Depts. for Investigation	385	330	
Suggestions Pending Referral to Departments	63	62	
Investigations Completed and Suggestions Closed	151	201	
Suggestions Adopted - No Award	2	2	
Adopted Suggestions Approved by Committee for Award	86	73	
Total Net Cash Savings	\$8,446.86	\$15,257.15	
Total Cash Awards	\$1,285.00	\$ 2,025.00	
Total Suggestions Assigned to Field for Investigation	795	735	
Total Number Suggestions Outstanding to Departments	771	729	

The highest award of \$450 was paid to an employee in the Metal Preparations Section for his suggestion pertaining to revising the method of stamping cans by installing a stamping device on the bottom of the slug press, thus combining the stamping and pressing into one operation instead of two. Savings in material and labor resulted from adoption of this suggestion.

Life Insurance

Code information which is known only to Home Office Life Underwriter's Association has been furnished 21 insurance companies and investigation agencies during the month of January, 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		<u>December, 1954</u>	
Department of Labor	<u>Long Forms</u>		<u>Short Forms</u>
and Industries	35		379
		<u>January, 1955</u>	
	<u>Long Forms</u>		<u>Short Forms</u>
	32		293
Total Since September, 1946 -	23,857		
Claims reported to	<u>December, 1954</u>	<u>January, 1955</u>	
Travelers Insurance Co.	10	* 13	
Total Since September, 1946 -	935		

*Of the claims reported to Travelers Insurance Company during the month of January ten were property damage, two were bodily injury claims, and one was both bodily and property damage.

WORKMEN'S COMPENSATION AND SUGGESTION PLANLiability Insurance

- a. vs. Knox, Akridge, and Overdahl -

A Summons and Complaint has been served against George J. Akridge, Clarence H. Overdahl and Ben Knox, Justice of the Peace of the Prosser precinct. The action by _____ alleges that he was falsely arrested by Mr. Akridge and Mr. Overdahl as a result of a bench warrant issued by Justice of the Peace Knox. Both Mr. Akridge and Mr. Overdahl are General Electric employees in the Richland Police Department. The amount alleged is \$93 special damages and \$5,000 general damages against each defendant. The matter has been referred to the Travelers and the law firm of Moulton, Powell, Gess and Loney is handling the defense for Mr. Akridge and Mr. Overdahl.

- b. -- The case has been concluded with a settlement payment of \$22,500. The release was signed by _____ on January 15, 1955. Case Closed.

- c. vs. General Electric Company and E. L. Burley,

A Summons and Complaint was served upon the General Electric Company and Mr. E. L. Burley on January 26, 1955. The action was brought by _____ as a result of an automobile collision which occurred on January 16, 1954 when their automobile was struck from the rear by a government sedan driven by Mr. E. L. Burley, an Engineering Department employee. Neither _____ are General Electric Company employees. The total amount claimed is \$124,617.39 plus costs. The action has been reported to the Travelers and they will arrange for the necessary defense.

- d. -- Mr. _____, a janitor in the Reactor Maintenance Sub-Section, filed a claim against General Electric for loss of sight in his right eye when he was allegedly struck by an ash tray thrown by a co-worker. The Travelers have advised Mr. _____ attorneys that the claim is to be rejected and a law suit may be expected at any time.

- e. vs. General Electric Company and David Casey, --
The deposition of Dr. Hunter McKay was taken on January 11, 1955 in Seattle. The case is set for trial February 16 and 17 in Pasco.

- f. vs. General Electric Company, --

At the Superior Court level the jury found that Mr. _____ had sustained general damages in the sum of \$39,944 and special damages amounting to \$2,412.50. The court later reduced the general damages to \$19,500 and Mr. _____ appealed to the Supreme Court of the State of Washington seeking to reinstate the verdict. The case was argued on January 25, 1955. We have not yet learned the court's decision.

Employee and Public Relations
PERSONNEL PRACTICES

Technical Recruitment

Results of 1954-55 campus recruiting of BS/MS candidates may be summarized as follows:

<u>Field</u>	<u>Offers Extended</u>	<u>Offers to be Extended</u>	<u>Offers Accepted</u>	<u>Offers Rejected</u>	<u>Estimated Requirements*</u>
Engineering:					
Chemical	12	8	2	2	20
Mechanical	15	4	2	5	20
Electrical	11	2	4	4	10
Chemistry	9	2	4	1	16
Physics	5	3		1	6
Metallurgy	<u>1</u>	<u>1</u>	<u> </u>	<u>1</u>	<u>10</u>
TOTALS	53	20	12	14	82

* - It is anticipated that requirements will be increased to 120-140, but no requisition is yet approved.

All offers to be extended are as a result of campus recruiting during the month of January.

Experienced drop-in candidates interviewed in the office totalled 35 during January. One experienced candidate and two new graduates were signed on HAPO rolls. Other experienced activities during the month may be summarized as follows:

<u>Field</u>	<u>Open Invitations</u>	<u>To Visit</u>	<u>Open Offers</u>	<u>Acceptances, but not OTR</u>	<u>Offers to be Extended</u>	<u>On the Roll</u>
Engineering:						
Electrical					1	
Mechanical			1	1		1
Chemical		1	1			
Industrial				1		
Chemistry		1			1	
Other	<u> </u>	<u>1</u>	<u> </u>	<u>3</u>	<u>1</u>	<u> </u>
		3	2	5	3	1

A total of 410 PhD cases have been reviewed with 117 visit invitations extended to date. Forty-three candidates have accepted these invitations. Of the total reviewed, 183 have been signed off as being of no interest to HAPO. Several of the candidates visiting during the month appeared to be extremely well-qualified scientists. One PhD, a theoretical physicist, reported on HAPO rolls.

During the month there were 18 terminations of exempt employees; 4 entered military service, 1 returned to school, 5 transferred to other GE sites, 4 left for other jobs, 1 discharged, and 3 for other reasons.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

During the month of January, the News Bureau issued 40 news releases. The breakdown by category, distribution and content was as follows:

<u>Subject</u>		<u>Distribution</u>	
Pay and Benefits	6	Hanford	28
Employment Services	10	West Coast Area	2
Good Will	5	National	10
Technology & Research	7		
Safety and Fire	6	<u>Content</u>	
Real Estate	1	Information	4
Administration & Legal	1	Pictures	4
Education and Library	2	Short	24
Health and Medicine	1	Long	1
Police and Fire	1	Feature	7
Total	40		

National publicity releases sent for distribution to the Schenectady News Bureau with carbon copies to N. P. Jackson included: a picture story on maintenance of radioactive machinery; a story and pictures of a new photo identification badge; a feature story about a woman chemist at Hanford; a photo on underwater maintenance showing men in protective clothing using extension tools to change a gasket; picture and outline on boroscope movie equipment used to examine the inside surface of reactor tubes; pictures and a short write-up on a negro husband and wife who work as technicians at Hanford; metallograph feature with pictures; feature with pictures of toy wagon used to haul hot samples; a feature story with pictures about a safety device; and a picture and outline on radiometallurgy caves used in Hanford research.

J. D. Morton, who handles Atomic Products Division publicity in the Schenectady News Bureau, and who, therefore, represents Hanford in contacts with national magazines and other media, visited Hanford January 10 through 14 to discuss national publicity plans and problems. Considerable information was gained from Mr. Morton on how to increase the flow of good quality national publicity. He also stated that the quantity of national publicity is good, considering the personnel available for this work, but that, in his opinion, the quality can be improved by adopting a number of suggestions he advanced while here.

LIFE photographer N. Farbman, and writer Bob Schulman visited Hanford January 24 and 25, to secure articles on homey devices for their magazine. Arrangements were made with Engineering and Manufacturing Department personnel to bring equipment into the 700 and 1100 areas so that LIFE could do a story on the plant laundry. The dishwasher used for laboratory glassware in the 325 building, the toy train setup originally designed for a special quality control laboratory, and the toy wagon used for transporting hot laboratory samples also were brought to the 700 - 1100 area and

Employee and Public Relations

photographed for use in the same story LIFE is planning. Additional material was sent to the representatives of LIFE magazine at their request after their visit here. It included pictures of a 200-West burial operation and a write-up on it, and two newspaper articles on Richland churches.

The fire prevention award of 1954 to Richland, and the visit of H. F. Smiddy, General Electric vice-president, were publicized, and nine stories and pictures were sent to the WALLA WALLA UNION BULLETIN for their annual Progress Edition.

"The Future of Plastics in Contamination Control" by H. A. Moulthrop was sent to the Middlesex County Medical Society, Perth Amboy, New Jersey, for publication in their journal.

Eight Hanford articles were selected by GE REVIEW editors from the 19 topics suggested for the July issue. These articles, and one on artificial graphite, will be written by various Hanford authors, for submission by the March 21 deadline. Co-authorship also was arranged for an educational article, "Technical Education for Nuclear Science and Engineering," for the July issue of the GE REVIEW, and a list of suggested topics for signed articles that might be prepared by Manufacturing Department people was prepared and submitted.

The following manuscripts were approved for publication:

"A Pulse Analysis Method for the Determination of a Low-Energy Gamma Emitter in a Radionuclide Mixture," by U. L. Upson, R. E. Connally and M. B. Leboeuf for publication in NUCLEONICS.

"Properties of High Density Concrete Made With Iron Aggregates," by Harold S. Davis for publication in the JOURNAL OF THE AMERICAN CONCRETE INSTITUTE.

"Flame Photometry of Organic Phosphorus," by D. W. Brite for publication in ANALYTICAL CHEMISTRY.

"Casework and Generic Practice," by R. Miller for publication in the JOURNAL OF PSYCHIATRIC SOCIAL WORK.

The following papers received all required approvals during the month:

"Statistical Methods in Chemistry," by C. A. Bennett for presentation at a meeting of the Spokane Chapter of the American Chemical Society on January 12, 1955.

"The Determination of Production Variability," by C. A. Bennett for presentation at the Rochester Quality Control Conference at Rochester, New York on February 15, 1955.

Employee and Public Relations

"Fascinating Fragments of Ruthenium Chemistry," by A. S. Wilson for presentation to the Oregon Section of the American Chemical Society, Willamette University in Salem, Oregon on January 21, 1955.

"The Hanford Heat Recovery System," by S. L. Nelson for presentation at a meeting of the University of California 1955 Conference on Nuclear Engineering.

"Accident Prevention Training at Undergraduate Level," by G. P. Tracy for presentation at a meeting of the American Chemical Society on April 4-7, 1955.

"Light-Scattering Control of Industrial Water Treatment," by M. C. Lambert for presentation at a meeting of the Naval Reserve Group on January 11, 1955.

"Effects of Various Types of Reactor Disasters on Plant and Community," by Dr. H. M. Parker for presentation at a meeting of the A.M.A. Congress of Industrial Health, AEC, Washington, D. C. on January 25, 1955.

"Health Problems of the Radiochemical Processing Industry," by Dr. H. M. Parker for presentation at a meeting of the A.M.A. Congress of Industrial Health, AEC, Washington, D. C., on January 26, 1955.

"The Preparation and Use of Procedure Manuals," by S. B. Badgett for presentation before the Yakima Chapter of National Office Management Association at Yakima, Washington on January 17, 1955.

The following speeches were arranged during the month:

<u>Presentation or Submission Date</u>	<u>Subject and Organization</u>	<u>Author</u>
January 17, '55	"Atomic Reactors" was presented and the film "A is For Atom" was shown to the College Place Kiwanis Club.	O. C. Schroeder
January 20, '55	"Acting Our Age" was presented to a joint annual meeting of the Ellensburg Chamber of Commerce and the Junior Chamber of Commerce.	C. R. Bergdahl
January 24, '55	"Human Relations" was presented to the Wapato Lions Club.	V. J. Byron
January 26, '55	"The Effect of the 1954 Atomic Energy Act on Industry" was presented at a luncheon meeting of the Richland Kiwanis Club.	W. E. Johnson
February 12, '55	"Film Making at Hanford" and showing of film, "Here's Hanford."	W. A. Halteman
February 14, '55	"Here's Hanford" will be introduced and shown to the Wapato Lions Club.	W. A. Halteman

Employee and Public Relations

The Community Newsletter and copies of the January 1955 issue of the GE REVIEW were mailed to community leaders in Pasco, Kennewick and Richland.

Arrangements were made for the Manager of Employee Communications and Public Relations to present, on behalf of the Company's Lamp Division, checks for \$50 to the Richland Jaycees and to the Richland winner of the GE Christmas house decoration contest.

As part of a complete program developed for presentation of the Certificate of Health Maintenance by the Occupational Health Institute to the Hanford Atomic Products Operation, invitations were prepared for department managers and the HCO-AEC manager, signed by Dr. W. D. Norwood. This ceremony is planned for 4:00 p.m. on February 1 at the Kadlec Hospital Library. The General Manager will accept the certificate from Dr. L. N. Farner of Seattle. An advance news release on the presentation was sent to the daily and local lists.

Arrangements for, and publicity concerning the General Manager's Annual Report to Management were carried out, including preparation of charts and projection slides, letters of invitation to all exempt people, letters to all Section Managers on ticket distribution, a Management NEWS Bulletin item, GE NEWS coverage, scheduling, security, ushers, organ music and refreshments.

Copy for booklet, "Caution, Contamination, and Cash," concerning policy for reimbursement for contaminated personal effects, was completed and submitted to Radiological Sciences for approval.

February safety topic, "When A Short Cut is Longer," and health bulletin, "Too Much of a Good Thing," were produced and distributed.

Publicity program conducted for the GE School of Nuclear Engineering included: publication of a program of courses, posters, and publication of news stories and course schedule in four consecutive issues of the GE NEWS.

Safety Annual Report for 1954 was written and placed in production.

Three Management News Bulletins were produced and distributed.

At the request of Public Relations Services Division in Schenectady, "thumbnail biographies" of four young Hanford employees, together with brief descriptions of their positions, were prepared and submitted for use in a series of advertising aimed at college student audiences.

Possible employee communications activities to inform Laboratory Assistants and Engineering Assistants of the advantages of being free to deal independently with the Company on all bargaining materials were proposed and discussed with the Manager, Union Relations.

Employee and Public Relations

GE NEWS featured, among other items, President Cordiner's review of GE business prospects in 1955, AEC Advisory Committee on Biology and Medicine visit, 5-year Perfect Attendance Pins, two Transportation Section cost reduction features, GE Supervisors Association, and HAPO "Corrosion" laboratory. In addition, a wide range of benefit plan promotion material appeared in the GE NEWS, expenditure of \$10.00 entrance fee was approved by the AEC to permit GE NEWS participation in the Annual ICIE contest to judge editorial content and make up of industrial newspapers, and all preparations necessary for requesting printing and engraving bids for two-year contracts were completed during the month preparatory to bid openings in February.

Commercial artwork included: completion of new page and cover layouts for "Radiation and Your Job" booklet, layout and final cover art work for GE School of Nuclear Engineering catalog (this art work also was revised and used as a poster), text layouts for Good Neighbor Fund Constitution and Bylaws booklet, layout and final art work for the 12-page 1954 Safety Report, new page layouts for the revised "Security Handbook" booklet, layout and final art work for the February health bulletin and the safety topic, and various other miscellaneous art work.

On-the-scene motion picture filming of a critical production condition in one of the plants was performed for Pile Technology. Additional filming of charts, drawings, models, still photos and actual materials necessary to depict the entire story of the operation is underway.

Scenes previously filmed of work done in production areas for training-documentary motion pictures were reviewed by Security officials and released for Northwest TV showings.

The edited edition of a Television featurette, "Hands Across the Atom," was shown to Joe Morton, who also will handle placement of our TV releases with national news shows. "Hands Across the Atom" will depict the actual handling of radioactive materials by remote handling devices.

The first 30-minute televised edition of "Hanford Science Forum" was developed and telecast by KIMA and KEPR-TV on Saturday, January 29, 1955 at 6:00 p.m. After viewing the first program, station officials expressed a desire to have HAPO presentations as a monthly "public service" feature. The show's audience encompassed a 200-mile radius, covering Eastern Washington, Northern Oregon and parts of Idaho.

Five editions of the weekly radio program, "Hanford Science Forum," and four editions of "Inside Hanford" were broadcasted as public service features during the month by radio station KWIE.

An educational tape was recorded for the Director of Industrial Medicine and an explanatory narration was recorded and added to the tape at his direction for use in training the Hospital staff on hard-of-hearing cases.

Employee and Public Relations

Graphics January assignments were distributed as follows:

	<u>Percent</u>
General Administrative (Includes Operations Research)	22%
Employee and Public Relations	4
Engineering	29
Manufacturing	18
Financial	6
Radiological Sciences	12
Atomic Energy Commission	9
	<u>100%</u>

	<u>December</u>	<u>January</u>
Total Assignments completed	54	61
Total Assignments backlog	48	26

Four Graphic Illustrators were called on to prepare "on the spot" sketches concerning a technical problem existing in the outer area. Using their sketches, supporting photographs and construction blueprints, Graphics personnel developed a number of informative illustrations that were considered quite useful to technical personnel in the field.

Five large colored visual aids were prepared for the CG-558 Project Review, including reactor plant modifications, nominal levels and power levels, schedule on bid period, construction shutdown and equipment installation, alternate schedules and 105 area flow schedule of equipment and piping replacements.

A total of 63 charts, graphs, illustrations, and reproduction plates were prepared for use in Engineering Department technical publications during the month.

Three lecture aids were prepared for the Manufacturing Department Manager to use in presenting forecasts of plant improvement, production and unit costs to a visiting GE official, six large visual aids were prepared for use in discussions on waste storage tank farms in the 200 Areas, and charts and illustrations for slides for the General Manager's annual information meeting were completed in the latter part of the month.

Plates also were prepared for the colored slides used during the AEC Advisory Committee on Biology and Medicine visit, six chart masters were prepared for use in the Radiological Sciences Communications and Administration Chart Room, and two large visual aids were prepared for the Financial Department Manager to use in discussions on GE Company business trends.

Employee and Public Relations

Graphics Statistical Summary

	<u>Charts or Graphs</u>	<u>Illustrations</u>	<u>Other</u>
Report Material (includes Technical Publications	45	29	31
Technical or Scientific Illustrations		12	
Mechanical Art (Flow charts, schematics, maps, etc. - not for publication)	25	4	
Lecture Material (Includes Plates for slides)	39	28	
Posters and Embossograph Signs	4	2	102
General (Posting of current data, assembly, revisions, etc.)	19		
	<u>132</u>	<u>75</u>	<u>133</u>

A total of 266 photographic assignments were completed for the month, and 17,774 prints were produced, of which 11,804 were "A" and "B" employee identification photographs. A total of 5,970 were area and news.

Motion picture film exposed for the month was: 2500 feet, 16mm (b&w) film for 100-K Construction and 560 feet, 16mm (b&w) film for Purex.

The details were worked out and prices established for the production of photographs by the Photography Unit, in preparation to liquidate the costs of operation. In working with the Cost and Budgets Section a simple method of liquidating costs by posting three charges to each customer was worked out. The three charges are, (1) negatives exposed, (2) photographic prints produced, and (3) photographing and travel time. A test period lasting two months, starting January 25 to go through March 25, is now in effect.

For inclusion in a blue cover report, HW-33849, 552 photographic pages of extremely fine detailed photographs were produced for Pile Technology.

See attached statistical report for Photography Unit.

PHOTOGRAPHY UNIT
MONTHLY REPORT
JANUARY, 1955

COUNSEL
Oper. Research

EMPLOYEE & PUBLIC RELATIONS

COMMUNITY

Fire

Police

EDUCATION & TRAINING

EMPLOYEE COMM. &

PUBLIC RELATIONS

Audio-Visual Comm.

Employee Comm.

Photography

Public Comm.

HEALTH & SAFETY

Public Health

Bacteriology

PERSONNEL PRACTICES

Employment

Employee Benefits

Technical Recruitment

AUXILIARY OPERATIONS &

PLANT PROTECTION

Security & Patrol

Telephone

Radio Maintenance

ENGINEERING

DESIGN

Design Engineering

Instrument Design

Process Engineering

2" 2" 4" 5" 8" 11" 11" 3 1/4" X 4" 3 1/4" X 4" 3 1/4" X 4" 16mm
X X X X X X X Color (B&W) Slides M.P.
2" 4" 5" 7" 10" 11" 14" G Slides Film

12 6 34
10

20 7 9
33 26 112

5

2 6 34
2 118 122 2 140 3,600'

3

6

12

2

114 10 2
4 3

40 202 35
19 42 136
30 26

(Continued)
at a

1210281

PHOTOGRAPHY UNIT		2"	2"	4"	5"	8"	8 1/2"	11"	11"	N	3 1/4" X 4"	3 1/4" X 4"	16mm
MONTHLY REPORT (Con't.)		X	X	X	X	X	X	X	X	E	Color	(B&W)	M.P.
JANUARY, 1955		2"	4"	5"	7"	10"	11"	14"	G.	G.	Slides	Slides	Film
ENGINEERING ADMINISTRATION													
Technical Information			15				21						
PROJECT				2		355		31					
PILE TECHNOLOGY													
Fuel Technology			188	25		2,570		368					
Metallurgy			18			194		8					
						63							
SEPARATIONS TECHNOLOGY			24	8			28	2	38			5	
FINANCIAL													
S.F. ACCOUNTABILITY				5						7			
MANUFACTURING OPERATIONS													
METAL PREP.			25	20	15		13		21				
PLANT ENGINEERING							15		5				
REACTOR							28						
Process							308		2				
SEPARATIONS							21		7				
ELECTRICAL UTILITY						14			7				
RADIOLOGICAL SCIENCES				2		60					1	9	
BIOLOGY						3					3	2	
BIOPHYSICS							28		16				
RADIOLOGICAL RECORDS & STANDARDS				60	18	24			9	3		18	
A.E.C. REPORTS & STATISTICS						8							

(Continued)

Gb-9

Employee and Public Relations

UNION RELATIONS

Union Relations - Operations Personnel

There are no new developments in the efforts of the Chemical Workers (HAMTC) to organize laboratory personnel in the Manufacturing Department. Apparently they have to date been unable to secure a sufficient showing of interest to present the case to the National Labor Relations Board. We have informed the Council that we would not consent to an election involving these people and were surprised to be informed by them that it really didn't make much difference whether an election was held or not since a substantial number of Laboratory Assistants were paying monthly dues into the Union anyway. We are continuing to communicate with these employees in order that they might have complete and accurate facts on which to base a decision regarding whether they do or do not need union representation.

The Hanford Guards Union has notified the Company of the desire to arbitrate a grievance alleging violation of the call-in procedure. It appears that this issue may actually wind up before an arbitrator and we are making no unusual efforts to prevent this. For some time the HGU has been "itching for a fight" and, if a showdown is inevitable, the issues involved in this case provide most favorable elements for a management victory.

Negotiations with the Material Expeditors and Take-Off Men to gain bargaining rights in the October 1 representation election have apparently reached an impasse. This is brought about primarily because there is very little in the way of increased wages or improved working conditions that we can appropriately offer to these people. The Council, likewise, has not to date pressed these negotiations with the vigor that we usually experience. No further meetings have been scheduled.

Reimbursement Authorization No. 239, approving revisions in our vacation plan which was negotiated last June to become effective January 1 of this year, has been received from the Atomic Energy Commission.

The use of the nonunit grievance procedure appears to be on the upgrade which we think is attributable to our recent campaign to secure better acceptance and utilization of the procedure.

The United Chemical Workers, CIO, has been elected to represent production and maintenance employees of Goodyear Atomic Corporation at Portsmouth, Ohio. In an election held by the National Labor Relations Board on November 17, the UCW polled 689 votes out of a total of 1131 votes cast. The Portsmouth Metal Trades Council, AFL, intervened and polled 227 votes. The remaining 215 voted for no union. The AFL's all-out campaign to win bargaining rights at this location featured letters from AFL workers at other atomic plants (including HAPCO) attesting to the substantial benefits they have received from their AFL membership.

Grievance Statistics:

A total of thirty-one (31) 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

	<u>ALL DEPARTMENTS</u>			<u>Total Unit</u>	<u>Total Nonunit</u>
	<u>HAMTC</u>	<u>HGU</u>	<u>BSEIU</u>		
Received this month	26	2	0	28	3
Received this year	26	2	0	28	3
Step I					
Pending December 31	4	0	0	4	0
Settled this month*	16	1	0	17	1
Settled this year	16	1	0	17	1
Pending January 31	0	1	0	1	0
Step II					
Pending December 31	10	2	0	12	1
Settled this month**	8	1	0	9	3
Settled this year	8	1	0	9	3
Pending January 31	31	0	0	31	0
Arbitration					
Pending December 31	4	0	0	4	
Settled this month	0	0	0	0	
Settled this year	0	0	0	0	
Pending January 31	4	1	0	5	
Total settled this month	24	2	0	26	4
Total settled this year	24	2	0	26	4

BY DEPARTMENTS

	<u>Received</u>		<u>Settled Step I*</u>		<u>Settled Step II**</u>	
	<u>This Mo.</u>	<u>This Year</u>	<u>This Mo.</u>	<u>This Year</u>	<u>This Mo.</u>	<u>This Year</u>
Manufacturing						
Reactor - Unit	9	9	5	5	4	4
Separations - Unit	11	11	7	7	2	2
Nonunit	2	2	1	1	2	2
Metal Preparation - Unit	3	3	1	1	1	1
Transportation - Unit	1	1	2	2	0	0
Electrical Utilities - Unit	1	1	1	1	0	0
Employee and Public Relations						
Community - Unit	1	1	0	0	1	1
Aux. Ops. & Pl. Pro. - Unit	2	2	1	1	1	1
Engineering - Nonunit	1	1	0	0	1	1

*Grievances brought to Step II prior to November 1, 1954, but never processed by the union are, for the purpose of this report, considered settled at Step I.

**Grievances which the union formally indicated their intention to submit to arbitration but have taken no further action since November 1, 1954, are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION RELATIONS

BY SUBJECTS

Unit	<u>Manufacturing</u>		<u>Emp. & Pub. Relations</u>		<u>Radiological Sciences</u>		<u>Engineering</u>		<u>Financial</u>	
	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>
	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>
Jurisdiction	7	7	2	2	0	0				
Health-Safety-Sanitation	1	1	0	0	0	0				
Hours of Work	6	6	0	0	0	0				
Overtime Rates	3	3	0	0	0	0				
Vacations	1	1	0	0	0	0				
Seniority	3	3	0	0	0	0				
Wage Rates	1	1	0	0	0	0				
Miscellaneous	3	3	1	1	0	0				
<u>Nonunit</u>										
Wage Rates	2	2	0	0	0	0	0	0	0	0
Miscellaneous	0	0	0	0	0	0	1	1	0	0

Construction Liaison

For some months we have been aware of the probability that, when construction forces began to taper off, our Davis-Bacon problems would increase due to the fact that construction unions would be looking more critically at every phase of the work. During the month the tempo of these complaints increased perceptibly. Accordingly, we, in conjunction with the Legal and Manufacturing Departments, have reviewed all work currently in progress or being planned as well as existing procedures for assigning work in order that we can detect any weaknesses in the area of Davis-Bacon work.

Employee & Public Relations

SALARY & WAGE ADMINISTRATION

1. All necessary records and control logs were established for operation under the new Company salary plan. Documents which authorize changes in salaries and positions are being processed daily and the work is up-to-date.
2. Reports detailing the distribution of salaries by levels and zones, as well as a summary report of the distribution of appraisals, were prepared and issued as aids to Managers having responsibility for salary administration.
3. Statistical data and IBM punch cards were supplied to Personnel Accounting Section for use in carrying out the forthcoming salary review.
4. Wage analysts are all engaged in an intensive review of all non-exempt jobs and job descriptions. Supervisory personnel have been assigned by Section Managers to participate in this review along with the wage analysts.
5. Questionnaires for the 1955 Northwest Area Wage Survey were mailed to more than 50 concerns which regularly participate in this study. We expect a very substantial number of these questionnaires to be returned within the next two weeks.
6. A special survey relating to drafting and design rates was begun by visiting 14 architectural and engineering concerns in the Northwest. The results of a limited salary survey conducted in the Northwest during November and December were compiled and documented.
7. Revised sets of structural and functional organization charts were completed and formally issued. The January 1955 issue of the plant directory is now being printed.

Employee and Public Relations Department
Education and Training Section

The report of the Education and Training Section is submitted as follows:

ROTATIONAL TRAINING PROGRAM

<u>Present Assignments</u>	<u>Last Month</u>	<u>This Month</u>
<u>Department</u>		
<u>Engineering</u>		
Pile Technology	6	5
Separations Technology	4	3
Design	4	4
Project	6	5
<u>Manufacturing</u>		
Metal Preparation	3	4
Separations	2	1
Reactor	8	11
Transportation	1	0
<u>Radiological Sciences</u>		
Biology	0	0
Records and Standards	0	0
Biophysics	2	3
<u>Financial</u>		
Procedures and Computation	<u>1</u>	<u>1</u>
	37	37

Permanent Assignments

There were three placements off the Program, as follows:

Pile Technology	1
Project	1
Separations Technology	1

Four additional placements are anticipated during the next week and four others during February. One loss to military service due to ROTC commitment is expected during February.

Additions

Three new graduates reported on the Program during the month. Seven others are expected to be added in February.

Employee and Public Relations Department
Education and Training Section

Selective Service

Two technically trained men were lost to the armed forces due to the selective service program. One was a former member of the Rotational Training Program.

During the past 17 months, 49 men have been lost to selective service.

A survey of men lost to the armed forces due to ROTC training commitment showed that, of the men who have returned to industrial activity, 67% have re-joined our organization. The returning men were predominately of higher potential abilities than those lost to other companies.

Rotational Program Placement Outlook

Efforts have been continued to be highly selective in the placement of men off the Rotational Training Program with the various sections in an attempt to keep the manpower supply available to fill the rotational assignments. The present number of 37 on the Program does not allow much leeway in filling any sudden needs which may develop. Anticipated requirements from the several sections covering the next few months have been surveyed and are relatively high.

Summer Programs

As in past years, we hope to conduct a program for third-year engineering and science students during the summer of 1955. Summer hiring of college juniors has now been carried on for four summers and approximately one-half of those who have entered industrial work have joined our organization. This ratio is considered to be entirely satisfactory since all of these students were top-notch men and there was considerable competition for them from other companies.

A survey is underway to develop suitable working assignments for a small number of college professors and graduate students during this coming summer. This type of program is becoming quite wide-spread in industry. Several schools in the western section of the country will be represented on this proposed program.

SCHOOL OF NUCLEAR ENGINEERING

Fall Semester

All fall classes completed the term during January. Grades have been received for half of the courses with the others expected within a week. As soon as complete, all grades will be reported to students and affiliated universities.

Employee and Public Relations Department
Education and Training Section

Spring Semester

Registration for spring term classes started January 17, 1955 and runs through January 28. Classes begin the following week with 23 graduate courses and 15 at college-level in the curriculum.

A revised course bulletin plus a number of work-oriented new subjects and increased publicity have stepped up the interest and participation of students. Posters have been placed in strategic locations in all areas in order to reach a maximum number of people. The revised cover of our regular course bulletin and improved presentation of material within have helped to bring the new school term to the attention of the reader. Registrations to date are considerably ahead of the corresponding period for previous years.

The graduate course announcement has been distributed to over 700 technical personnel who have come to the plant since 1950. In addition, graduate bulletins are sent to section managers to supplement the announcements made in the G.E. News. A separate five-page announcement covering only college-level subjects has been sent to over 900 cost and accounting personnel, laboratory assistants, radiation monitors, technicians, engineering assistants and instrument trainees and mechanics.

TRAINING

Conference Leading was conducted on January 6 and 17, with an attendance of 21 exempt personnel. This program is directed toward stimulating interest in learning the techniques of leading group discussions.

Principles and Methods of Supervision meetings were held during two weeks of January 10-21, with 19 supervisors completing the course.

Supervisor's Accident Prevention Program was presented January 12 in the 200-W Area, with a participation of 16 supervisors. This four-hour meeting gives supervisors an opportunity to discuss the many facets of accident prevention and how they as supervisors can develop their employees' awareness of the desirability of performing their jobs safely.

New Exempt Responsibilities met on January 24-26 with an attendance of 19 new exempt personnel. This 24-hour revised program combines the two former programs, New Supervisors 40-Hour and Exempt Orientation. This presentation deals with Company organization, effective management, the new employee, wage rates, labor law, Company policies and procedures, and various personal considerations. It was well received.

Throughout this period the following activities were performed by Training Representatives:

Completion of the new program "New Exempt Responsibilities" for presentation by January 24.

Reviewed (for J.M.I. course) articles of Job Methods and Work Simplifications.

Employee and Public Relations Department
Education and Training Section

Revisions on "Secretarial-Stenographic Conference" were completed on Thursday, January 13.

Visual aids were prepared for use in "Effective Human Relations" and visual aids have been designed for J.R.D. Also, work is being done on a visual aids brochure, a handbook for training.

Program attendance transcripts forms for 1955 have been printed and are now in use.

Staff members previewed and evaluated five films for possible use in various training programs.

Various revisions are in the process of being made on the Supervisor's Handbook. During the past four weeks there have been 18 Supervisor's Handbooks issued to supervisory personnel.

A proposed training brochure for 1955 was submitted to the Manager of Education and Training Section.

Three members of Training Unit on Tuesday night, January 11, attended P.N.P.M.A. meeting in Yakima. Two of the members assisted in a panel discussion of the association's conference held in Vancouver, B.C. last fall.

On Thursday, January 13, the Supervisor of Employee Relations Unit met with all Training Representatives to explain Company Vacation Plan policies.

"Disciplinary Action" program has been prepared, dealing with philosophy of the program and the functioning of disciplinary action.

Work has been continued on "Introductory Economics".

A member of Training gave a talk on "Why of Human Relations" on Monday night, January 24 to 75 members of the Wapato, Washington Lions Club.

"Conference Leading" manuals have been prepared for programs next month.

First Quarter Training Program schedule charts of 1955 have been completed and will soon be ready for distribution to supervision.

A member of Training gave a talk "Why of Human Relations" to 57 PTA members of Sacajawea Grade School Thursday night, January 20.

At the request of Project Section management, Engineering Department, a Training Representative instructed a Project Section supervisor in the use of 16mm projector as an aid in instruction in Project Section Welder's Course.

During this period, there were 192 program attendance transcripts prepared for exempt personnel in various units of Manufacturing Department and Engineering Department.

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
JANUARY 1955

General

Personnel Changes

Seven additions and ten deletions resulted in a decrease to 247.

Employee Relations

Employee attendance at 31 meetings was 258.

Visits

Dr. Norwood attended the meeting of the A.E.C. Advisory Committee on Biology and Medicine at the University of Washington at Seattle. He also attended the A.E.C. Industrial Physicians and Bio-Medical Directors meeting in Rochester, New York, and the Annual Congress on Industrial Health of the Council on Industrial Health of the American Medical Association.

Dr. Sachs and Mr. Branchini attended a Washington State Public Health Association executive board meeting in Seattle. Dr. Sachs also attended an executive board meeting of the Western Branch, American Public Health Association meeting in Berkeley, California.

Mr. Bakko attended a meeting of the Board of Trustees, Washington State Hospital Association, in Seattle.

Industrial Medicine

Medical examinations increased from 890 to 1088 while dispensary treatments decreased from 4847 to 4504.

Sickness absenteeism was 1.76% as compared with 1.58% for December while total absenteeism was 2.42% as compared with 2.24%.

The health topic for the month was "Sleeping Tablets."

Safety and Fire Prevention

The operation group sustained two major injuries and one sub-major injury. The community group had no major or sub-major injuries. There were 312 minor injuries in the plant and 18 in the community. Four plant fires were reported with an estimated loss of \$40.

Kadlec Hospital

The average daily census increased from 60.6 to 74.0 as compared with 77.9 a year ago. This is expected to further improve the fiscal year to date financial picture.

Public Health

The recently appointed Board of Health of the Community Council held its first meeting.

Costs-December

	<u>Nov.</u>	<u>Dec.</u>	<u>Dec. Budget</u>
Industrial Medicine	\$44,818	\$47,093	\$45,537
Public Health (Oper.)	9,484	10,025	9,962
Kadlec Hospital (Net)	28,658	23,553	29,244
Hospital Expense Credits	2,165	2,085	2,129
Safety & Fire Prevention	<u>22,550</u>	<u>20,301</u>	<u>22,247</u>
Total Health & Safety	\$107,675	\$103,057	\$109,119

HEALTH & SAFETY SECTION

JANUARY 1955

General

Costs (Continued)

The net cost of operating the Health & Safety Section before charges were assessed to various departments was \$103,057, about \$4,000 less than the November cost and some \$6,000 below the budget. The improvement in the patient load at Kadlec accounts for the over-all improvement.

HEALTH & SAFETY SECTION

JANUARY 1955

Industrial Medical Services

The total number of examinations increased from 890 to 1088. The total number of dispensary visits decreased from 4847 to 4504. General Electric employees sustained two major injuries and one sub-major injury. Contractor employees sustained no major or sub-major injuries.

There were two information meetings for staff physicians held during the month.

Department of Labor hearings for alleged hearing loss due to noise exposure were scheduled for January but were postponed until February 8, 9, and 10.

The Health Activities Committee met and discussed the topic of the indiscriminate use of sleeping tablets. Material on this subject was prepared for distribution to all employees in February. Sickness absenteeism was 1.76% for the month and 2.42% for all causes.

Net costs for December reflected a \$3,000 increase over November due mainly to increased salaries, utilities and maintenance charges. In addition, expense credits, or charges to other departments for services rendered, declined \$640 from the November level.

Costs - Operations

	<u>Dec.</u>	<u>Nov.</u>	<u>Increase (Decrease)</u>
Salaries	\$36,144	\$33,963	\$ 2,181
Continuity of Service	3,253	3,057	196
Laundry	196	254	(58)
Utilities, Transportation, Maintenance	4,130	3,410	720
Supplies and Other	<u>4,307</u>	<u>5,163</u>	<u>(856)</u>
Total Gross Costs	48,030	45,847	2,183
Less: Revenue	937	1,029	(92)
Expense Credits	<u>7,726</u>	<u>8,366</u>	<u>(640)</u>
Net Cost of Operation	\$39,367	\$36,452	\$ 2,915

Comparison between actual costs and the Midyear Budget Review for six months' operation indicates a close relationship, as evidenced by the fact that net expenses are approximately \$600 over budget. In relation to the total budget, however, this is a negligible amount, (.3 of 1 per cent). Costs are expected to remain within budgeted limits during the remainder of the fiscal year.

HEALTH & SAFETY SECTION

JANUARY 1955

<u>Industrial Medical Services (Continued)</u>	<u>1954</u> <u>December</u>	<u>1955</u> <u>January</u>
<u>Physical Examinations</u>		
<u>Operations</u>		
Pre-employment	79	85
Rehire	10	19
Annual	282	295
Interim	139	191
A.E.C.	42	24
Re-examination and recheck	144	171
Termination	70	73
Sub-total	766	858
<u>Contractors</u>		
Annual	53	18
Pre-employment	49	157
Recheck	17	46
Termination and Transfer	5	9
Sub-total	124	230
Total Physical Examinations	890	1088
<u>Laboratory Examinations</u>		
<u>Clinical Laboratory</u>		
Government	121	95
Pre-employment, Termination, Transfer	1409	2113
Annual	1578	1577
Recheck (Area)	725	986
First Aid	2	20
Total	3835	4791
<u>X-Ray</u>		
Government	20	15
Pre-employment, Termination, Transfer	206	338
Annual	482	523
First Aid	69	85
Total	777	961
Electrocardiographs	53	105
Physical Therapy Cases Referred	238	275

DECLASSIFIED

HEALTH & SAFETY SECTION

JANUARY 1955

<u>Industrial Medical Services (Continued)</u>	<u>1954</u> <u>December</u>	<u>1955</u> <u>January</u>
<u>First Aid Treatments</u>		
<u>Operations</u>		
New Occupational Cases	375	354
Occupational Case Retreatments	1343	1245
Non-occupational Treatments	2789	2521
Sub-total	4507	4120
<u>Construction</u>		
New Occupational Cases	68	79
Occupational Case Retreatments	200	216
Non-occupational Treatments	72	89
Sub-total	340	384
Total First Aid Treatments	4847	4504
<u>Major Injuries</u>		
General Electric	0	2
Contractors	0	0
Total	0	2
<u>Sub-Major Injuries</u>		
General Electric	2	1
Contractors	1	0
Total	3	1
<u>Nurses' Visits</u>		
Calls made	2	0
Employee Personal Illness	2	0
No. absent due to illness in family	0	0
No. not at home when call was made	0	0

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HEALTH & SAFETY SECTION

JANUARY 1955

Kadlec Hospital

The average daily adult census increased from 60.6 to 74.0 as compared with 77.9 a year ago. This represents an occupancy percentage of 67.9 broken down as follows: Mixed Service (Medical, Surgical, Pediatrics) 72.2; Obstetrical Service 50.0. The minimum and maximum daily census ranged as follows:

	<u>Minimum</u>	<u>Maximum</u>
Mixed Service	36	82
Obstetrical Service	7	15
Total Adult	46	90

The average daily newborn census decreased from 12.0 to 9.9 as compared with 10.6 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.15
Obstetrical	5.74
Newborn	3.64

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of December was 2.43. When newborn infants are included, the ratio is 2.03.

The net expense for the operation of Kadlec Hospital for December, 1954, was \$23,553 as compared with \$28,658 for November. Summary is as follows:

Kadlec Hospital net expense \$23,553
 This is a decrease of \$5,105. Gross costs decreased \$3,424 and revenue increased \$1,761 as a result of a slightly higher patient census. Expense credits decreased \$80.

Mr. O. E. Bakko attended a meeting of the Board of Trustees, Washington State Hospital Association in Seattle.

At the annual meeting of the Kadlec Auxiliary a number of members were presented with bronze, silver, and gold pins for 50 or more, 100 or more and 150 or more hours of service in behalf of the hospital. A meeting was also held with the president and vice-president of the Auxiliary to make plans for the coming year.

Following is a summary of employee relations meetings held in the Health and Safety Section during January.

	<u>Meetings</u>	<u>Attendance</u>
Hospital	21	180
Industrial Medicine	3	13
Public Health	5	46
Safety & Fire Prevention	1	13
General	1	6
Total	31	258

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HEALTH & SAFETY SECTION

JANUARY 1955

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Hospital Unit (Continued)	1954 December	1955 January
<u>Kadlec Hospital</u>		
Average Daily Adult Census	60.6	74.0
Medical	17.2	23.6
Surgical	17.9	26.0
Pediatrics	13.5	13.9
Mixed	48.6	63.5
Obstetrical	12.0	10.5
Average Daily Newborn Census	12.0	9.9
Maximum Daily Census:		
Mixed Services	70	82
Obstetrical	17	15
Total Adult Census	81	90
Minimum Daily Census:		
Mixed Services	21	36
Obstetrical Service	4	7
Total Adult Census	27	46
Admissions: Adults	448	567
Discharges: Adults	457	523
Medical	119	136
Surgical	162	219
Pediatrics	84	91
Mixed	365	446
Obstetrical	92	77
Newborn	82	71
Patient Days: Adult	1879	2295
Medical	534	732
Surgical	555	806
Pediatrics	419	431
Mixed	1508	1969
Obstetrical	371	326
Newborn	372	306
Average Length of Stay: Adults	4.1	4.4
Medical	4.5	5.4
Surgical	3.4	3.7
Pediatrics	5.0	4.7
Mixed	4.1	4.4
Obstetrical	4.0	4.2
Newborn	4.5	4.3
Occupancy Percentage: Adults	55.6	67.9
Medical	46.5	63.8
Surgical	55.9	81.3
Pediatrics	71.1	73.2
Mixed	55.2	72.2
Obstetrical	57.1	50.0
Newborn	46.2	38.1
(Occupancy Percentage based on 109 adult beds and 26 bassinets.)		

HEALTH & SAFETY SECTION

JANUARY 1955

Hospital Unit (Continued)	1954 December	1955 January
<u>Kadlec Hospital (Continued)</u>		
Avg. Nursing Hours per Patient Day:		
Medical, Surgical, Pediatrics	3.99	3.15
Obstetrics	3.87	5.74
Newborn	3.00	3.64
Avg. No. Employees per Patient (excluding newborn)	2.43	
Operations: Major	53	73
Minor	54	74
E.E.N.T.	55	62
Dental	0	1
Births: Live	83	70
Still	1	2
Deaths	4	3
Hospital Net Death Rate37%	.34%
Net Autopsy Rate	25.0	66.6
Discharged against advice	2	0
One Day Cases	140	155
Admission Sources:		
Richland	73.9	78.8
North Richland	9.2	8.3
Other	16.9	12.9
Admissions by Employment:		
General Electric	66.5	72.7
Government	2.7	.5
Facility	7.4	5.6
Contractors	12.5	14.5
Schools	2.0	.7
Others	8.9	6.0
Hospital Outpatients:		
First Aid		521
Clinical Laboratory		158
Bacteriological Laboratory		81
X-Ray		159
Physical Therapy		341
<u>Physical Therapy Treatments</u>		
Outpatient Treatments	227	335
Hospital	124	86
Total	351	421
<u>Pharmacy</u>		
No. of Prescriptions Filled	2710	3054
No. of Store Orders Filled	493	534

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HEALTH & SAFETY SECTION

JANUARY 1955

	<u>1954</u> <u>December</u>	<u>1955</u> <u>January</u>
<u>Hospital Unit (Continued)</u>		
<u>Kadlec Hospital (Continued)</u>		
<u>Clinical Laboratory Examinations</u>		
Outpatient Examinations		444
Hospital		4380
Public Health		0
Total		4824
<u>X-Ray Examinations</u>		
Outpatient Examinations		200
Hospital		245
Public Health		19
Total		464
<u>Electrocardiographs</u>		
Outpatient Examinations		2
Hospital		37
Total		39
<u>Bacteriological Laboratory</u>		
Treated Water Samples	175	191
Milk Samples (Inc.Cream & Ice Cream)	41	38
Other Bacteriological Tests	461	612
Total	677	841
<u>Patient Meals</u>		
Regulars	2883	3369
Children under 8	857	943
Specials	729	1148
Softs	432	708
Tonsil and Adenoid	86	87
Liquids	105	133
Surgical Liquids	110	92
Total	5202	6480
<u>Cafeteria Meals</u>		
Noon	1688	1788
Night	359	291
Total	2047	2079

HEALTH & SAFETY SECTION

JANUARY 1955

Public Health Unit

The total number of communicable diseases reported remained about the same. Chickenpox and mumps were the two most common diseases reported. Scarlet fever remained at the same increased level which is expected at this time of year.

The first meeting of the recently formed Board of Health, Richland Community Council, was held. Dr. E. W. Warren was named chairman. The Health Board is composed of five members who will serve staggered terms. Mrs. R. W. Benoliel's one-year term will end June 30, 1955. Dr. Warren will serve for two years; Mrs. L. D. Test, three years; Mr. S. A. Spohr, four years; and Mr. F. A. R. Stainken, five years. Presentation of the public health activities will be made to the Board at the next scheduled meeting.

Another meeting was held with Mr. Seymour Standish and the Steering Committee in regards to the Health Clinic to be held in Pasco in the spring dealing with "Family Life." Invitations have been sent to various speakers from the University of Washington and American Medical Association, in regards to leading discussions in respect to family structure.

Miss Grace Watson, Chief, Public Health Nursing, State Department of Health, visited with the nursing supervisor in respect to public health nursing practices.

Mr. Spencer Crookes, Executive Secretary of the Washington Children's Home Society, met with the Health Officer to discuss the welfare developments for the community and Tri-City area.

Mr. Roger James, Engineer, State Department of Health, Spokane Office, made a routine visit to the department.

Preliminary plans are being formulated for the next x-ray survey to be held in Richland in March with a representative of the Chest Survey Incorporated.

The Health Officer and Health Educator attended a Washington State Public Health Association executive board meeting in Seattle.

The Health Officer attended an executive board meeting of the Western Branch, American Public Health Association meeting in Berkeley.

Of the 325 contacts made by the social service counselors, 210 (65%) were directly concerned with problems in family relationships. Of these 101 focused primarily on marital difficulties while 109 involved conflict between parents and their children.

In 41 instances, children were seen in play interviews. Nineteen adults and 24 adolescents consulted regarding personal problems.

Physical and mental illness accounted for 22 of the total interviews during the month. There were also 9 contacts regarding economic need.

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HEALTH & SAFETY SECTION

JANUARY 1955

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Public Health Unit (Continued)

Permits for operation were issued to food handling establishments, which included restaurants, grocery stores and taverns. A restaurant survey was conducted. The survey indicated that compliance with items of sanitation rated 79.2% and the rating on enforcement methods was 75%. The item most frequently violated was adequate cleaning of equipment which was checked in 13 of the 19 restaurants surveyed. A new grading program has been worked out and will be presented to the Board of Health for their endorsement.

School cafeterias were inspected and found to be in excellent condition insofar as sanitation is concerned.

Improper methods of washing and sterilization of glasses were noted in two tavern inspections.

Bacteriological results of pasteurized milk samples were satisfactory.

Two citations were issued to individuals for picking up and transporting garbage for hog feeding purposes without Department of Agriculture permit.

Sterilization procedure of new high tanks in the area was supervised. Samples were obtained after flushing and were negative for coliform organisms.

Plans were made to continue the pollen reduction program again this spring.

HEALTH & SAFETY SECTION

JANUARY 1955

Public Health (Continued)	1954 December	1955 January
<u>Education</u>		
Pamphlets distributed	11,988	10,997
News Releases	6	0
Staff Meetings	1	1
Classes	3	8
Attendance	13	59
Lectures & Talks	6	20
Attendance	224	602
Films Shown	9	16
Attendance	996	587
Community Conferences & Meetings	25	20
Radio Broadcasts	9	0
<u>Immunizations</u>		
Diphtheria	1	51
Diphtheria Booster	89	525
Diptussis	0	15
Tetanus	1	1
Tetanus Booster	3	1
Pertussis	1	1
Pertussis Booster	3	1
Smallpox	43	553
Smallpox Revaccination	93	0
Tuberculin Test	5	2
Immune Globulin	7	5
Other	0	1
<u>Social Service</u>		
Cases carried over	107	109
Cases admitted	17	12
Cases closed	15	27
Remaining case load	109	94
Activities:		
Home Visits	9	2
Office Interviews	316	330
Conferences	39	73
Meetings	14	12
<u>Sanitation</u>		
Inspections made	104	103
Conferences held	10	17

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HEALTH & SAFETY SECTION

JANUARY 1955

<u>Public Health (Continued)</u>	<u>1954</u> <u>December</u>	<u>1955</u> <u>January</u>
<u>Communicable Diseases</u>		
Chickenpox	49	58
German Measles	10	4
Impetigo	3	3
Influenza (U.R.I.)	0	4
Infectious Mononucleosis	0	1
Infectious Hepatitis	0	2
Measles	3	2
Mumps	24	27
Pinkeye	4	0
Ringworm	13	3
Roseola	2	1
Scabies	2	0
Scarlet Fever	15	18
Streptococcal Infections-Throat	1	0
Whooping Cough	0	4
Total	126	127
 Total No. Nursing Field Visits	 524	 428
Total No. Nursing Office Visits	78	65

COMMUNITY SECTION

JANUARY 1955

ORGANIZATION AND PERSONNEL:

	<u>BEGINNING OF MONTH</u>		<u>END OF MONTH</u>	
	<u>Exempt</u>	<u>Nonexempt</u>	<u>Exempt</u>	<u>Nonexempt</u>
Community Administration	1	1	1	1
Maintenance & Renovation Unit	9	144	9	142
Police Unit	16	28	16	31
Commercial & Residential Property Unit	8	24	8	24
Fire Unit	65	0	67	0
Transfer Study	1	1	1	0
Community Operations Administration	1	1	1	1
Electrical Unit	5	15	5	16
Engineering Unit	7	4	7	4
Water & Sewerage Utilities Unit	5	18	5	18
Library Unit	4	9	4	9
Public Works & Recreation Unit	<u>7</u>	<u>38</u>	<u>7</u>	<u>37</u>
	129	283	131	283

	<u>Exempt</u>	<u>Nonexempt</u>
Additions to Payroll	0	9
Transfers In	0	2
Removals from Payroll	0	5
Transfers Out	0	4
Net Increase	<u>2</u>	

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MAINTENANCE AND RENOVATION UNIT

January, 1955

	<u>Exempt</u>	<u>Nonexempt</u>
Employees - Beginning of the month	9	144
New hires	0	1
Transfers out	0	2
Terminations	0	1
Employees - End of month	9	142

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INTERIOR PAINT REPORT - FY 1955

<u>FOREMAN</u>	<u>PAINTERS</u>	<u>TRUCK DRIVERS</u>	<u>TOTAL</u>
R. A. Chambliss	20	1	21
D. W. Lukins	20	1	21
M. E. Tappan	<u>20</u>	<u>1</u>	<u>21</u>
Total	60	1	63

<u>TYPE UNIT</u>	<u>NO. UNITS SCHEDULED</u>	<u>COMPLETED THIS MONTH</u>	<u>COMPLETED TO DATE</u>	<u>BALANCE TO BE PAINTED</u>
A	136	15	45	91
B	158	14	73	85
C	8	0	0	8
D	0			
E	23	1	3	20
F	52	6	13	39
G	0			
H	92	4	20	72
K	2	0	0	2
L	13	0	0	13
M	1	0	0	1
Q	3	1	2	1
R	1	0	1	0
S	1	1	1	0
T	3	0	3	0
U	21	2	12	9
V	79	4	33	46
Y	96	7	68	28
Z	6	0	5	1
LBP	95	7	28	67
2BP	460	43	171	289
3BP	304	54	154	150
Tract	16	4	5	11
1BR Apt.	10	4	5	5
2BR Apt.	0			
W-13 Apt.	2	0	0	2
Total	1582	167	642	940

3 Units added.

Est. MH B. F.	21,119	Actual MH B.F.	21,468 $\frac{1}{2}$
Est. MH This Month	<u>7,413</u>	Act. MH This Mo.	<u>7,552$\frac{1}{2}$</u>
Total Est. MH	28,532	Total Act. MH	29,021

There are 8 men working full time in dormitories whose time has not been counted in this report.

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PLUMBING SHOP

FOREMAN - F. L. ELSENSOHN

JOB DESCRIPTION

NO. COMPLETED

Electric water heaters replaced	28
Laundry trays replaced	34
Shower stalls replaced	10
Miscellaneous plumbing work orders completed	18
Cleared major sewer stoppages caused by tree roots	61
Cleared major sewer stoppage in main	1
Worked on plumbing service orders	122.3 hrs.
Radiators completely overhauled in dormitories	17
Plumbing for floor and sink linoleum replacement	88
Loaded and hauled dirt to fill holes where prefabs were removed; loaded and hauled old blacktop walks to the dump	10
Steam work orders completed	1

Made routine steam inspection once each week in Government owned commercial buildings, apartments and dormitories.

Excavated sewer lines for cleaning out of roots, and to repair all leaking and broken underground piping, and backfilled and landscaped excavated portion.

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	157
B. Received during the month	1946
C. Completed during the month	1908
D. On hand at the end of the month	195

E. A total of 79.2 hours were spent on work orders.

F. Backlog of service orders by craft:

Electrical	52
Plumbing	142
Carpentry	<u>1</u>
Total	195

RENOVATION AND LABOR CREW

FOREMAN - B. C. BAIN

The following services were performed during the month:

Vacant houses renovated	36
Trash pickups	27
Minor carpentry repairs to housing units	32
Minor carpentry repairs to dormitories	11
Sprayed entire dormitories W-7, M-5, and M-8 for insect control	3
Minor paint jobs - renovated houses	15
Complete paint job - renovated house	1

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	225
Routine furnace inspections	170

Routine inspections have been completed on the George Washington Way apartments, and they are about 15% complete on the Ranch houses.

An experimental "dust stop" filter pad has been installed in Apartment 55, 1213 George Washington Way, in an attempt to eliminate, at least in part, the dirt and lint from entering the blower, fan, coil, and duct work.

B. Sheetmetal Crew:

Fabricated shower stalls	3
Replaced smoke pipes	11
Installed gutters and flashings	7
Installed coal hatch flashings	3
Installed Ranch house bathroom flashings	24
Prefab door keepers	96

C. Labor Crew:

Tree removal orders	66
---------------------	----

LINOLEUM AND CARPENTER SHOP

FOREMAN - R. M. MARTIN

Replaced bath wall tile	1
Replaced bath floor linoleum	9
Repaired bath floor linoleum	6
Replaced bedroom floor linoleum	3
Replaced utility floor linoleum	1
Repaired utility floor linoleum	2
Replaced living room linoleum	1
Repaired living room linoleum	4
Repaired dining room linoleum	1
Replaced kitchen floor linoleum	48
Repaired kitchen floor linoleum	9
Replaced hall linoleum	1
Replaced steps linoleum	22
Replaced sink top linoleum	80
Repaired sink top linoleum	4
Replaced work bench linoleum	8
Replaced cupboard top linoleum	2
Jack and shim	11
Sash balances	2
Repaired exterior doors	4
Repaired interior doors	1
Repaired floor boards	1
Repaired roofs - houses	32
Ranch house screens	5
Interior carpentry - houses	187
Drilled weepholes	61
Replaced broken sinks	9
Chempoints	156
Paint touchups	68

COMMUNITY SECTION
 RICHLAND POLICE DEPARTMENT
 MONTHLY REPORT
 JANUARY 1955

ORGANIZATION

	EXEMPT	Non-EXEMPT
EMPLOYEES - BEGINNING OF MONTH	16	28
TRANSFERS IN	0	2
TRANSFERS OUT	0	0
NEW HIRES	0	2
TERMINATIONS	0	1
	<hr/>	<hr/>
TOTAL - END OF MONTH	16	31

GENERAL

SGT. T. J. MCGUIRE OF THIS DEPARTMENT GAVE A TALK ON JUVENILE PROBLEMS BEFORE A YOUTH GROUP OF A LOCAL CHURCH.

A PUBLIC TELEPHONE WAS INSTALLED DURING THIS MONTH NEAR THE ENTRANCE TO THE LOBBY AT THE POLICE DESK, TO BE USED BY PERSONS DESIRING TO MAKE CALLS OUTSIDE THE CITY.

THIS MONTH TWO POLICE VEHICLES WERE EXCHANGED FOR NEW 1954 CHEVROLET SEDANS.

ONE GROUP OF CAMP FIRE GIRLS AND FOUR BOY SCOUT GROUPS WERE ESCORTED ON A TOUR THROUGH POLICE HEADQUARTERS DURING THE MONTH OF JANUARY.

TRAFFIC

	<u>1954</u> DEC.	<u>1955</u> JAN.	<u>1953</u> DEC.	<u>1954</u> JAN.	<u>1955</u> TOTAL TO DATE	<u>1954</u> TOTAL SAME PERIOD
REPORTABLE ACCIDENTS	20	34	29	32	34	32
PROPERTY DAMAGE ACCIDENTS	18	30	27	29	30	29
INJURY ACCIDENTS	2	3	2	3	4	3
TOTAL PERSONS INJURED	2	6	2	3	6	3
FATAL ACCIDENTS	0	0	0	0	0	0
ACCIDENTS-DAYLIGHT HOURS	9	17	16	20	17	20
DARKNESS	11	17	13	12	17	12
ACCIDENTS-BUSINESS DISTRICT	5	5	8	8	5	8
RESIDENTIAL "	11	26	16	20	26	20
OTHER "	4	3	5	4	3	4
ACCIDENTS INVESTIGATED	17	21	20	16	21	16
CRIMINAL COMPLAINTS FILED	13	5	17	9	5	9
VIOLATIONS CONTRIBUTING TO ACCIDENTS:						
NEGLIGENT DRIVING	6	2	8	3	2	3
FAIL TO YIELD R.OF WAY	4	8	9	4	8	4
FOLLOWING TOO CLOSE	2	3	4	8	3	8
DRUNK DRIVING	2	1	1	0	1	0
PEDESTRIAN VIOLATION	0	0	0	0	0	0
INATTENTION TO DRIVING	0	0	0	0	0	0
RECKLESS DRIVING	1	0	3	0	0	0
SPEEDING	0	1	0	0	1	0
UNSAFE SPEED	0	14	0	16	14	16
IMPROPER BACKING	0	3	1	0	3	0
DISREGARDING STOP SIGN	0	0	0	0	0	0
HIT AND RUN	0	1	0	0	1	0
IMPROPER PASSING	0	0	1	0	0	0
IMPROPER TURN	0	1	0	1	1	1
FAILURE TO SIGNAL	0	0	1	0	0	0
WIDE RIGHT TURN	2	0	0	0	0	0
IMPROPER PARKING	0	0	1	0	0	0
BICYCLE VIOLATION	1	0	0	0	0	0
DEFECTIVE EQUIPMENT	1	0	0	0	0	0
NORTH RICHLAND:						
REPORTABLE ACCIDENTS	9	12	5	10	12	10
PROPERTY DAMAGE ACCIDENTS	7	12	4	9	12	9
INJURY ACCIDENTS	2	0	1	1	0	1

	<u>1954</u> DEC.	<u>1955</u> JAN.	AVE.PER ACCIDENT <u>1954</u> DEC.	AVE.PER ACCIDENT <u>1955</u> JAN.	AVE.PER ACCIDENT <u>1953</u> DEC.	AVE.PER ACCIDENT <u>1954</u> JAN.
RICHLAND						
ACCIDENT PROPERTY DAMAGE	\$9,477.50	\$7,360.50	\$473.88	\$216.49	\$285.86	\$168.31

TRAINING

THERE WAS NO RANGE ACTIVITY DURING THE MONTH OF JANUARY.

ACTIVITIES

	1954		1955	
	DECEMBER	JANUARY	DECEMBER	JANUARY
	RICHLAND	NORTH RICHLAND	RICHLAND	NORTH RICHLAND
BANK ESCORTS AND DETAILS	2	4	0	4
BICYCLES IMPOUNDED	2	0	0	0
BICYCLE VIOLATIONS, OTHER	2	0	0	0
BICYCLES REGISTERED	42	0	33	0
CHILDREN LOST OR FOUND	7	5	7	1
COMPLAINTS INVESTIGATED	25	9	43	9
DEATHS REPORTED	2	1	0	0
DOG, CAT, LOOSE STOCK COMPLAINTS	6	0	4	0
DOGS, CATS, REPORTED LOST OR FOUND	8	1	7	2
DOORS, WINDOWS FOUND OPEN IN FACILITIES	27	10	33	2
EMERGENCY MESSAGES DELIVERED	20	90	18	52
FIRES INVESTIGATED	14	3	4	2
GUNS REGISTERED	9	0	16	0
LAW ENFORCEMENT AGENCIES ASSISTED	8	0	10	0
LETTERS OF INQUIRY	134	0	229	0
MISCELLANEOUS ESCORTS	2	2	7	5
PERSONS INJURED BY DOGS	0	0	0	0
PLANT DEPARTMENTS ASSISTED	45	1	37	0
PRISONERS PROCESSED THROUGH JAIL	21*	5	10	6
PRIVATE INDIVIDUALS ASSISTED	29	2	12	3
PROPERTY LOST OR FOUND	19	3	30	1
RECORDS INQUIRIES	75	0	80	0
REPORTS PROCESSED THROUGH RECORDS	239	141	242	102
STREET LIGHTS OUT REPORTED TO ELECTRICAL	242	20	248	20
TRAFFIC SAFETY MEETINGS (JAN ATTENDANCE 135)	8	0	3	0

TOTAL

988

297

1073

209

* 1 PRISONER HANDLED FOR SECURITY PATROL - DECEMBER

MONTHLY REPORT
 RICHLAND POLICE DEPARTMENT
 (RICHLAND - NORTH RICHLAND)
 JANUARY 1955

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER		CLEARED ARREST	
	RICH.	No. RICH.	RICH.	No. RICH.	RICH.	No. RICH.	RICH.	No. RICH.
PART I								
1. CRIMINAL HOMICIDE								
A. MURDER & NON-NEG MANSLAUGHTER								
B. MANSLAUGHTER BY NEGLIGENCE								
2. RAPE								
3. ROBBERY								
4. AGGRAVATED ASSAULT	4						1**	
5. BURG. - BREAK. & ENTRY	1	2						
6. LARCENY OVER \$50.00	15	2	1		2			
UNDER \$50.00								
7. AUTO THEFT	1	1					1	
TOTAL PART I CASES	21	5	1		2		2	
PART II								
8. OTHER ASSAULTS	1						1	
9. FORGERY & COUNTERFEIT	2						2	
10. EMBEZZLEMENT & FRAUD	3						8**	
11. STOLEN PROP:BUY:RECEIVE								
12. WEAPONS: CARRY: POSS.								
13. PROSTITUTION								
14. SEX OFFENSES	1	1						
15. OFFENSES AGAINST FAMILY & CHILD	1							
16. NARCOTICS								
17. LIQUOR LAWS		1						
18. DRUNKENNESS	4	2					4	
19. DISORDERLY CONDUCT								
20. VAGRANCY		1						
21. GAMBLING								
22. DRUNK DRIVING	2	1					2	
23. VIOL. ROAD & DRIVING LAWS:								
FAIL. TO STOP & IDENTIFY	3						2	
SPEEDING	22	7			3		19	
STOP SIGN	14	9			1		13	
RECKLESS DRIVING	2						2	

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER		CLEARED ARREST	
	RICH.	No. RICH.	RICH.	No. RICH.	RICH.	No. RICH.	RICH.	No. RICH.
RIGHT OF WAY	4	-	-	-	2	-	2	-
NEGLIGENT DRIVING	6	4	-	-	-	-	6	4
DEFECTIVE EQUIPMENT	5	4	-	-	3	2	2	2
ILLEGAL PASSING	1	4	-	-	-	-	1	4
PARKING	16	32	-	-	3	10	13	22
24. ALL OTHER TRAFFIC VIOL.	13	9	-	-	-	2	13	7
25. ALL OTHER OFFENSES:								
26. MALICIOUS MISCHIEF	1	-	-	-	1	-	-	-
VANDALISM	6	4	-	-	1	-	-	-
TRESPASSING	1	-	-	-	1	-	-	-
PUBLIC NUISANCE	1	1	-	-	-	-	1	1
INVESTIGATION	1	2	-	-	1	2	-	-
PROWLER	1	1	-	-	-	-	-	-
DISTURBANCE	2	1	-	-	-	-	-	-
MOLESTING	1	-	-	-	2	1	-	-
ILLEGAL SHOOTING	2	-	-	-	-	-	-	-
PICKUP FOR OUTSIDE AGENCY	1	-	-	-	-	-	-	-
DAMAGE TO PROPERTY	1	1	-	-	-	-	1	-
OBSCENE PHONE CALLS	1	-	-	-	1	-	-	-
27. SUSPICION	1	1	-	-	1	-	-	1
TOTAL PART II CASES	120	86	0	0	23	19	94	62
PART III								
28. MISSING PERSONS	4	-	-	-	4	-	-	-
LOST PERSONS	7	1	-	-	7	1	-	-
LOST ANIMALS	5	3	-	-	1	2	-	-
LOST PROPERTY	27	-	-	-	35	6	-	-
29. FOUND PERSONS	-	-	-	-	-	-	-	-
FOUND PROPERTY	30	-	-	-	23	2	-	-
FOUND ANIMALS	1	-	-	-	1	-	-	-
TOTAL PART III CASES	74	4	0	0	71	11	-	-

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. TRAFFIC ACCID.	-	-	-	-	-	-	-	-
31. PERS. INJ. M.V. TRAF. ACC.	4	-	-	-	-	-	-	-
32. PROP. DAM. M.V. ACCID.	30	12	-	-	-	-	-	-
33. OTHER TRAFFIC ACCIDENTS	-	-	-	-	-	-	-	-
34. PUBLIC ACCIDENTS)							
35. HOME ACCIDENTS)							
36. OCCUPATIONAL ACCIDENTS)							
37. FIREARMS ACCIDENTS	-	-	-	-	-	-	-	-
38. DOG BITES	-	-	-	-	-	-	-	-
39. SUICIDES	-	-	-	-	-	-	-	-
40. SUICIDE ATTEMPTS	-	-	-	-	-	-	-	-
41. SUD. DEATH & BODY FOUND	-	-	-	-	-	-	-	-
42. SICK CARED FOR	-	-	-	-	-	-	-	-
43. MENTAL CASES	-	-	-	-	-	-	-	-
TOTAL PART IV	34	12	0	0	0	0	0	0
COMPOSITE TOTALS								
PART I, II, III, IV CASES	249	107	1	0	96	31	96	63

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.

** 1 BURGLARY, CLEARED FROM PREVIOUS YEAR; 7 EMBEZZLEMENT & FRAUD CASES CLEARED FROM PREVIOUS YEAR.

PROPERTY REPORTED STOLEN	RICHLAND	\$2,304.55
PROPERTY REPORTED STOLEN	N. RICHLAND	760.95
PROPERTY RECOVERED	RICHLAND	2,069.50
PROPERTY RECOVERED	N. RICHLAND	801.00

MONTHLY REPORT		RICHLAND POLICE DEPARTMENT				JUVENILES INVOLVED										JANUARY		
OFFENSES	NO. CASES	JUVENILES	SEX	4	6	9	10	11	12	13	14	15	16					
<u>RICHLAND</u>																		
VANDALISM	1	2	M								2							
MISCHIEF	1	4	M			1	1	1	1									
FORGERY	1	2	M										2					
LARCENY	2	15	M				1	2	2	4	4	1						
ILLEGAL SHOOTING	2	4	M					2	2									
TRESPASSING	1		M									1	3					
TOTALS	8	31				1	2	5	5	4	6	2	5					

<u>NORTH RICHLAND</u>																		
INVESTIGATION	1	3	M															
TOTALS	1	3																

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RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
JANUARY 1955

VIOLATIONS	NO. OF CASES	NO. OF CONV.	NO. OF FORF.	CASES CONT.	CASES DISM.	SENT. JAIL	SENT. SUSP.	LIC. REV.	CASES ORIG. PREV. MONTH	BAIL FORF	\$	FINES	\$	FINES SUSP.
DEFECTIVE EQUIPMENT	2	1	1	1	1							\$12.50	\$	
IMPROPERLY DISP VEH LIC	1	1	1									7.50		
INVALID VEHICLE LICENSE	6	5	1							10.00		42.50		7.50
NO CERT OF REGISTRATION	3	2			1							15.00		7.50
NO DRIVERS LICENSE	9	5	3	1					1	30.00		35.00		7.50
NEGLIGENT DRIVING	3	1	1									27.50		
NEGLIGENT DRIVING, LIQ INV	5	1	4						1	200.00		50.00		
RECKLESS DRIVING	3	3										37.50		20.00
DRUNK DRIVING	3	1		1	1	1			2					
SPEEDING	15	5	9		1					95.00		71.00		7.00
ILLEGAL PARKING	13	3	7	1					2	23.50		7.00		7.50
STOP SIGN	14	8	6						1	70.00		72.50		
FOLLOWING TOO CLOSE	1			1										
FAILURE TO STOP & IDENTIFY	1	1				1								
FAIL. TO YIELD RIGHT OF WAY	3	2	1							50.00		32.50		
FAIL. TO DIM LIGHTS	1	1										7.50		
FAIL. TO OBEY POLICE OFFICER	1		1							15.00				
VIOL. OF FINANC. RESP. ACT	1	1				1			1					
TRANSFER OF REGISTRATION	1	1										7.50		
PUBLIC NUISANCE	1	1										12.50		
PUBLIC INTOXICATION	5	2	2	1						25.00		25.00		
INDECENT LIBERTIES	1			1										
NON SUPPORT	1	1										102.50		
TOTALS	94	46	35	6	4	3			8	\$518.50		\$565.50		\$49.50

1 NEGLIGENT DRIVING - DID NOT APPEAR
2 ILLEGAL PARKING - DID NOT APPEAR
2 RECKLESS DRIVING AMENDED TO NEGLIGENT DRIVING
1 DRUNK DRIVING - APPEALED VERDICT, POSTED \$250.
1 PUBLIC INTOXICATION - APPEALED VERDICT, POSTED \$15.

RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
JANUARY 1955

VIOLATIONS	NO. OF CASES		NO. OF FORF.		NO. OF CONT.		CASES DISM.		SENT. JAIL		SENT. SUSP.		LIC. REV.		BAIL FORF.		FINES		FINES SUSP.	
	CASES	NO. OF	CASES	NO. OF	CASES	NO. OF	CASES	NO. OF	CASES	NO. OF	CASES	NO. OF	CASES	NO. OF	CASES	NO. OF	CASES	NO. OF	CASES	NO. OF
DEFECTIVE EQUIPMENT	1																			
NO VEH LICENSE PLATE	1																			
INVALID VEHICLE LICENSE	1																			
NO DRIVERS LICENSE	5	1																		
NEGLIGENT DRIVING	1	2																		
NEGLIGENT DRIVING, LIQ INV	4	2																		
DRUNK DRIVING	3	3																		
SPEEDING	7	4																		
ILLEGAL PASSING	6	3																		
ILLEGAL PARKING	17	3																		
STOP SIGN	9	5																		
FAIL. TO YIELD RIGHT OF WAY	1																			
FOLLOWING TOO CLOSE	1																			
VIOLATION OF DRIVING RESTRICTION	1																			
VIOLATION OF FINANC RESP ACT	1																			
OPERATING MOTOR VEH w/o LIGHTS	1																			
LEAVING CAR WITH MOTOR RUNNING	1																			
PUBLIC NUISANCE	1																			
PUBLIC INTOXICATION	4	2																		
INDECENT EXPOSURE	1																			
AUTO THEFT	1																			
TOTALS	68	25	24	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

1 AUTO THEFT - BAIL \$1500, BOUND OVER TO SUPERIOR COURT
1 PUBLIC INTOX - APPEALED VERDICT, POSTED \$27.50
1 DRUNK DRIVING - APPEALED VERDICT, POSTED \$250.00
1 DRUNK DRIVING - DRIVING PRIVILEGES DENIED 1 YEAR
1 VIOL. FINANC. RESP. ACT - DRUG PRIV. DENIED 1 YEAR
1 STOP SIGN - DID NOT APPEAR
7 ILLEGAL PARKING - DID NOT APPEAR
1 NEGLIGENT DRIVING, LIQ INV - DID NOT APPEAR
1 DRUNK DRIVING - AMENDED TO NEG DRVG, LIQ INV

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT
COMMUNITY SECTION
January, 1955

PERSONNEL - COMMERCIAL & RESIDENTIAL PROPERTY UNIT:

	<u>January</u>	
	<u>Exempt</u>	<u>Non-Exempt</u>
Beginning of Month	8	24
End of Month	8	24
Net Change	0	0

PERSONNEL - COMMERCIAL AND NON-COMMERCIAL FACILITIES:

	<u>Commercial</u>		<u>Non-Commercial</u>		<u>Total</u>	
	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>
December	1,635	165	120	1	1,755	166
January	<u>1,639</u>	<u>140</u>	<u>120</u>	<u>1</u>	<u>1,759</u>	<u>141</u>
Net Change	/4	-25	0	0	/4	-25

SUMMARY OF ROUTINE ITEMS PROCESSED:

	<u>Commercial</u>		<u>Non-Commercial</u>		<u>Total</u>		
	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>	<u>Total</u>
Work Orders	55	20	2	0	57	20	77
Back Charges	2	0	0	0	2	0	2
FY Work Orders	843	318	36	0	879	318	1197
FY Back Charges	37	1	4	0	41	1	42

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Supplemental Agreements:

- a. F. M. Love - to provide for lease of additional space in the Medical-Dental Building and adjustment in rental.

2. Business Development:

- a. Ten bids were received from prospective Lessees in connection with leasing the three sites in the plot of land located at Van Giesen St. and Wright Avenue. These were opened and read on January 5, 1955.

- b. The bid of R. Bruce Johnson was accepted in connection with leasing the space in the government-owned building located at 615 George Washington way. He proposes to operate a tavern in approximately 50% of the space and will sublet space to others.

3. Assignments:

- a. Mr. L. G. Cook was granted permission to sell his building located in the Light Industrial Area and assign the existing leases to Mr. E. C. Maillard.

GENERAL:

A. Commercial:

1. Miriam Minnear & Rita Launer opened a collection agency in the Automatic Laundry Co. Building, Uptown Business District.
2. Final Building Inspections were received on the following construction:
 - (a) Alterations at Johnny's Minuteman Service Station.
 - (b) Alterations and additions to Skip's Drive In.
 - (c) Alterations at Richland Marina.
 - (d) Construction of addition to C. M. Well's Building.
 - (e) Parcell's Automotive Service Station #4 at Lee and Duane.
3. M. E. Robbins commenced operation of the fountain and lunch counter in Ray's Pharmacy on a sublease basis.

B. Non-Commercial:

1. Fourteen North Richland Commercial and two Non-Commercial lessees were given notices of lease termination on January 25, 1955. Eight leases will be terminated effective February 28, 1955, and these lessees will have 120 days for removal of their structure(s) and site restoration. Seven leases will be terminated effective May 31, 1955. One lease will be terminated effective March 31, 1955. It is presently indicated that several lessees who own their own structure(s) will request authorization to remain open longer than the period allowed under the notice-of-termination and if their requests are granted a shorter period than 120 days, as provided for in their leases, will be required for site restoration. The Atomic Energy Commission has indicated that some of these requests may be granted.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland.

Tavern
Bowling Alley

COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

January, 1955

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

A. Commercial:

	<u>DECEMBER</u>			<u>JANUARY</u>		
	<u>Richland</u>	<u>North Richland</u>	<u>Total</u>	<u>Richland</u>	<u>North Richland</u>	<u>Total</u>
1. Number of Government-owned Buildings	42	8	50	42	8	50
a. Number of Prime Lessee Businesses	37	10	47	37	10	47
b. Number of Sublessees Businesses	<u>17</u>	<u>0</u>	<u>17</u>	<u>18</u>	<u>0</u>	<u>19</u>
c. Total Businesses in Government-owned Buildings	54	10	64	55	10	65
2. Doctors and Dentists in Private Practice	35	0	35	35	0	35
3. Number of Privately-owned Buildings	70	6	76	71	6	77
a. Number of Prime Lessee Businesses	45	5	50	45	5	50
b. Number of Businesses operated by Sublessees	<u>112</u>	<u>0</u>	<u>112</u>	<u>113</u>	<u>0</u>	<u>113</u>
c. Total Businesses in Privately-owned Buildings	157	5	162	158	5	163
4. Privately-owned Buildings under Construction	4	2	6	3	2	5
5. Total Number of Businesses in Operation	211	15	226	213	15	228

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COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

January, 1955

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

B. Noncommercial:

	<u>DECEMBER</u>			<u>JANUARY</u>		
	<u>North</u>		<u>Total</u>	<u>North</u>		<u>Total</u>
	<u>Richland</u>	<u>Richland</u>		<u>Richland</u>	<u>Richland</u>	
1. Government-owned Buildings						
a. Churches	1			1		
b. Clubs and Organizations	5			5		
c. Government agencies	2			2		
Total	<u>8</u>			<u>8</u>		
2. Privately-owned Buildings						
a. Completed and in Use	10	2	12	10	2	12
b. Under Construction	<u>6</u>	<u>0</u>	<u>6</u>	<u>6</u>	<u>0</u>	<u>6</u>
Total	<u>16</u>	<u>2</u>	<u>18</u>	<u>16</u>	<u>2</u>	<u>18</u>
3. Church Plots and Buildings in Private Ownership	3		3	3		3
4. Pasture Land Permits	105		105	105		105

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of December 31, 1955	Orders issued 12-30 to 1-31	Total orders Incomplete as of January 31, 1955
Service orders	354	2173	423
Work orders	694	551	1043
Service charges		225	

Principal work order loads

	Incomplete as of December 31, 1954	Incomplete as of January 31, 1955
Laundry tub replacement	44	29
Tileboard bathroom	6	9
Kitchen floor linoleum	80	97
Kitchen cabinet linoleum	116	196
Shower stall	17	21

133 alteration permits were issued, as compared to 139 issued in December.

Install automatic dryer	32	Install TV antenna	46
Install automatic washer	15	Basement partition	3
Remove kitchen cabinets	1	Change range receptacle	4
Install outlets	6	Sand floors	1
Install air conditioner	1	Basement excavation	4
Install toilet stool & sink	1	Convert to oil	4
Tool shed	1	Water softener	2
Dishwasher	2	Garbage disposal	1
Remove broom closet	4	Install patio	1
Install fence	2	Install thermostat	1
Install vent fan	1		

1026 inspections were made, as compared to 857 in December.

Alteration permits	75	Basement	2
Bathroom	12	Doors	8
Fill	2	Floors	16
Laundry trays	12	Linoleum	142
Paint	208	Porch and steps	7
Range & refer recall	14	Screens	5
Shower stall	6	Sink	11
Toilet seat	10	Trees	10
Walls	7	Yard	3
Renovation rechecks	35	Dormitories	220
Miscellaneous	27	Cancellations	78
Renovations	67	Shows (new tenants)	49

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

<u>Merchandise Issued</u>	<u>Total Amount</u>
Shades	280
Reflectors	14
Drip tray	9
Meat tender	4
Ice trays	11
Hydrator glass	1
Furniture delivered	14
Furniture recalled	32
Range parts	4
Refer parts	0
Cooker pots	1
Space heaters	4
Door stops	1
Caulking compound	2
Grass seed (lbs.)	3

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS -- MONTH OF JANUARY

	DELIVERY		RECALLED	
	REFERS	RANGES	REFERS	RANGES
1Br.	0	0	0	0
2Br.	1	0	2	1
3Br.	1	1	0	0
A	3	3	1	2
B	0	0	1	4
H	1	0	1	0
Q	0	0	0	1
R	0	1	0	1
Y	1	0	1	3
Total	7	5	6	12

Excess: 1-14-55 7 ea. GE ranges, and 11 ea. 3 burner AB ranges

IN WAREHOUSE:

10 ea. TA refers 7'
 2 ea. SO 82 refers 7'
 1 ea. GM refer 7'
 1 ea. GM refer 6'
 1 ea. GE refer 8'
 10 ea. GE ranges
 13 ea. SC ranges
 1 ea. GM range

COMMERCIAL & RESIDENTIAL PROPERTY UNIT
RESIDENTIAL LEASES

JANUARY 1955

DORMITORY REPORT

Dormitories:

	<u>Beds available</u>	<u>Vacant beds</u>	<u>Occupied beds</u>
Men	477	50	427
Women	381*	64**	317*
Total	858*	114**	744*

*This includes 2 beds used for Dorm Offices

**This includes 11 vacant beds in Dorm M 13

WAITING LISTS

	<u>Single Rooms</u>	<u>Double Rooms</u>
Men	1	0
Women	3	0

The following Dormitories are in stand-by condition:

W 21	50 beds	W 15	50 beds
W 17	50 beds	M 7	39 beds
W 16	50 beds		
Total beds			239

RESIDENTIAL LEASING

CANCELLATIONS

Voluntary terminations	12
R.O.F.	2
Discharge	1
Transfers	9
Retirement	2
Move off project	14
Divorce	1
Death	0
Move to Wherry house	0
Military Service	3
Total	44

ALLOCATIONS

Houses allocated to new tenants	40
Exchanged houses	8
Moves (within Richland)	16
Turnovers (Divorce, death, schools)	3
Wherry house move to G.E House	0
Total leases signed	67
Total cancellations	71
Houses assigned "AsIs"	21
Houses sent to "Renovation"	38
Applications pending	278

RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING JANUARY 31, 1955
HOUSES OCCUPIED BY FAMILY GROUPS

	Conven	A&J	T	Pre Cut	Ranch	Pre Fab	Dorm Apt.	A&J Apt.	2BR Apt.	4th Hsg.	Tract	Total
G. E. Employees	2233	256	10	390	848	1128	10	54	62	202	37	5230
Comm. Fac.	90	18		28	59	48		5	4	10	2	264
AEC	63	29		19	52	15		4	3	11	3	199
Other Gov't	7	2			3	1						13
Post Office	6				2	8				1	3	20
Schools	64			7	11	44			1	1		128
Comm. Activities	11			2	6	4					1	24
Medical Facilities	4	17			3	1				3		28
Chas. T. Main	2				2	2				2		8
Kaiser Eng.	5	7			6	2						20
J. A. Jones	2	2			2							6
Blaw-Knox	2	2		2	2							8
Minor Const.					1	1		1				3
Not Certified	3			2		5					1	11
Turnover												
House Ex.												
Total	2492	333	10	450	997	1259	10	64	70	230	47	5962
Ready to Rent					1	8						9
In Renovation	8				2	9						19
Total	2500	333	10	450	1000	1276	10	64	70	230	47	5990

	Begin Month	Moved In	Moved Out	End of Month	Diff.
Conventional Type	2494	+19	-21	2492	-2
A&J Type	333	+1	-1	333	
"T" Type	10			10	
Precut Type	449	+5	-4	450	+1
Ranch Type	999	+5	-7	997	-2
Prefab Type	1260	+22	-23	1259	-1
Dorm Apts.	10			10	
A&J Apts.	64			64	
2BR Apts.	69	+1		70	+1
Fourth Housing	229	+3	-2	230	+1
Tracts	47			47	
Total	5964	+56	-58	5962	-2

COMMUNITY SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT

January 1955

<u>Organization and Personnel</u>	<u>Exempt</u>	<u>Non-Exempt</u>
Employees beginning of Month	65	0
Transfers In	0	0
Transfers Out	0	0
Terminations	0	0
New Hires	2	0
End of Month	67	0

<u>Fire Protection</u>	<u>Richland</u>	<u>North Richland</u>
Fire Loss (Estimated) Government	20.00	0.00
Personal	5.00	25.00
January Total	25.00	25.00
Fire Alarms	20	23
Investigation of Minor Fires & Incidents	4	0
Ambulance Responses	42	0
Inside Schools or Drills	32	15
Outside Drills	5	2
Safety Meetings	7	4
Security Meetings	5	3
Fire Alarm Boxes Tested	216	104

One Engine Company stood by January 2, at Riverside Park for "Operation Torch" and extinguished embers after burning of the Christmas trees.

Class instruction was begun to renew all Red Cross First Aid Cards for experience personnel and to qualify newer personnel for accredited cards.

Tank truck was dispatched on January 16, to assist Kennewick Fire Department combat the Kennewick Social Club fire.

Fire Marshal's Activities

A total of 133 Richland and 114 North Richland buildings were inspected, resulting in 36 hazard reports being submitted. A total of 620 fire extinguishers were inspected and tested; 16 were installed; 15 recharged; 1 weighed; 5 winterized, and 13 removed. Also, 319 fire hose standpipes were inspected and serviced.

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Fire Marshal's Activities - continued

Richland Fire Department was a participant in the 1954 National Fire Protection Association Fire Prevention contest and was awarded 1st Place in U.S.A., for cities between 20,000 and 50,000 population; 1st Place in State of Washington, and 7th Place in the International Sweepstakes competition out of 1668 entries. This is the highest rating we have attained in seven year's of competition - the best previous record being 17th in Sweepstakes competition. However, this is the third time we have been awarded 1st Place in U.S.A., and the sixth consecutive year as best in State of Washington.

Investigated a fire in local sporting goods store where hazardous operations caused a serious gas and vapor condition that were in violation of fire and building codes. A letter recommending discontinuing the hazardous work and correction of code violations was submitted.

Assisted Commercial Real Estate Unit with formulation of a letter requesting all merchants comply with fire inspection recommendations.

Conferred with Owner of fire damaged drug store and explained advantages and economics of a fire sprinkler system for his re-modeled building. Following our encouragement, he agreed to consider installing a complete system and will consult the Washington Surveying and Rating Bureau regarding insurance premium savings.

Advised Tenant Relations of Code violating electrical wiring installed by a Prefab tenant to energize electrical appliances in an adjacent shack erected at rear of house.

Investigated fire in Dormitory W-8 caused by smoking in bed.

Investigated fire alarm from the new Bio-Assay Laboratory caused by excessive heat actuating a water sprinkler head.

Assisted AEC Engineering and School officials in conducting a test for recording water pressure surges in Jason Lee School sprinkler system in an effort to determine correct setting for retarder unit above peak pressures as a means of eliminating unnecessary fire alarms.

Transferred usable fire extinguishing equipment from our temporary warehouse in North Richland and turned the building back to AEC.

Reviewed available records of home inspections and compiled statistics and a pamphlet on "Home Fire Causes" in preparation for a future home inspection program.

Arranged with City Engineers to assist with inspection of fire damaged drug store prior to it being opened to the public during a fire sale. Owner was requested to make certain changes to improve fire safety and

Fire Marshal's Activities - continued

provide additional safety to the public.

Reviewed plans for proposed fire alarm and sprinkler systems for Columbia High School at request of AEC Engineering. Made tour of building with AEC officials and offered recommendations for the type of systems and necessary coverage.

Attended conference with school officials and surveyed Columbia High School boy's gymnasium for proposed changes in seating arrangement to gain larger capacity. Approval could not be granted due to proposal being in violation of the Building Exit Code.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
JANUARY 1955

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	<u>5</u>	<u>15</u>
New Hire	<u> </u>	<u>1</u>
Transfers Out	<u> </u>	<u> </u>
Terminations	<u> </u>	<u> </u>
Total End of Month	<u>5</u>	<u>16</u>

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set and transferred	<u>4</u>	
Anchors set and guys installed	<u>3</u>	
Street lights repaired and steel mast arms installed	<u>2</u>	
Street lights relamped - mercury vapor	<u>7</u>	
Street lights relamped - 6000L and 4000L, 1100 Area	<u>202</u>	
Street lights relamped - 6000L and 4000L, 700 Area	<u>4</u>	
Flood lights relamped, 1100 Area	<u>0</u>	
Flood lights relamped, 700 Area	<u>0</u>	
Stack lights relamped, 700 Area	<u>4</u>	
Primary line footage added	<u>0</u>	
Primary line footage removed	<u>200'</u>	- Excess Yard
Transformer KVA added	<u>125</u>	
Transformer KVA removed	<u>142.5</u>	
Net transformer KVA installed	<u>-17.5</u>	
New services installed - residential	<u>3</u>	
New services installed - commercial	<u>8</u>	
Temporary services installed and removed	<u>19</u>	
Scheduled outages - primary	<u>2</u>	
Scheduled outages - secondary	<u>3</u>	
Unscheduled outages - primary	<u>3</u>	
Unscheduled outages - secondary	<u>0</u>	
Standby and escort	<u>2</u>	
High voltage tree trimming	<u>81</u>	
Low voltage tree trimming	<u>3</u>	

TRAFFIC SIGNALS

Relamping	<u>0</u>
Operational failures	<u>0</u>
Installations	<u>0</u>
Removals	<u>0</u>

RICHLAND ELECTRICAL UNIT

Routine maintenance checks	<u>34</u>
Routine check R. R. signal at Van Giesen	<u>4</u>
Total signals in operation - automatic	<u>19</u>
Total signals in operation - manual	<u>3</u>
Total signals in operation - flasher	<u>3</u>

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	<u>0</u>
Electrical motors checked and serviced - water	<u>96</u>
Electrical motors checked and serviced - sewage	<u>102</u>

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	<u>8</u>
Outside circuit checks	<u>6</u>
Inside faults repaired	<u>3</u>
Outside faults repaired	<u>4</u>
New circuits placed in operation	<u>0</u>
New boxes placed in operation	<u>0</u>

SUBSTATIONS

Main feeder checks - BBLS1	<u>4</u>
Main feeder checks - BBLS2	<u>4</u>
Secondary and pad located substations - checked jumpers, cutouts, grounds and general condition	<u>26</u>

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	<u>16</u>
Meters tested - customer's requests	<u>4</u>
New meters shop tested	<u>13</u>
Faulty meters replaced	<u>0</u>
Damaged meters and covers	<u>3</u>
Residential read-ins	<u>134</u>
Residential read-outs	<u>179</u>
Residential disconnects	<u>6</u>
Residential reconnects	<u>6</u>
Meters resealed	<u>1</u>
Radio interference checks	<u>2</u>
Overloaded meters changed out	<u>16</u>
Routine meter tests	<u>26</u>

Consumption and Revenue:

	<u>No. of Customers</u>	<u>KWH</u>	<u>Revenue</u>
Residential - Schedule 1	6,984	8,699,962	\$82,527.50
Commercial - Schedule 2	<u>399</u>	<u>3,507,014</u>	<u>28,487.86</u>
Total	7,383	12,206,976	\$111,015.36

RICHLAND ELECTRICAL UNIT

COMMENTS

TRAFFIC SIGNAL SYSTEM:

Arrangement and Maintenance - Railroad crossing signal at Van Giesen and Bypass has been free of operational difficulties since the installation of current limiting track coils.

The usual monthly routing circuit and controller checks and lamp maintenance was performed.

Unusual repairs were made to signal at Stevens and Williams due to auto accident.

Signal at Riding Academy turned off for the winter.

FIRE PROTECTION SYSTEM:

Arrangement and Maintenance - Changed out defective Box #811.

Routine circuit checks at central fire station indicated ground fault on #6 circuit, which required holdover for two men to run down and repair trouble, traced to grounded relay.

Repaired defective condition found on repeater relay in unit #5 also.

SEWAGE TREATMENT AND DISPOSAL PLANT:

Electrical Maintenance - Reconnected circulating pump motor.

Repaired motor to sump pump at McMurray Road sewage lift station.

Repaired defective controller and circuit to 7.5 Kva main sewage pump motor.

WATER SYSTEM:

Electrical Maintenance - Installed new thrust bearing to water pump motor to #12 domestic water well.

Inspected and overhauled switches in Columbia Field chlorination building, which were fouled up due to corrosion.

Re-energized domestic water wells No's. 4, 5, and 14 which had been disconnected for construction clearances.

STREET LIGHTING:

Replaced mercury vapor light at Stevens and Jadwin because of auto accident. Routine lamp maintenance was continued.

Replaced 6000L light at Cullum and Gillespie with mercury vapor light because of increase in traffic due to shopping activity in area.

OUTSIDE LINES AND STATIONS:

Secondary services - Installed permanent service and meter at Central United Protestant Church addition on Stevens Drive, and removed temporary service, meter, and 5 Kva transformer.

Installed temporary service and meter to site of Thrifty Drug fire for Elvrum Construction Company - later removed it and reinstalled permanent service following repairs to panel in building.

RICHLAND ELECTRICAL UNIT

Disconnected service to three paint busses for removal and subsequent reconnection.

Installed permanent service to Thorsness Service Station location at Goethals and Williams.

Disconnected services to three hutments in 1131 Area at request of Mr. Pedersen.

Made four disconnects for delinquent billing.

Disconnected temporary service to Malarkey-Moore shack at Christ the King convent building.

Connected service to Radiation Monitoring building in Central Transportation Yard.

Connected service to hutment at A. E. C. Airport.



RICHLAND ELECTRICAL UNIT

Blown transformer fuse on 1100 block on Elm - 2 men called out.
Broken signal at Stevens and Williams - 2 men.

Residents reported two line disturbances: 411 Roberdeau and 1429 Riche Court.
Traced to 115 kv corona arcing due to fog. Foreman only - 2 hours.

Total callout hours - 14.

VANDALISM:

BB gun damage to meter at Bomber Bowl.

Rock damage to two street lights. Repair costs were backcharged to two
Richland families.

COMMUNITY OPERATIONS SUB-SECTION
ENGINEERING UNIT
MONTHLY REPORT
JANUARY 1955

<u>PERSONNEL:</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Employees Beginning of Month	7	4	11
Transfers In	0	0	0
Transfers Out	0	0	0
Terminations	0	0	0
Total End of Month	7	4	11

BUILDING PERMITS ISSUED IN JANUARY:

1. Wilhite & Duncan - Alteration - 94 Lee Boulevard
2. Richland Tire Exchange - Alteration - 837 Stevens Drive
4 sign permits

NEW MUNICIPAL CONSTRUCTION STARTED IN JANUARY:

1. Sewer Extension to Commercial Site - Wright & Van Giesen
2. Utility Extension to Knight & Stevens
3. 6" Water Line on Williams near Goethals

NEW PRIVATE CONSTRUCTION STARTED IN JANUARY:

1. Rehabilitation of Uptown Thrifty Drug Store

PRIVATE CONSTRUCTION COMPLETED OR ON WHICH FINAL INSPECTION MADE
IN JANUARY:

Grace Bacon Roller Rink
Bus Depot Service Station
Carnation Company (Loading Dock)
Central U. P. Church Educational Unit
Johnny Gerdes Service Station (Richland Laundry Station)
Parcell Service Station (Duane & Lee Blvd.)
Richland Heights Baptist Church
Richland Baptist Church
Skip's Drive In (O. W. Couden)
Walsh Tire Shop (Remodeling of building)
Well's Radio & T. V. (Metal Storage Building)
Wilhite & Duncan

ENGINEERING JOBS COMPLETED IN JANUARY:

- C-11439 - Catholic Church Sewer Easement (Legal Description).
- C-11452 - Land between Carmichael Jr. High & Redeemer Lutheran Church.
(Legal Description)
- C-89548 - Seattle-First National Bank (As Built Plans).
- C-70589 - Legal Description Plot of Land on Southeast Corner Goethals & Williams
- C-70608 - Study & Sketch for Utility Lines for "Rose Garden"
- C-70682 - Heavy Industrial Area. (Map Revisions).
- C-70684 - Approval "As Built" Plans - Parcell's Service Station, Duportail
and Hartford.
- C-70588 - Legal Description at SE Corner Goethals & Williams.
- G-01004 - Installation of Fire Insulated Fire Alarm Wire.
- G-02182 - 6" Water Main, Stevens Drive, Kadlec Hospital to Central U. P.
Church.
- ESR I-90594 - "As Builts" - General - Part II.
- ESR I-90604 - 24" Sanitary Sewer, Swift Boulevard - Title III Services.
- ESR I-90624 - Title III Services, Storm Drain - Geo. Washington Way.
- ESR I-90634 - Kadlec Hospital Grounds Improvements.

STATUS OF ENGINEERING UNIT PROJECTS:

- G-01005 - Sewer and Water Lines to Richland Heights Baptist Church - 90%
complete. Concrete lining of irrigation ditch to be completed.
- G-01008 - 6" Water Line Williams & Goethals - 90% complete. Backfilling
operations to be completed.
- G-01013 - Sewer Extension to Commercial Site - Wright and Van Giesen -
Construction 90% complete.
- G-01014 - Utility Extension to Knight & Stevens - Construction 95% complete.
Backfill to be completed.
- G-02171 - Automatic Bar Screens Sewage Lift Station - To be readvertised in
April 1955. No bids received at first advertising.
- G-02176 - Comfort Station, Sewage Lift Station - Chlorination Station,
Riverside Park - Original design being altered to meet new scoping.
- G-03570 - Replace Raw Water Line #5 Well to Lee Boulevard - Construction 88%
complete. Backfilling and pavement replacement operations to be
completed.

STATUS OF ACTIVE ENGINEERING SERVICE REQUESTS:

- I 90234 - Inspection, Bauer-Day Housing - Materially complete. Question remains on final surveying and monumenting of intersections.
- I 90914 - Utility Lines, Legal Descriptions and Diagrams for Churches - 95% complete.
- I 91014 - Retirement of Separate Irrigation System - Design approximately 45% complete.
- I 91024 - Retirement of Irrigation Canal - Design delayed temporarily.

STATUS OF WORK ORDERS:

- C-0554 - Expansion of Riverside Park North of Lee Blvd. - Preliminary field work complete.
- C-11443 - Plat & Legal Description on Church of Jesus Christ of Latter Day Saints - 95% complete.
- C-11448 - Northwest corner Lee Boulevard and Goethals Drive (Tide Water Associated Oil) - Legal Description - 90% complete.
- C-70524 - Pauls, Inc. (Legal Description) - 95% complete.
- C-70590 - Legal Description of Plot at Southeast Corner Knight & Stevens - (Continental Oil Co.) - 90% complete.
- C-70591 - Legal Description Plot West of By's Burgers - 95% complete.
- C-70592 - Legal Description Plot Southeast Corner Knight & Stevens (Frances S. Taylor) - 95% complete.
- C-70667 - Murphy Motors, Inc. (Legal Description) - 95% complete.
- C-70698 - Legal Description of Plot of Land on Lee Boulevard (Chas. D. McGuinness) - 90% complete.
- C-70699 - Southeast Intersection of Lee & Wellsian Way (Colin Bleiler) - 90% complete.
- C-81020 - "As Built" - Phase III - Field work progressing.
- C-89516 - Legal Description on Newton & G. W. Way (Tide Water Associated Oil) 90% complete.

BUILDINGS UNDER CONSTRUCTION:

- First Baptist Church (Richmond and Raleigh Streets) - 92% complete. No pro- this month.
- Assembly of God Church - 98% complete. Work progressing very slowly.

Alteration Permits - an open active file.

Television Antennae - an open active file - no permits being issued.

Plans, Specs., Inspections, Church of Nazarene Addition - 86% complete. Progressing slowly.

Plans, Specs., Inspections, Christ of King Parish (Catholic) - 83% complete. Work progressing slowly. Portion of school occupied.

Plans, Specs., Inspections, Thorsness Drive In - SE Corner of Goethals & Williams - 85% complete. Work progressing according to schedule.

COMMUNITY OPERATIONS SUB-SECTION
PUBLIC WORKS & RECREATION UNIT
MONTHLY REPORT
JANUARY 1955

<u>ORGANIZATION AND PERSONNEL</u>	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	7	38
Transfers Out	0	1
Transfers In	0	0
New Employees	0	1
Terminations	0	1
Total End of Month	7	37

ROADS AND STREETS

Approximately 400 Cu. Yds. of sand were spread on icy street intersections during the month. This work required, in addition to those hours worked during the regular day shift, a total of 128 man hours of overtime. About 700 Cu. Yds. of sand were hauled in from Horn Rapids Road to replenish the stock-pile.

A large weir box on the north side of McMurray, opposite the dead-end of Thayer Dr. which has been a potential hazard to north-bound traffic on Thayer Dr. that for any reason might not make the turn into McMurray, was demolished and removed.

The shoulders of Stevens Dr. from the 1131 area to a point near the intersection of Jadwin, which were so narrow that the pavement edge was breaking away have been widened to provide an 8' clearance off the pavement and thus allow safe parking for vehicles that must stop for repair, and also to protect the pavement edge.

The road to the sanitary fill disposal area was extended to reach the constantly moving dumping area, through the laying of 82 loads of base material. The entire road was bladed and re-shaped.

Six new street sign installations were made and 12 "Stop" signs were raised to provide a standard clearance. In all of these installations the recently approved practise of mounting a Stop sign and street sign on the same upright was incorporated. Routine seasonal maintenance of all facilities was continued.

PARKS AND PUBLIC GROUNDS

Signs have been installed restricting the tying up of docks beyond certain points in the vicinity of the boat launch ramps in an attempt to eliminate the blocking of these launching facilities by dock structures.

Pruning and clean-up of shrub beds at Kadlec Hospital was completed.

The following report on results of pollen control weed spraying done early in 1954 was received from the laboratory (through Public Health). Although statistics are not available for 1953; the comparison of count in 1952 and 1954 is significant, and the spray program will be continued in the early spring of 1955.

PUBLIC WORKS AND RECREATION UNIT

Parks and Public Grounds Continued

<u>1.87 square centimeter counted</u>	<u>1952</u>	<u>1954</u>
Pollen Season	6/11 - 9/21	6/10 - 9/21
Number of Pollen Days	56	65
Total Number of Pollens Counted	294	213
Average Pollen per day	5.25	3.28

General clean-up of open areas in the community, and maintenance of all facilities were continued.

RECREATION

General

The Hanford Guards Union sponsored a dance for the March of Dimes at the Community House on 1-29-55. The entire profit of \$2,700 was turned over to the March of Dimes.

The Rec-A-Teers, a social organization of young adults, held a successful semi-formal dance at the Community House on 1-20-55.

The Boys of Woodcraft Sportsman Club, a youth group dedicated to the advancement of safety in hunting outdoor life, held its first organizational meeting at Community House on 1-24-55.

Attendance Statistics - January 1955

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub-Total</u>
A. <u>Community House</u>				
Adult Table Tennis League	4		63	63
Arts & Crafts Class	8	146	12	158
Ballroom Dancing	3	148	19	167
Elementary Movies	4	569	39	608
Elementary Square Dancing	4	662	57	719
Fencing	5		25	25
Games Room (Open Play)	21	1 128	175	1 303
Junior Square Dancing	4	226	33	259
Minnesingers	4	286	9	295
Photography Class	1	3	1	4
Tumbling	5	61	18	79
Gentrics	1		32	32
GE Public Relations	2		14	14

PUBLIC WORKS & RECREATION UNIT

Attendance Statistics Community House Continued

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub-Total</u>
Rec-A-Teers	3		305	305
H1 Spot	8	2 923	40	2 963
Int. Folk Dancers	4	19	45	64
Junior Sportsmen Club	1	19	2	21
Junior Stamp Club	2	10	3	13
Richland Rod & Gun Club	1		150	150
Y-Supper Club	3		95	95
Youth Council	2		16	16
March of Dimes	3		650	650
Miscellaneous Bookings	<u>38</u>	<u>31</u>	<u>796</u>	<u>827</u>
Total Community House	131	6 231	2 599	8 830
 B. <u>Parks & Playgrounds</u>				
School Activities - Columbia	<u>15</u>	<u>3 390</u>	<u>206</u>	<u>3 596</u>
Total Parks & Playgrounds	15	3 390	206	3 596
 C. <u>Summary</u>				
Community House and Parks and Playgrounds total for January 1955.	<u>146</u>	<u>9 621</u>	<u>2 805</u>	<u>12 426</u>
Calendar Year To Date				<u>12 426</u>

SANITATION

All collections were continued according to schedule. Total weight of waste material collected and disposed of during the month was 1151 tons.

COMMUNITY OPERATIONS SUB-SECTION
WATER AND SEWERAGE UTILITIES UNIT
MONTHLY REPORT
JANUARY 1955

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	5	18
Transfers Out	0	0
Transfers In	0	0
New Employees	0	0
Terminations	0	0
Total End of Month	5	18

DOMESTIC WATER

Normal operations were continued throughout the month with the Richland well field out of service for construction of the new raw water collection main. Richland wells No. 2 and No. 13 were used for short periods to assist the contractor in filling and testing the new raw water main.

Water meters were installed during the month on water service lines to the following facilities:

Carnation Company, Columbia Service Co, Depot Cafe;
W. D. Gray Building, Western Union Telegraph Company,
L. G. Cook Building, Tastee Freeze, Skipp's Drive in,
Medical-Dental Properties, Inc., New City Cleaners,
Rice's Rug Service, Safeway Stores, Inc., and
Conoco Service Station at Stevens & Knight Streets.

These facilities will be added to our list of facilities presently being billed direct for water on a metered basis.

The blow-off valves on sand traps at 3000-F well and at 3000 Area Pump Station were raised from bottom of sand trap to frost-line level. This was done to correct some difficulty encountered in operating these valves to remove sand from traps.

Richland No. 12 well pump was pulled and is being overhauled.

Community Operations
Water and Sewerage Utilities Unit

DOMESTIC WATER

	<u>Well Production</u>	<u>Av. Da. Prod.</u>	<u>Total Consumpt.</u>	<u>Av. Da. Consumpt.</u>
Richland	0	0	88,195,700	2,845,000
North Richland	125,845,000	4,059,500	41,721,000	1,345,800
Columbia Field	58,558,200	1,888,900		
300 Area			54,879,000	1,770,200
<u>TOTAL</u>	<u>184,403,200</u>	<u>5,948,400</u>	<u>184,795,700</u>	<u>5,961,000</u>

Maximum daily production was 7,153,600 gallons on January 2, 1955.

Maximum daily consumption was 7,153,600 gallons on January 2, 1955.

SEWERAGE SYSTEM

Normal operations were continued throughout the month.

Routine maintenance of treatment plant equipment was continued. The No. 3 pump at Swift Blvd. Sewage Lift Station was put on a standby status pending delivery and replacement of a leaking oil seal in pump drive unit.

Three sewer collection main stoppages were cleared during the month. The routine sewage collection system flushing program is progressing well and is about 70% complete.

SEWAGE

Plant No. 1	Total Flow	33,080,000	Av. Daily Flow	1,067,000
Plant No. 2		62,428,000		2,013,000
<u>Total</u>		<u>95,508,000</u>		<u>3,080,000</u>

IRRIGATION SYSTEM

Irrigation canal was put back in service on January 5 supplying water to the 3000 Area percolation basin. Cleaning and weed burning is progressing on the portion of canal that is not in service.

COMMUNITY OPERATIONS SUB-SECTION
 RICHLAND PUBLIC LIBRARY
 MONTHLY REPORT
 JANUARY 1955

<u>ORGANIZATION AND PERSONNEL</u>	<u>EXEMPT</u>	<u>NON-EXEMPT</u>
Employees - Beginning of Month	4	7½
Transfers In	0	0
Transfers Out	0	0
New Hires	0	1
Terminations	0	½
End of Month	4	8

GENERAL

Circulation

Books	20,070
Magazines	661
Pamphlets	125
Records	1,188
Inter-Library Loans	36
Grand Total	22,080

Current Book Stock

Books added this month	554
Books withdrawn this month	65
Grand Total	33,707* (Corrected figure)

Registration

Adult	203
Juvenile	51
Grand Total	254
Total Registered Borrowers	18,624
Children's Story Hour Attendance	397
Meetings in North Hall	15

Community Operations
Library Unit

Mrs. Edna Caudill joined the Richland Public Library staff this month as Secretary.

An exhibit of paintings done by students in foreign countries and foreign exchange students in the United States has been on display in North Hall this month. This display was sponsored by the Junior American Red Cross.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT - JANUARY 1955

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Increase</u>	<u>Decrease</u>
Staff	2	2		
Administration Area Maintenance	103	104	1 (a)	
Security and Patrol	496	490		6 (b)
Fire Protection	135	135		
Office	118	113		5 (c)
Telephone	78	79	1 (d)	
	<hr/>	<hr/>	<hr/>	<hr/>
TOTALS	932	923	2	11

NET DECREASE: 9

(a) - Administration Area Maintenance

1 - New Hire

(b) - Security and Patrol

5 - Transferred out
1 - Termination

(c) - Office

5 - New Hires
5 - Transferred out
2 - Deactivated
3 - Terminations

(d) - Telephone

1 - New Hire

Gh-1

1210347

FIRE PROTECTION UNIT

Fire Responses

Construction	3
HAPC	3

TOTAL	6	NO LOSS
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Safety and Security Meetings

Number of Security meetings	12
Number attending meetings	86
Number of Safety meetings	24
Number attending meetings	170

Drills Held during January

Outside drills held	45
Inside drills held	185

6,150 feet of fire hose was used for drill purposes during January.

One information meeting was held with 22 Fire Protection officers attending. Five information meetings were held with eight members attending each meeting, exempt and non-exempt.

Twelve Round Table meetings were held with six members attending each meeting, non-exempt.

Fire Protection officers held three classes on Chemox masks which were attended by 34 people of various departments; also, twelve classes on fire extinguishers were held which were attended by 121 people of various departments.

Fire Extinguishers

Inspected	1,776
Installed or relocated	10
Tested	383
Delivered to new locations	10
Seals broken	27
Serviced	413
Weighed	851

Gas Masks

Inspected	94
Serviced	10

OFFICE AUXILIARIES SUB-SECTION

Plant Mail Unit

Inter-office mail decreased slightly during the past period. Out going postal mail increased and incoming postal mail remained normal. Teletype activity increased and special assignments decreased slightly. A more marked drop was noted one year ago following the heavy Christmas season.

Special assignments included preparation of a sample form of "Authorization for Change of Employee Payroll Status", and a preparation for mailing for Payroll to all employees entitled "Instruction Pamphlets for 1954 Income Tax Returns."

One new addressograph file was added for Security for information to an exclusive list and another file for Plant Library was increased by approximately 1,000 plates.

<u>Types and Pieces of Mail Handled</u>	<u>December</u>	<u>January</u>
Internal	4,519,930	4,321,107
Postal	87,401	86,993
Special	2,079	1,781
Registered	10,611	10,287
	<hr/>	<hr/>
	4,620,021	4,420,168
Total postage used	\$3,000.23	\$2,794.39
Total teletypes handled	2,446	2,545
Total store orders handled	742	816

<u>Addressograph Type of List</u>	<u>December</u>		<u>January</u>	
	<u>Number of runs</u>	<u>Total Copies</u>	<u>Number of runs</u>	<u>Total Copies</u>
Plate name list	112	153,352	114	164,385
Housing list	14	42,130	15	44,360
Payroll list	10	31,494	10	35,602
Total new plates	3,280		3,659	
Total corrected plates	1,362		2,952	
	<hr/>		<hr/>	
	4,642		6,611	

Printing Unit

The Semi-Annual Class "B" Printing Plant Report for the period July 1 through December 31, 1954, was completed and forwarded to AEC on January 13. The report covered the operation of Blueprint and Duplicating Units more comprehensively than in prior years.

Representatives of the Thatcher Litho Equipment Company of Seattle spent two days adjusting, checking and repairing the dark room type process camera in our Printing Plant.

Printing Unit (Contin)

<u>Work Completed</u>	<u>December</u>	<u>January</u>
Orders received	319	411
Orders completed	333	372
Average orders on hand	71.4	74.1
Copies printed	1,865,499	1,133,223
Negatives masked	508	664
Negatives processed	600	701
Photo copy prepared	292	421
Litho plates processed	568	752

Stenographic Unit

The heavy load handled in the Stenographic Unit in January together with reduced number of personnel made it necessary to refuse a large number of loan requests throughout the month. Also, due to lack of replacements, only one transfer was effected. A total of two new employees were assigned to the Unit, one of whom terminated in two days to accompany her husband who was unexpectedly transferred out of town.

Arrangements were made to have a small office in the Stenographic Unit set up in such a manner that transcriptions of classified tape recordings can be handled in the Unit when this service is requested.

The larger assignments handled during the month included a draft of an AEC Accounting Manual requiring 84 hours of typing time; setting up indexed sheets for Salary Administration Organization Charts; 64 hours miscellaneous work for Reactor-Process; monthly reports for Manufacturing Cost; 74 hours typing duplimat and xerographic masters; typing duplimat masters for Radiation Protection Standards and other miscellaneous work for Radiological Standards Unit, 80 hours. Sixty-four hours were required for typing, collating and binding an SF Accountability Manual.

<u>Breakdown of Hours</u>	<u>December</u>	<u>January</u>
Holiday and vacation time	64	112
Meeting time	8.5	4
Absentee time	24	
Machine Transcription	25.5	17.5
Letters	4.5	7.5
Rough Drafts	41	77.5
Dittos, duplimats and xerography	347.5	330
Miscellaneous	306.5	365
Training	270.5	242
Unassigned time	36	23.5
Total	1,128	1,179
Employees on loan to other units	1,184	965
Grand Total	2,312	2,144

Duplicating Unit

A new and improved Eastman Kodak Verifax printer was installed in Central Duplicating, 703 Building, this month. The new unit makes it possible to quickly and economically reproduce from legal size copy, and from thick magazines or booklets. Such materials formerly had to be photostated - a slower, more expensive process involving negative making. The unit also has improvement features which permit greater ease of cleaning and maintenance.

On January 17, 1955, the duplicating office located in 1704-H Building, 100-H Area, was moved to 1709-H building. The new location provides additional work and storage space and will make possible an expansion in service on orders requiring collating. The location is also more accessible to personnel in 100-D and 100-F areas. One urgently needed office in 1704-H Building was released to the 100-D areas landlord and all costs of the move were absorbed by Reactor Section.

	<u>December</u>	<u>January</u>
Orders received	3,390	3,295
Orders completed	3,378	3,251
Orders on hand	134	189
Offset plates	14,146	14,882
Offset copies	883,780	857,110
Verifax masters	2,924	2,192
Verifax copies	9,282	7,302
Ditto Masters	281	261
Ditto copies	4,730	3,513
Xerox plates	1,647	1,480
Ozalid masters		9
Ozalid copies		32

Office Equipment Unit

Delivery of furniture for 100-K Area facilities has been completed with exception of two special type file cabinets. These facilities were furnished with office furniture and machines on schedule as outlined by the Engineering group.

Section Managers were requested to submit their office furniture and machine forecasts for FY-57 and a review of FY-56. These requirements will be used as a basis for additional office equipment requirements during FY-57 and FY-56.

Contractor rehabilitating office furniture has been requested to replace worn desk and table tops with linoleum instead of plywood veneer. This will result in a savings of approximately \$4.50 per unit and increase the life of working surface of desks or table. Top replacements have averaged approximately one out of every eight pieces rehabilitated.

Office Equipment Unit (Contin)

The following is a detail of number of pieces of furniture handled during the month:

<u>Item</u>	<u>Issued</u>	<u>Received</u>	<u>Salvaged</u>
Blackboard	5	0	0
Chairs	255	66	188
Costumers	24	1	4
Card File	0	4	6
Cabinet	82	50	19
Desk	80	44	12
Tables	93	18	7
Daveno	1	0	1
Miscellaneous	197	150	11
	—	—	—
	737	333	248

Office Machines

Total machines on hand on the 20th of January 1955 was 4,914 or a net reduction of 19. No machines were excessed by the contractors during the month. It is anticipated that approximately 300 machines will be removed from service and excessed by construction contractors during the month of February.

A total of 595 cost code changes were made during the month. These excessive cost code corrections were caused by new cost code assignments and organization changes made in the Engineering Department.

Some difficulty has been encountered in reconciling office machine inventories with Plant Accounts General Ledger records. Approximately 200 machines appear on our inventories that are not listed in Plant Accountability. Some machines are appearing on Plant Accounts' records which are not carried on physical inventories. These discrepancies are being reconciled and records will be adjusted to conform with physical inventory as reconciliations are completed.

Office Machine Repair Unit

The 100-K Area repair shop expanded its service to all 100 Areas during the past month. The new procedure has proven very satisfactory and at the end of January the Office Machine Repair Shop formerly located in the 100-K Area was moved to the 100-H Area, 1709 Building. The space formerly occupied in 100-K Area was in a temporary construction building.

An Autotypist and a Perforator were transferred from the W-10 Building to the 705 Building. Each machine was checked for satisfactory operation in this new location.

The Instrument Maintenance men completed the installation of the Friez Aerovane Transmitter at Well House #15. This work was performed for the Meteorology Unit. A routine maintenance schedule has been set up for this equipment.

Office Machine Repair Unit (Contin)

HW numbers have been placed on all attendance time recorders. This was accomplished so that each clock can be recorded on the office machine IBM listing.

Repair tickets were processed as follows:	<u>December</u>	<u>January</u>
	600	570

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

AEC-1114 New Transportation Facilities: Contact engineering services closed out.

CA-606 Additional Office Space - Central Stores Warehouse: Letter from AEC dated January 18, 1955, requests preliminary study of overall space requirements before action is taken on this proposal. Study is now under way.

Project Proposal for improvement to roads, walks and storm sewers in east end of 700 Area is planned for submission in February.

Four Hauserman partition installations were made in the 700 Area, and partitions were provided for one office enclosure in the 300 Area.

Manufacturing Cost Unit was moved from 717-A to 722-A Building.

Revision of a portion of 717-A Building is under way, and it is planned to move the Photography Unit from Building 69-X to this area on February 12.

Hauserman partition enclosures are being installed in 770-A Building to house Employee Communications and Public Relations Section.

Planning for minor revisions in 705 Building for Personnel Practices Section is complete.

Property disposal reports were completed in anticipation of sale and removal of 1131 and 729-A Area buildings and facilities.

General Maintenance

Restroom revisions in 713-A Building were completed. Repairs were made to 722-A Building, including replacement of damaged floor tile and acoustical wall tile. Power wiring was removed. Building was cleaned and repainted and venetian blinds and light fixtures were cleaned.

Temporary enclosure was provided in one corner of 723 Laundry building to accommodate Graphics Unit model room. A small section of office wall was removed in the office area of this building to provide temporary space for design engineers who are to be brought in from the outer areas.

Interior cycle repainting of 717-A Building is approximately 25% complete.

Platforms were extended in 703 Building attic to accommodate Farr-Air additions to desert coolers which will be installed prior to the cooling season.

General Maintenance (Contin.)

Approximately 20 feet of Hauserman partition was installed in 702 Building to revise office space.

A number of miscellaneous items, including bookcases, bulletin boards, suggestion boxes, etc., were fabricated and painted.

Carpentry work in connection with stores excess program required twenty-six manhours in January.

Two 614 Radiological Sciences monitoring buildings were moved from 3000 Area to new foundations which had previously been provided in the Transportation Area and at the Richland Barricade.

Acoustical tile was installed on one wall of the train dispatchers' office of 1170 Building, and miscellaneous small carpentry jobs were completed in Building 1171.

Two windows were relocated in building at Richland Barricade to provide better vision for Patrolmen.

Pistol range target boards were repainted and miscellaneous repairs were made to several 600 Area buildings.

Cycle painting program included repainting of eight offices and a portion of 703 Building fourth wing stairwells.

Sign painter refaced 60 stop signs for Community; silk-screened 175 radiation signs; lettered 10 suggestion boxes; relettered large safety board in front of 703 Building, six large barricade security signs; and painted miscellaneous small signs.

Three radiators were installed in 761 Building; radiator push nipples were replaced in four radiators at the hospital, and eight in 705 Building. Radiator valves and traps were repaired in 722-C Building.

Leak in underground "Ric-wil" steam line leading to Desert Inn was repaired.

Six pilot valves and three "E" valves were bench tested and repaired.

Dynometer piping was revised, and motor room equipment was leveled and anchored in Building 1171.

Other work for Transportation Area included: installation of metal ladder to provide access to overhead crane in Rail and Heavy Equipment Shop; relocation of fire door between office and shop sections, fabrication of 20 aluminum cans for bus lane trash pits; installation of individual control circuits on hot air heating furnaces (based on factory recommendation) - 50% complete; installation of Klaxon horn and circuit in 1171 Building stores parts room; fabrication of 27 ceiling electrical drops; and fabrication and installation of 12 Kimstart cables.

Ten Farr-Air cooling attachments were moved to 703 Building attic, for later installation over second wing.

General Maintenance (Contin.)

Hoist trolley in 729-A Building was dismantled for later use in lifting of electric trucks and batteries at Central Stores Warehouse.

Motor generator at Telephone Building was repaired, and bell "ringers" were rebuilt.

Centrifuge was rebuilt and two new hot plates were installed for Bio-Assay Laboratory.

Electrical circuits were rewired and repaired at Richland Barricade, 760 Building dark room, 717-A and 722 Buildings.

A number of buzzer systems were installed.

Twelve desk lamps were repaired.

Locksmith work included repair to door locks in 100-KW and 100-KE, and lock on 105 Building deep freeze unit; reworking of 70 Schlage locks for Real Estate Maintenance; and installation of combination locks on three doors at 234-5 Building.

Building Services

Janitorial service for Central Stores and Transportation Areas is being continued at the request of building occupants. Schedules have been revised to some extent.

In cooperation with Safety, experimental tests were made on non-slip floor dressing in 760 Building hallways, 722-A and Central Stores Warehouse.

Supply room in 770 Building was sprayed to control silver fish.

Steam Operation

Nos. 1, 2 and 4 boilers were in service at the beginning of the month, with No. 2 in reserve.

On January 24, No. 2 boiler was placed in service to permit No. 4 unit to be removed from the line to repair a leaking tube.

At the close of the month, No. 1, 2 and 3 boilers were in service, with No. 2 being repaired.

The quantity of steam generated at the 784 plant was 0.8% less than for the same period of the previous year.

With the boiler overhaul program completed, numerous small repairs were performed on various kinds of equipment; also several jobs were performed which will increase operating and maintenance convenience and reliability.

Community Electrical Unit repaired sockets and cleaned reflectors of chimney floodlights, thereby considerably increasing light output.

Steam Operations (Contin.)

Operation of Central Stores Heating Plant was normal throughout the month. Suction lines next to the fuel oil pumps were cleaned.

Coal consumed: 2,088.50 net tons.

Steam generated:	29,740.2 M. Lbs.
Steam leaving plant:	25,832.0 M. Lbs.
Steam delivered:	23,451.2 M. Lbs.
Total water softened:	4,198,900 gallons
Total soft water sent to Kadlec Hospital:	81,550 gallons
Total soft water sent to 784 Heating Plant:	3,614,080 gallons

TELEPHONE SUB-SECTION

An agreement with the General Telephone Directory Company to print three editions of the Hanford Works telephone directory was made during the month. Information required by the printer was air mailed to him on January 25th. Receipt and distribution of the first edition is tentatively scheduled for March 1st.

The greater part of the switching equipment for the 100-K Area dial telephone exchange was received on January 20th. The equipment is to be installed by the vendor (Automatic Electric Company). Installation work has not yet been started but completion of equipment installation is scheduled for April 4, 1955 and the exchange is scheduled to be placed in service April 16, 1955.

Construction of the new 700 Area official exchange building is reported by General Electric Engineering Department to be 99% complete. Installation of equipment in the exchange by the Stromberg-Carlson Company is progressing at a satisfactory rate, but the installation job is approximately six weeks behind schedule. In view of this delay, it is now estimated that the exchange will not be ready to be placed in service until about June 3, 1955. The originally planned date was April 29th.

Assignment of new exchange telephone numbers to official telephones presently served from the Richland exchange was commenced during the month.

A new edition of the Richland telephone directory was distributed to subscribers.

Plant Telephone Operations

Cable installation work being done by Lewis Hopkins Company on Official Exchange Project CA-533 is expected to be completed about February 10, 1955. Prior to making electrical tests on the newly installed cables, Telephone Sub-Section cable splicers worked several days forming and setting up the new cable ends in the positions required for making tie-in splices.

Relocated and installed about 50 telephones in the 10 building at North Richland for Kaiser Engineers. The expanded service was needed for personnel relocated from the 100-K Area.

Plant Telephone Operations (Contin.)

Removed a remote metering circuit which operated between Electrical substations BBl-S1 (Lee and Thayer) and BBl-S2 (Stevens and Wilson) and a blackout control circuit to the Electrical substation at Thayer and the By-Pass highway.

Moved 11 stations and 12 extensions from the 717-A Building to the 722-A Building for Manufacturing Cost Unit.

At the request of Blaw-Knox, service to 38 phones located in the 87 Building at North Richland was rearranged.

Made a cable terminal transfer in 300 Area to make pairs available for future use at the 306 Building.

Installed permanent metal numbers on every fifth pole in the BY to White Bluffs trunk cable lead.

Approximately 80 manhours were spent providing additional wire capacity in the conduit system at the 1704-K Building to permit completion of needed telephone installations.

In order to provide specific night connections to the Central Stores PBX, a transfer relay, controlled from the PBX, was installed in the North Richland exchange to disable the PBX trunk rotation selection feature.

Completed an inventory of equipment in service in all area telephone exchanges and at all PBX and PAX locations.

Prepared report covering all purchases of telephones, subscriber station equipment, test equipment, etc., made during the Calendar Year 1954.

Prepared job specifications P-55-18 covering cable rearrangements in the 3706 Building, 300 Area. This work is required in order to provide cable facilities to serve the new Patrol Headquarters.

Revised key map of project trunk cables, drawing No. H-5-465.

Made traffic studies on a total of 57 official telephone lines during the month.

Cost estimates and preliminary plans were furnished to the T Plant Sub-Section for replacing the existing sound-powered PBX system with a central battery type PAX system.

Commercial Telephone Operations

Completed final arrangements for making 55 business and 22 residential number changes in July. These changes are being made to improve distribution of traffic in the Richland exchange.

Prepared engineering details pertaining to making more cable facilities available to the Downtown business district by summer. Preliminary work for this will be performed during the next several weeks.

Commercial Telephone Operations (Contin.)

Reviewed plans and consulted with Community Engineering Unit regarding telephone facilities affected by proposed building of two new gasoline filling stations in Richland.

Installed temporary plastic cable in the Downtown business section to provide relief in vicinity of the Post Office, pending permanent expansion of cable facilities next summer.

Rehabilitated the house cable system in the Cannon Building. This was necessitated by trouble experienced last summer arising from moisture from an evaporative-type cooling system.

Restored to good condition the emergency open-wire circuit to Enterprise.

Taking advantage of the many telephone numbers that were changed concurrently with the issue of the new directory, a successful "actual service" trial was made of the message announcer that will be used to intercept calls to official lines transferred to the official exchange.

Installed automatic message announcer trunk equipment in the North Richland exchange, in order to make use of an automatic message announcer installed in the Richland exchange.

Radio System Operations

In the Carmichael Junior High School auditorium, two special loud speakers were permanently installed for the benefit of Company meetings held in that auditorium.

Installed and operated portable public address and sound recording equipment in the Carmichael School auditorium for Mr. W. E. Johnson's January 25 and 26 meetings with HAPO supervisors.

Installed a four-station intercommunicating system in the 703 Building for the Union Relations Section.

Installed a three-station intercommunicating system in the 713 Building for the Computing and Scheduling Unit.

Recorded Science Forum radio programs on January 5, 12 and 19.

Three radio station outages occurred during the month: KKE-624, Station No. 11 (100B Area Patrol) was out of service from 10:00 PM January 6, 1955 to 9:28 AM January 7, 1955 due to tube failure. KKE-624, Station No. 13 (Army Post No. 210) was out of service from 3:00 PM to 5:20 PM on January 21, 1955 due to broken microphone and was out of service again on January 26, 1955 from 4:00 PM to 5:00 PM due to low line voltage and defective rectifier.

Statistical Data

	<u>At 20th of January</u>	<u>Change From Previous Month</u>	<u>Change From Year Ago</u>
Residential Subscribers	6,040	-14	/293
Business Subscribers	486	/2	- 12
Paystation Telephones	72	/1	/7
Official Subscribers:			
Richland Exchange	987	- 6	/4
North Richland Exchange	236	- 1	/8
Process Area Exchanges	1,798	-32	/72
		<hr/>	<hr/>
		-50	/372

New Service Requests Received During the Month:

For Residential Service	84
For Business Service	8
	<hr/>
TOTAL	92

Backlog of Service Requests:

		<u>Total</u>
For new residential telephones:	300	
For new business telephones:	2	
		302
For residential outside moves:	26	
For business outside moves:	0	
		26

Service orders processed:

In connection with residential and business service:	397
In connection with official service:	393
	<hr/>
TOTAL	790

Facilities - Installed, In Service and Available:

	<u>Exchange Lines</u>			<u>Party Lines Available</u>
	<u>Installed</u>	<u>In Service</u>	<u>Available</u>	
Richland	4050	3970	80	304
North Richland	600	431	169	96
Process Areas	2050	1696	354	--
	<hr/>	<hr/>	<hr/>	<hr/>
	6700	6097	603	400

Radio Stations:

	<u>At 20th of January</u>	<u>Change From Previous Month</u>	<u>Change From Year Ago</u>
Fixed Stations	35	0	/17
Mobile Stations	155	0	/11
	<hr/>	<hr/>	<hr/>
	190	0	/28

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SECURITY AND PATROL SUB-SECTION

Document Report

Number of classified documents and prints unaccounted for as of January 1: 341
(105 of the 341 classified documents and prints are chargeable to
E. I. du Pont de Nemours & Company)

Number of classified documents and prints reported as unaccounted for 0
during January, 1955:

Number of classified documents and prints either recovered or downgraded 4
in classification during January:
(One document and one print were located and one document and one print
were declassified)

(The print which was declassified is chargeable to E. I. du Pont de
Nemours and Company)

Number of classified documents and prints remaining unaccounted for as 337
of February 1:
(104 of the above 337 documents and prints are chargeable to E. I. du Pont
de Nemours and Company)

The Non-Technical Document Review Board held three meetings during January 1955, and
reviewed a total of 125 classified documents. Of this number

31 had their classification retained;
90 were downgraded to "Official Use Only",
2 were not within the scope of the board, and
2 were declassified.

Security Education

Three security items appeared in the GE NEWS during the month.

290 security meetings were held and attended by 4,312 HAPO employees. A representative
of the Plant Protection Services Unit showed one of the security films at some of these
meetings as indicated below:

"Turn Left Across the Bridge" was shown at 14 meetings, each with an
average attendance of 22 employees.

"Words Are Weapons" was shown at two meetings, each with an average
attendance of 33 employees.

"Signal 99" was shown at one meeting with nine employees present.

"The Case of the Smokeless Chimney" was shown at one meeting with 14
employees present.

GE Security Bulletin No. 90 entitled "The New 'L' Clearance" was issued January 14.
This bulletin explained the security limitations included in the "L" type clearance.

Security Education (Contin)

650 posters with the slogan "Compare Face with Badge" were posted in the plant areas during January.

2,000 copies of the "A-B-C" security pamphlet with the slogan "Wear Your Badge in Plain Sight" were distributed to all personnel in the plant areas.

Organization and Policy Guide No. 15.2 entitled "Control of Classified Documents" was issued January 3, revising 16 sets of previous instructions regarding the control of classified material.

Organization and Policy Guide No. 15.1.3 entitled "Security Clearances and Identification" was issued January 3, revising previous instructions.

The survey of all HAPO positions to determine those that would fall within the new "L" category clearance was completed and submitted to the Commission on January 21.

On February 1, 1955, a program of a Monthly Self-Inventory of Top Secret documents will be placed in effect. This inventory is, of course, in addition to the semi-annual inventories conducted by the Atomic Energy Commission.

On January 10, a memorandum was issued by the Security office regarding the "Transfer of 100-K Area to Manufacturing Department" during the first part of February, requesting each department to review its needs for personnel clearances to the area after the transfer of operation from construction to Operations.

The new Material and Package Pass Procedure was placed in effect in January, 1955. Passes were issued for those employees who will act as authorized messengers of classified documents and Barricade Authorization Cards for those who will need them for the removal of government property and equipment were issued.

During the month, representatives of the Security Practices and Procedures Unit and the Technical Information Unit met with the Standards Committee of the Reactor Section in an effort to standardize and set up proper control of all classified forms and data used by Reactor personnel. This meeting resulted in the establishment of several policies and classification of forms, distribution of data and proper control by Files.

Effective January 28, 1955, the 3000 Area was downgraded in security classification from "limited" to "control" status.

Ninety-five employees of the General Electric Company received a "Q" security orientation from either a representative of the Plant Protection Services Unit or a Patrol supervisor during the month of January, 1955.

Eighteen employees of the General Electric Company received an "L" security orientation from either a representative of the Plant Protection Services Unit or a Patrol supervisor during the month of January, 1955.

Statistical Report of Security Patrol Activities

	<u>100-B</u>	<u>100-D</u>	<u>100-F</u>	<u>100-H</u>	<u>100-K</u>	<u>200-W</u>	<u>300</u>
Pat Searches	90	90	54	14	0	0	2
Escorts	17	7	7	30	48	18	80
Ambulance Runs	3	3	2	3	0	4	6
Passes issued:							
Temporary one day	44	7	4	8	0	41	82
Travel	0	0	0	0	0	0	105
Red Tag	166	104	38	28	0	450	68
Telephonic	0	0	0	1	0	0	0
Supervisor's post contacts	408	237	222	133	336	824	624

Other Security Patrol Activities (computed by hours): 300 &
700

Security File Check	165	287.5	202.6	445.6	407	552	2,220
Building Check	253	75.5	235.2	676.5	410	552	720

Arrest Report

<u>Violations</u>	<u>Number of Violations</u>	<u>Cont. Cases from Dec.</u>	<u>Cases Cleared</u>	<u>Pending</u>	<u>Fined</u>
Speeding	0	1	0	1	0
No Driver's License	1	1	1	1	1
Illegal Parking	7	0	5	2	5
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	8	2	6	4	6

Citation Tickets issued:	8
Warning Tickets issued:	34
Verbal warnings:	0

Patrol Training Activities

227 Security Patrolmen received classroom instruction during the reporting period.

224 Security Patrolmen received Firearms Training during the same period.

Patrol Post Changes

On January 14, 1955, the Salvage Yard Post, 3000 Area, was discontinued.

The 101 Building post, 3000 Area, was discontinued January 28, 1955.

There were no new posts established during the reporting period.

General

On January 14 and 15, the Audit and Inspection Unit assisted during the plant tours of the areas and monitored conferences and meetings held during the visit of the U. S. Atomic Energy Commission Advisory Committee on Biology and Medicine.

Security and Patrol - General (Contin.)

As indicated in a letter to the AEC on December 29, 1954, the Patrol supervisory organization was revised, permitting the elimination of five sergeant positions on February 1, 1955. On the same date, the remaining six sergeants will be reassigned as Lieutenants - Relief. Also, effective February 1, the 'Sergeant' position will be eliminated.

In case of Patrol supervision shortage resulting from sickness or other reasons, arrangements have been made to operate the 100-H Area with 100-D Area supervision during these temporary periods.

On February 7, the starting and quitting times of Patrol Lieutenants and Captains will also be changed. Their new schedule will be identical with the operation schedule (i.e. starting times: 7:48 AM, 3:48 PM and 11:48 PM, and quitting times: 8:18 AM, 4:18 PM, and 12:18 AM) This will permit sufficient lapover periods to transfer current information.

Security Information

Daily Badge Log entries:	2,282
"Q" clearances:	95
Formal "P" clearances issued:	26
"P" Approval clearances issued:	22
Category access granted:	32
Category Access withdrawn:	39
Category Access revised:	119

Number of photos for "A" badges:	420
Number of photos for "B" badges:	2,000
Number of persons rephotographed:	250

Total of 1,172 photo passes were laminated and issued.

Total of "A" badges assembled and distributed to the proper areas was 627.

Total of 106 "A" badges were received from areas.

Total of 114 "A" badges were received from areas for repair.

Top Secret Clearances

Clearances for 19 employees cancelled.

39 employees were granted clearance by AEC Security

25 employees were requested for clearance.

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HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING JANUARY 31, 1955

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

I. Visitors to this Works

W. S. Hill General Electric Company Schenectady, New York	Discuss technical and physical requirements associated with work at Hanford	D. W. McLenegan T. G. Marshall	1-23-55	1-24-55	X	100-B 105-C
						100-H 105
						105-KW
						200-F 202-A
						200-W Redox, 221-U 300-L 303
J. D. Morton News Bureau General Electric Company Schenectady, New York	Gain background in pre-paring and editing articles on technical and other achievements at Hanford	G. L. Brown, Jr. W. Watts R. Mackness	1-10-55	1-14-55	X	100-F 105, 108
						100-H 105
						105-KW, 105-KE
						200-W Redox, 221-U 300-L 303

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ENGINEERING DEPARTMENT - ADVANCE ENGINEERING SECTION

I. Visitors to this Works

A. R. Matheson General Electric Company Schenectady, New York	Discuss uranium fabrication	F. W. Albaugh	1-6-55	1-7-55	X	300-L XXX

II. Visits to other Installations

F. W. Albaugh to: Knolls Atomic Power Lab. Schenectady, New York	Discuss atomic power problems and KAPL assistance to Hanford	B. R. Prentice R. Bennett	1-17-55	1-26-55	X	

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- 2 -

<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Restricted Data Class.</u>	<u>Unclass.</u>	<u>Areas</u>
P. D. Wright to: Bridgeport Brass Co. Adrian, Michigan	Observe Pilot Lot Extrusion	G. T. Murray	1-10-55	1-17-55	X		

ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION

I. Visitors to this Works

R. D. Bennett Knolls Atomic Power Lab. Schenectady, New York	KAPL assistance to Hanford	A. B. Greninger W. K. Woods	1-6-55	1-7-55	X		700-703
F. H. Tingey Phillips Petroleum Co. Idaho Falls, Idaho	Procure data pertinent to problem at Arco	R. J. Schier	1-26-55	1-28-55	X		300-L XXX

GB-19

ENGINEERING DEPARTMENT - DESIGN SECTION

I. Visits to other Installations

R. K. Andersen to: General Electric Co. Schenectady, New York	Consultation on reactor design	B. R. Prentice	1-17-55	2-4-55	X		
W. J. Love to: General Electric Co. Schenectady, New York	Consultation on reactor design	B. R. Prentice	1-30-55	2-11-55	X		
J. H. Snyder to: General Electric Co. Schenectady, New York	Consultation on reactor design	B. R. Prentice	1-30-55	2-5-55	X		

ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS

I. Visitors to this Works

A. Armstrong Aero Jet Corporation Los Angeles, California	Discuss pump application and reactor safety	R. B. Richards	1-10-55	1-11-55	X		300-L XXX 700
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<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Restricted Data</u>	
					<u>Class.</u>	<u>Unclass. Areas</u>
J. H. Bach Westinghouse Atomic Power Div. testing Pittsburgh, Pennsylvania	Discuss non-destructive	E. C. Wood	1-31-55	2-5-55	X	300-L 303 700
G. Banerian Aero Jet Corporation Los Angeles, California	Discuss pump application	R. B. Richards	1-10-55	1-11-55	X	300-L XXX 700
R. L. Carter North American Aviation Co. Downey, California	Discuss graphite work	M. Lewis	1-27-55	1-28-55	X	100-D XXX 300-L XXX
J. G. Christ Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss non-destructive	E. C. Wood	1-31-55	2-5-55	X	300-L 303 700
J. W. Conley Aircraft Nuclear Propulsion Idaho Falls, Idaho	Discuss waste disposal methods Discuss protective coatings	R. S. Bell R. G. Geier	2-1-55 1-24-55 1-25-55	2-1-55 1-28-55 1-26-55	X X X	100-B 105-B 200-W 221-T, 231 Redox, 221-U 300-L XXX
D. H. Cornell Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL 120 Loop and irradiation facilities	J. A. Berberet G. E. Wade	1-6-55	1-7-55	X	100-D 105-D 100-H 105 105-KW, 700
R. S. Dalrymple Reynolds Metal Company Louisville, Kentucky	Discuss impact extrusion and corrosion problems	J. A. Ayres A. C. Callen W. P. Wallace	1-5-55	1-6-55	X	300-L XXX
P. C. Daly Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss use of Hanford for in-pile experiments	J. A. Berberet	1-18-55	1-21-55	X	100-D XXX 100-H 105 105-KE 300-L XXX; 700
J. E. Draley Argonne National Laboratory Lemont, Illinois	Discuss corrosion problems	N. G. Wittenbrook M. Lewis J. A. Ayres	1-10-55	1-11-55	X	100-D XXX 300-L XXX
T. J. E. Glasson Knolls Atomic Power Lab. Schenectady, New York	Discuss in-pile loop facilities	J. A. Berberet G. E. Wade	1-24-55	1-25-55	X	100-D XXX 100-H 105 105-KW 300-L XXX; 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
A. E. Guay National Lead Company Fernald, Ohio	Attend subcommittee meeting of Metal Quality Working Committee on gas specifications and circle four treatment	W. T. Kattner	1-17-55 1-18-55	1-18-55 1-20-55	X	100-B 105-B, 105-C 300-L 303
D. Gurinsky Brookhaven National Lab. Upton, Long Island, New York	Discussion on graphite	M. Lewis L. P. Bupp	1-17-55	1-18-55	X	100-B 105-C 100-D XXX 100-F 105 300-L XXX
H. A. Hardt E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Attend subcommittee meeting of Metal Quality Working Committee	W. T. Kattner	1-17-55	1-21-55	X	100-B 105-B, 105-C 300-L 303
H. H. Hausner Sylvania Electric Products Pittsburgh, Pennsylvania	Discuss tests on fuel elements (contract AT 30-1-GEN-366)	A. G. Blasevitz	1-28-55	1-28-55	X	100-B 105-B, 105-C 300-L 303 700
J. R. Keeler Battelle Memorial Inst. Columbus, Ohio	Discuss metallurgical problems relating to Hanford	V. R. Cooper A. G. Blasevitz	1-18-55	1-20-55	X	100-B 105-B, 105-C 300-L 303 700
W. S. Knecht Mallinckrodt Chem. Works St. Louis, Missouri	Observe puls column and continuous denitration system	F. W. Woodfield M. J. Szulinski	1-6-55	1-7-55	X	200-W 221-U 300-L XXX
W. J. Koshuba Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss results of test on progress	L. D. Turner	1-20-55	1-21-55	X	300-L XXX
R. R. Lee Aircraft Nuclear Propulsion Idaho Falls, Idaho	Coordinate experiments between Hanford and GE-ANP	J. A. Berberet	1-13-55	6-30-55	X	100-B 105-B, 105-C 100-H 105; 105-KW 300-L 303; 700
F. H. Meyer, Jr. National Lead Company Fernald, Ohio	Consultation on corrosion problems	J. J. Cadwell	1-11-55	1-14-55	X	100-D 105 200-W 221-T, 221-U, Redox 300-L XXX

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
R. Meyers Brookhaven National Lab. Upton, Long Island, New York	Discussion on graphite	L. P. Bupp M. Lewis	1-17-55	1-18-55	X	100-B 105-C 100-D XXX 100-F 105 300-L XXX
C. E. Polson National Lead Company Fernald, Ohio	Attend subcommittee meeting of Metal Quality Working Committee on gas specifications and circle four treatment	W. T. Kattner	1-17-55	1-18-55	X	100-B 105-B, 105-C 300-L 303
R. C. Regier Phillips Petroleum Company Idaho Falls, Idaho	Analytical consultations	W. H. Reas	1-31-55	2-2-55	X	200-W XXX 300-L XXX 700
M. B. Reynolds Knolls Atomic Power Lab. Schenectady, New York	Discuss programs of mutual interest in Hanford assistance	M. J. Sanderson	1-26-55	1-28-55	X	100-B 105-C 300-L XXX
A. E. Ruehle Mallinckrodt Chem. Works St. Louis, Missouri	Attend subcommittee meeting of Metal Quality Working Committee on gas specifications and circle four treatment	W. T. Kattner	1-17-55	1-18-55	X	100-B 105-B, 105-C 300-L 303
C. M. Slansky Phillips Petroleum Company Idaho Falls, Idaho	Consultation on separations processes	V. R. Cooper W. H. Reas F. W. Woodfield	1-5-55	1-7-55	X	200-W Redox, 221-U 300-L 303
R. S. Summers Mallinckrodt Chem. Works St. Louis, Missouri	Observe pulse column and continuous denitration system	F. W. Woodfield	1-6-55	1-7-55	X	200-W 221-U
F. H. Tingey Phillips Petroleum Company Idaho Falls, Idaho	Exchange technical data on slug processing	P. H. Reinker V. D. Donihue J. A. Berberet J. M. Fouts	1-26-55	1-28-55	X	100-D 105; 105-KE 200-W XXX; 300-L 303; 700 200-E XXX

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
C. R. Tipton, Jr. Battelle Memorial Institute Columbus, Ohio	Discuss metallurgical problems relating to Hanford	V. R. Cooper A. G. Blasevitz	1-18-55	1-20-55	X	100-B 105-B, 105-C 300-L 303 700
K. C. Vint Aircraft Nuclear Propulsion Idaho Falls, Idaho	Observe and get train- ing on handling various jobs in highly radio-active and contamination	R. S. Bell	1-17-55	1-21-55	X	200-W 221-T, 231, Redox, 221-U
G. W. Watt University of Texas Austin, Texas	Consultation on technical problems	R. B. Richards	1-17-55	1-21-55	X	100-D 105-D, DR 200-W 221-U, 231 234, 235 300-L XXX
D. M. Wilsey All States Employee Schenectady, New York	Instrumentation work on in-pile water loop	G. E. Wade	12-31-54	5-1-55	X	100-B 105-B, 105-C 100-D XXX 100-F XXX 100-H 105; 105-KW 300-L XXX
B. C. Wing Aircraft Nuclear Propulsion Idaho Falls, Idaho	Observe and get train- ing on handling various jobs in highly radio-active and contamination Discuss protective coatings	R. S. Bell R. G. Geier	1-17-55 1-25-55	1-28-55 1-26-55	X X	200-W 221-T, 231, Redox, 221-U 300-L XXX
J. L. Hyde E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Instrumentation and separations problems	R. B. Richards W. H. Reas	1-24-55	1-27-55	X	200-E 202-A 200-W 221-T, 221-U, Redox, 231 300-L 303
C. H. Ice E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Instrumentation and separations problems	R. B. Richards W. H. Reas	1-24-55	1-27-55	X	200-E 202-A 200-W 221-T, 221-U, Redox, 231 300-L 303
B. S. Johnson, Jr. E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Instrumentation and separations problems	R. B. Richards W. H. Reas	1-24-55	1-27-55	X	200-E 202-A 200-W 221-T, 221-U, Redox, 231 300-L 303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
R. W. Coyle Aircraft Nuclear Propulsion Idaho Falls, Idaho	Maintain liaison perti-	J. A. Berberet	1-1-55	6-30-55	X	109-B 105-C 100-D XXX 105-KW 300-L XXX; 700

II. Visits to other Installations

F. P. Brauer
to: Aircraft Nuclear Propulsion methods for burnup
Cincinnati, Ohio studies

E. W. Rebol 1-10-55 1-11-55 X

F. P. Brauer
to: Oak Ridge National Lab.
Oak Ridge, Tennessee studies

S. A. Reynolds 1-12-55 1-12-55 X

R. J. Brouns
to: Ames Laboratory
Ames, Iowa chemistry problems

C. V. Banks 1-25-55 1-28-55 X

J. J. Cadwell
to: Knolls Atomic Power Lab.
Schenectady, New York element technology

C. E. Weber 1-4-55 1-6-55 X

J. J. Cadwell
to: Argonne National Lab.
Lemont, Illinois element technology

F. Foote 1-7-55 1-7-55 X

J. J. Cadwell
to: National Lead Company
Cincinnati, Ohio element technology

J. M. Ciboraki 1-10-55 1-11-55 X

J. J. Cadwell
to: Aircraft Nuclear Propulsion element technology
Cincinnati, Ohio

A. E. Focke 1-11-55 1-11-55 X

J. J. Cadwell
to: E. I. du Pont de Nemours & Co.
Savannah River Plant
Augusta, Georgia element technology

M. H. Wahl 1-12-55 1-13-55 X

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Restricted Data
Class. Unclass. Areas

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Class. Unclass. Areas
J. J. Cadwell to: Mallinckrodt Chem Wks. St. Louis, Missouri	Consultation on fuel element technology	W. M. Leaders	1-14-55	1-14-55	X
J. M. Davidson, III to: Phillips Petroleum Co. Idaho Falls, Idaho	Check engineering data on design of an in-pile facility	W. H. Pennington	1-5-55	1-6-55	X
E. A. Eschbach to: Atomic Power Study Group General Electric Company Schenectady, New York	Discuss reactors and fuel technology	B. R. Prentice	1-17-55 1-21-55	1-18-55 1-21-55	X X
E. A. Eschbach to: E. I. du Pont de Nemours & Co. Metallurgy Develop- ment Advisory Committee Savannah River Plant Augusta, Georgia	Attend meeting of	M. H. Wahl	1-19-55	1-20-55	X
E. A. Eschbach to: National Lead Company Fernald, Ohio	Observe and discuss uranium fabrication	C. L. Cuthbert	1-22-55	1-24-55	X
T. W. Evans to: Phillips Petroleum Co. Idaho Falls, Idaho	Consultation on Material Test Reactor	W. W. Hickman	1-5-55	1-8-55	X
J. F. Fletcher to: Phillips Petroleum Co. Idaho Falls, Idaho	Consultation on Material Test Reactor	W. W. Hickman	1-19-55	1-21-55	X
M. D. Freshley to: Phillips Petroleum Co. Idaho Falls, Idaho	Check engineering data on design of an in-pile facility	W. H. Pennington	1-5-55	1-6-55	X
E. P. Galbraith to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on Material Test Reactor	W. W. Hickman	1-19-55	1-21-55	X
	Discuss analytical development problems	J. Flagg	1-24-55	1-28-55	X

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Class.	Unclass.	Areas
O. H. Greager to: E. I. du Pont de Nemours & Co. Metallurgy Development Advisory Committee Savannah River Plant Augusta, Georgia	Attend meeting of & Co. Metallurgy Development Advisory Committee	M. H. Wahl	1-18-55	1-20-55	X		
D. C. Kaulitz to: Phillips Petroleum Co. Idaho Falls, Idaho	Observe Material Test Reactor experiment	W. W. Hickman	1-5-55	1-8-55	X		
W. H. Reas to: Argonne National Lab. Lemont, Illinois	Attend symposium on high temperature fuel processing	H. M. Feder	1-18-55	1-21-55	X		
J. W. Riches to: Bridgeport Brass Co. Adrian, Michigan	Consultation on uranium metallurgy	R. M. Treco	1-25-55	1-27-55	X		
M. J. Sanderson to: Phillips Petroleum Co. Idaho Falls, Idaho	Observe Material Test Reactor experiment	W. W. Hickman	1-5-55	1-8-55	X		
F. A. Scott to: Knolls Atomic Power Lab. Schenectady, New York	Discuss analytical development problems	J. Flagg	1-24-55	1-28-55	X		
L. D. Turner to: U. S. Atomic Energy Comm. Washington, D. C.	Attend Hot Laboratory Information Committee Meeting on BNL-24	L. G. Stang, Jr.	1-17-55	1-17-55	X		
L. D. Turner to: Knolls Atomic Power Lab. Schenectady, New York	Discuss hot laboratory equipment	T. J. E. Glasson	1-18-55	1-18-55	X		
L. D. Turner to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss hot laboratory equipment and experimental techniques	S. Dismuke	1-20-55	1-21-55	X		
E. C. Wood to: Argonne National Lab. Lemont, Illinois	Discuss non-destructive testing methods	W. J. McGonnagle	1-17-55	1-17-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
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E. C. Wood to: E. I. du Pont de Nemours Svanabh River Plant Augusta, Georgia	Attend meeting of Metallurgy Development Advisory Committee	M. H. Wahl	1-18-55	1-20-55			X
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E. C. Wood to: National Lead Company Fernald, Ohio	Discuss non-destructive testing methods	J. P. Scheuer	1-21-55	1-21-55			X
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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT - AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

I. Visitors to this Works

J. W. Latchum, Jr. to: Phillips Petroleum Co. Idaho Falls, Idaho	Security activities and inspection of document control	T. B. Farley	1-19-55	1-20-55			X 300-L XXX
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MANAGEMENT

I. Visitors to this Works

R. D. Bennett Knolls Atomic Power Lab. Schenectady, New York	Indoctrination	W. E. Johnson A. B. Greninger	1-6-55	1-7-55			X 200-W 221-T, 231 Redox, 221-U 300-L 303 100-H 105
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I. H. Mandil General Electric Company Washington, D. C.	Discuss design of possible irradiation facilities	W. E. Johnson A. B. Greninger	1-5-55	1-7-55			X 300-L 303 700
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H. F. Smiddy General Electric Company Schenectady, New York	Tour of plant	W. E. Johnson	1-28-55	1-29-55			X 105-KW 200-W Redox, 221-U 300-L 303; 700
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SPECIAL STUDIES SECTION

I. Visits to other Installations

W. J. Davis to: Knolls Atomic Power Lab. Schenectady, New York	Review engineering and cost data for draft literature	F. K. McCune B. R. Prentice	1-17-55	1-27-55			X
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Class. Unclass. Areas

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Class.	Unclass.	Areas
W. K. MacGready to: Knolls Atomic Power Lab. Schenectady, New York	Review engineering and cost data for draft literature	F. K. McCune B. R. Prentice	1-17-55	1-27-55			X
K. L. Robertson to: Knolls Atomic Power Lab. Schenectady, New York	Review engineering and cost data for draft literature	F. K. McCune B. R. Prentice	1-17-55	1-27-55			X

OPERATIONS RESEARCH STUDY SECTION

I. Visits to other Installations

L. W. Smith, Jr. to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss mathematical planning techniques	J. W. Darley H. R. J. Grosch	1-21-55	1-23-55			X
L. W. Smith, Jr. to: U. S. Atomic Energy Comm. Washington, D. C.	Discuss mathematical planning techniques	C. W. D. Thornton	1-24-55	1-28-55			X
P. M. Thompson to: Rand Corporation Santa Monica, California	Using Rand equipment for mathematical formula- tions on production scheduling research program	J. D. Madden M. L. Jancosa W. Orchard-Hays D. M. Fort	1-10-55	1-31-55			X

MANUFACTURING DEPARTMENT

I. Visitors to this Works

J. L. Hyde E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Consultation on instru- mentation and separa- tions problems	C. A. Priode L. M. Knights	1-24-55	1-28-55			X
C. H. Ice E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Consultation on instru- mentation and separa- tions problems	C. A. Priode L. M. Knights	1-24-55	1-28-55			X

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
B. S. Johnson, Jr. E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Consultation on instru- mentation and separa- tions problems	C. A. Priode L. M. Knights	1-24-55	1-28-55	X	200-E 202-A 200-W 221-T, 231 Redox, 221-J 300-L 303

II. Visits to other Installations

H. A. Carlberg
to: West Milton
Knolls Atomic Power Lab.
Schenectady, New York

Discuss plant engineering E. P. Lee
problems of mutual interest

1-28-55 1-31-55 X

W. M. Mathis
to: E. I. du Pont de Nemours & Co. Savannah River Plant
Augusta, Georgia

Attend Metallurgical
Development
Advisory Committee meeting

1-18-55 1-20-55 X

W. M. Mathis
to: U. S. Atomic Energy Comm. Washington, D. C.

Discuss metal require-
ments

1-21-55 1-21-55 X

W. M. Mathis
to: Sylvania Electric Products Hicksville, Long Island, New York

Discuss hot press
canning

1-24-55 1-24-55 X

W. N. Mobley
to: Dow Chemical Company
Rocky Flats Laboratory
Denver, Colorado

Discuss operating
problems

1-19-55 1-19-55 X

W. N. Mobley
to: U. S. Atomic Energy Comm. Los Alamos Scientific Lab.
Los Alamos, New Mexico

Discuss production and
shipping schedules

1-20-55 1-21-55 X

C. A. Priode
to: Dow Chemical Company
Rocky Flats Laboratory
Denver, Colorado

Discuss operating
problems

1-19-55 1-19-55 X

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<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Class.</u>	<u>Unclass.</u>	<u>Areas</u>
C. A. Priode to: U. S. Atomic Energy Comm. shipping schedules Los Alamos Scientific Lab. Los Alamos, New Mexico	Discuss production and shipping schedules	E. C. Stewart	1-20-55	1-21-55	X		
RADIOLOGICAL SCIENCES DEPARTMENT							
I. Visitors to this Works							
H. C. Brown Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
J. C. Bugher Division of Biology and Medicine Meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 105-F 300-L XXX 700
J. S. Butts Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 105-F 300-L XXX 700
S. T. Cantril Tumor Institute Swedish Hospital Seattle, Washington	Attend Advisory Committee meeting	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 105-F 300-L XXX 700
E. A. Doisy Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
C. L. Dunham Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Class.	Unclass.	Areas
M. Eisenbud Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
G. Failla Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
F. R. Montgomery Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
P. B. Pearson Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
C. Stern Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
S. Warren Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
D. L. Worf Division of Biology and Medicine meeting U. S. Atomic Energy Comm. Washington, D. C.	Attend Advisory Committee	H. M. Parker J. M. Smith J. W. Healy M. L. Mickelson	1-14-55	1-15-55	X		100-F 108-F 300-L XXX 700
W. Lindsey Division of Production U. S. Atomic Energy Comm. Washington, D. C.	Discuss radiological engineering program	J. M. Smith	1-28-55	1-28-55	X		700-703

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Class.	Unclass.	Areas
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J. H. Hyde E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Tritium counters, automatic filter samplers, waste stream monitoring and tritium counting and calibration	Z. E. Carey F. E. Adley J. M. Nielsen	1-26-55	1-26-55	X		300-L XXX
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II. Visits to Other Installations

G. R. Hilst to: Argonne National Lab. Lemont, Illinois	Problems in meteorological research and development	H. Moses	1-21-55	1-21-55	X		
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H. A. Kornberg to: University of Rochester Rochester, New York	Attend AEC Bio-Medical program Director's meeting	H. A. Blair	1-20-55	1-21-55	X		
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H. M. Parker to: University of Rochester Rochester, New York	Attend AEC Bio-Medical program Director's meeting	H. A. Blair	1-20-55	1-21-55	X		
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H. A. Kornberg to: Applied Fisheries Lab. Seattle, Washington	Attend AEC conference	L. R. Donaldson	1-12-55	1-13-55	X		
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RADIOLOGICAL SCIENCES DEPARTMENT

JANUARY 1955

SUMMARY

Thirty-six informal, fourteen Class I and four Class II radiation incidents were recorded. All of the Class II incidents had to do with quite high exposures of limited parts of the body. The most severe was in a range that might produce a demonstrable radiation reaction.

The ruthenium particle contamination pattern was essentially unchanged. Continued emission of I^{131} above the desirable long term limit, coupled with the reduced atmospheric dilution characteristic of the winter season, brought vegetation contamination close to the limit in the environs.

Research studies on the ruthenium problem continued with significant progress in interpretation of skin reaction on pigs, particle solubility measurements and direct analyses of liquid samples. The inadequacy of the current MPC for Ru^{106} was confirmed in rat experiments.

Unfavorable results generally developed in waste disposal studies. Difficulties in scavenging the dangerous isotope Sr^{90} from wastes and the vagaries of Sr^{90} transmission through earth materials were contributing factors.

The uptake of plutonium upon ingestion of highly acidic solutions is 100 or more times greater than the normal value. Although of no consequence in the conventional drinking water contamination limit, the finding emphasizes the risk of accidental ingestion in the laboratory.

A sound presentation of the department's research and development activities was made to the AEC Advisory Committee on Biology and Medicine when that group met here.

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RADIOLOGICAL SCIENCES DEPARTMENT

JANUARY

1955

This is the first monthly report written under a new pattern which makes no attempt to account systematically for work progress of all units, but rather selects topics of current interest, and, where appropriate, orients them in the department's over-all plans, or the broader plans of the whole Hanford operation. Detail of the department's operations will appear in a new series of reports entitled "Radiological Sciences Monthly Section Reports." Comments on the effectiveness of this new system will be appreciated.

The month-end force of 387 included 39 supervisors, 87 engineers and scientists, 22 clerical and 239 other personnel.

Number of Employees on Payroll

Beginning of month	387
End of month	<u>387</u>
Net change	0

The department is currently handicapped by a deficit of about 5 per cent in the roster, and efforts are being made to stimulate action where repair of a deficit is not wholly in the department's hands.

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

R. C. Pendleton

Flexible hand shield for handling radioactive materials

In addition, 20 suggestions were received during the month.

The draft of a Radiological Defense Handbook was completed. Discrepancies between in-plant disaster plans and civil defense plans were reviewed, and steps taken to achieve more coherent planning. It is felt that neither set of plans will be wholly effective unless more time is given to actual practice under simulated disaster conditions.

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The valuable communications channels of the Radiological Map Room were further strengthened, and a descriptive booklet on the available material there was issued.

During the visit of the AEC Advisory Committee on Biology and Medicine, the map room was one feature that attracted highly favorable attention. Despite the time limitations of a one day inspection, a fruitful tour of laboratories, all of which were well groomed, and effective condensed presentations of the research achievements and objectives combined to give a satisfactory accounting of the department's work.

Two areas of program redirection were brought to the Committee's attention. One relates to the need for substantial acceleration of earth sciences and related radiological engineering studies to achieve economical waste disposal objectives in time. The other concerns the rapid increase in the number of cases of demonstrable internal deposition of radioisotopes, and the resultant need for a major attack on improved methods of detection and analysis of such cases.

On the occasion of a biomedical directors' meeting at the University of Rochester, the toxicology work there was seen to be of high caliber, with useful applications to problems here. As an example, the time-consuming studies of shortening of life by radiation continue to emphasize the need for highly conservative management of radiation exposures. In fact, they support a growing feeling that the upward trend of exposures in the last two years should be forcibly restrained.

At a meeting of the AMA Congress of Industrial Health in Washington, D. C., the department contributed to two of three panel discussions on the impact of atomic energy on plant and community health. Of particular interest were the diverse views on the extent of radiation protection that will prevail when the costs are of stockholders' concern. It is our own view that the generally superior standards of HAPD will prove also to be among the most economical in the long run, with savings achieved by continuous improvement, not by elimination of pieces of the protective program.

The problems of legislation for protection were discussed at both these meetings. The different attitudes of those who were writing the regulations and those on the receiving end in areas already subject to regulation were of interest. As seen from Hanford, it is unfortunate that the regulation writers do not have a profound experience of the large-scale administration of radiation protection. It can be safely surmised that some of the regulations, if enforced, would cause needless additional expenditure. This is perhaps unavoidable in a field that has previously had a good general record of self-regulation.

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Radiation incidents continued at a high level with a total of 54, almost equalling the December record of 57. There were 36 informal, 14 Class I and 4 Class II incidents. All the Class II incidents were characterized by high dose of external radiation over a small part of the body. One was a 5 rad exposure of a biologist's finger, another a 2 to 5 rad exposure from a particle on the eyelid of a Separations employee, and another a 20 rad exposure of the seat of a radiation monitor. The fourth case was potentially one of the most severe in the history of the operation. It involved contamination of coveralls during testing of a reactor tube after a rupture. Dose in such a case is difficult to assess. First calculated to be about 2,000 rads, it is now believed to be closer to 1,000 rads over an area about 4" x 6" on the upper leg. Possibly this will prove to be the first case of demonstrable radiation reaction at the plant; however, no reaction has occurred to date, and if the dose is still overestimated, none may occur.* In any case, the restricted area of exposure and preponderance of radiation of low penetrating power will combine to limit the severity of the case.

The general status of the ruthenium particulate contamination of the reservation and the environs has remained unchanged. However, there has been a resurgence of the earlier and more familiar problem of I^{131} contamination. The average daily emission was close to 3 curies, with the T Plant contributing about 70 per cent of this. As a result, vegetation in surrounding areas has been contaminated rather close to the provisional limit of 10^{-5} uc per gram. As the more recent findings from the experimental animal farm tend to indicate damage at lower levels than were previously found to be damaging, the limit should be viewed with mild suspicion. Continued emission at the present level, at least during winter months, is inadvisable.

A recent study of wind speed records serves to emphasize the substantially greater winter risk. Periods as long as 5 days with no wind in excess of 5 mph and periods of 2 days with no wind in excess of 2 mph have been found in the winters. These low wind speeds and the prevalence of atmospheric inversions at the same time lead to maximum ground depositions in the environs.

Another disposal problem currently causing concern is the sharp upswing of alpha emitter contamination in the well waters of the 300 Area and in the river nearby. The contaminant has been identified as uranium, but the reason for the sudden change has not been established. The situation will be closely followed. The new levels are not currently critical; the interest lies in whether they will continue this unexpected trend.

Waste disposal to ground, in general, continued to pose troublesome problems. Of immediate urgency was the need to reach a decision on the disposal of TBP scavenged wastes. The predominant hazard of these wastes is related to the high content of Sr^{90} , the most dangerous of the fission products. To date, the scavenging process has failed to reduce the Sr^{90} content to levels that can be currently accepted as safe. This

*Note added in press: Eleven days after the incident no reaction had appeared. It is unlikely that one will now develop.

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is emphasized by the work on transmission of Sr^{90} wastes through soil columns. Although there is reasonably good primary exchange of the contaminant onto soil particles, the binding is not a firm one and is influenced by the presence of other ions. Also, it is now known that masses of disposed waste once assumed to be permanently held in situ may migrate slowly downward and so eventually reach ground water. Significant dilution in ground water is now clearly understood not to occur. An additional contra-indicator is the rapidly growing national and international interest in Sr^{90} as a world-wide contaminant, arising from nuclear explosions. This will probably bring other phases of Sr^{90} release into the limelight.

Two specific studies with strontium wastes are of interest. In one, it is found that removal of Sr by soil from the TBP wastes is quite sensitive to the presence of sodium nitrate and sodium phosphate. Adequate removal in the presence of nitrate requires as much as an 0.2 M concentration of phosphate. In other work, Sr removal from first cycle wastes was good, and that from aluminum coating wastes poor, with an indication of poor retention for a mixture of the two. Such a mixture would otherwise represent a disposal simplification.

The recognition of inert nitrate ion in water as a potential health hazard may lead to a revision of some disposal practices. The highest recorded ground water contamination to date is 3,500 ppm. The appropriate limit for drinking water is uncertain, but is probably not more than 10 ppm. Ground water under the reservation is therefore liable to be unportable even with adequate decay time for radioactive constituents. The more important question of contamination of the Columbia River is probably under control because dilution in the river would be adequate. On a gross basis, 5,000 tons of nitrate are going to ground per year; at some ultimate steady state condition the same quantity would reach the river. This would give only about 0.1 ppm on the average. A feasible drainage path to the Yakima River could establish an unfavorable condition.

Progress continued on the various studies directed toward a fuller understanding and solution of the ruthenium particulate hazard. Additional determinations of solubility of particulates in synthetic body fluids were made, with confirmation of the previous highly variable solubilities. A rapid system for detection of Ru^{106} in liquid samples such as urine, by gamma ray spectrometry was developed; the method is good only for quantities in excess of 0.01/uc. Improved techniques for the preparation of synthetic particles as ruthenium oxide colloids were developed. First steps toward the sensitive detection of radioelements inside the body were taken in terms of testing the shielding properties of water and concrete for a special room for this purpose; previous work in this direction has usually led to pure iron shielding. The requirement is to achieve minimum radiation inside a closed room; both the natural radioactivity of the shield material and its generation of secondary particles from incident cosmic rays

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are important. Water would seem to offer advantages over iron where space is available. Concrete was readily shown to be too radioactive for this purpose. Graphite, which would normally be too expensive, is another possibility in our case if a stock unsuitable for reactor application yet essentially freed from radioactive contaminants could be located.

In the field work on the ruthenium particles, the hurriedly constructed doorway monitors have suffered mechanical damage from the pushing of carts, etc. through the narrow doorways. More rugged forms are being designed.

In the biological work on ruthenium thirty-two sites on pig skin have been irradiated with sources ranging from 200 to 19,000 microcurie-hours. At the highest exposure level there was inflammatory involvement to a diameter of 10 cm, a quite surprising size. Since, in addition, some breakage of the thin mica covering of the particles has occurred, the proposed human tests have been deferred until safe application can be assured.

Previous work on the inadequacy of the existing MPC for ingested ruthenium was confirmed when all tissues except brain from rats fed at the MPC for Ru¹⁰⁶ in drinking water exceeded the permissible deposition. Highest concentrations were found in kidney, spleen, pelt, bone and liver in decreasing order.

In other tests, 3 per cent of rats fed discrete particles showed significant retention in the gut. One retained particle was specifically located at the cecum. This test confirms the hazard of a particle being similarly held up in the human gastro-intestinal tract.

The Columbia River biological studies showed significantly lower activity densities in river organisms generally, which is a seasonal expectation from the lower water temperatures, and the reduction of whitefish activity above the reservation to background, an indication of cessation of upward migration.

Salmon fry again showed significant mortality in sodium dichromate solution at 0.5 ppm, which is considerably below the alleged safe concentration. This observation emphasizes the need for carefully controlled chemical toxicity tests in this field, and also suggests risks in the ground disposal of large quantities of chromic acid, as proposed in a reactor tube cleaning program.

Thirty six silver salmon reared in 5 per cent area effluent water or in river water in 1952-53 have returned from sea as adults and been collected at the University of Washington station. This gives enough data to show that, as of 1952-53, exposure of the fingerlings to the effluent was harmless.

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Plutonium solutions of different pH and valence state fed to rats showed uptake dependence on both parameters. In particular, the uptake at pH 1 was enhanced one hundred-fold or more. Such a finding is of little consequence in fixing the permissible limit for drinking water contamination. It may need further study to determine the best action in the event that someone should accidentally swallow a highly acidic plutonium solution in laboratory or factory. It may also help to reconcile some British data on unusual uptake and elimination patterns in laboratory accident cases there.

Other plutonium work showed preliminary results that uptake of plutonium through wounds is greater from quite dilute nitric acid solutions than from concentrated solutions. This is the reverse of the situation for intact skin, and may ultimately affect the nature of defenses against these routes of intake.

For those radioelements, especially bone-seekers, whose rate of elimination from the body has been carefully measured, it is found that the elimination follows a power function. All calculations in sources such as NBS Handbook 52 are based on the simpler concept of exponential elimination. Attempts are being made to convert the permissible limits to appropriate power function bases; considerable change can occur when the elimination is projected over the entire working life of an individual.

Amherst

Director
RADIOLOGICAL SCIENCES DEPARTMENT

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Radiological Sciences Department
APPENDIX
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1. Condensed Exposure Records

Type	Number of Readings	Potential High Results	Confirmed High Results
Pocket chambers - gamma	264,014	21	0
Pocket chambers - slow neutron	843	0	0
Film Badges - beta-gamma	41,268	31	0
Neutron film	735	0	0
Pu bioassay	943	18	0
F. P. bioassay	981	0	0
U bioassay	143	0*	0
Alpha hand counts	52,346	9	0
Beta hand counts	60,120	0	0

*The current base for uranium bioassay reporting is not consistent with that for Pu or F. P. bioassay. Any positive result in the latter is listed as a potential high result. Practically all analyses for uranium are listed as positive, but it is known that these are usually not high in the sense of being above limits.

2. Regional Monitoring Records

Sample Type and Location	Activity Type	Average Activity Density /uc/cc	Trend* Factor
<u>Drinking Water and Related Materials</u>			
Benton City Water Company Well	alpha	1.4×10^{-8}	--
Richland, N. Richland, Benton City Wells	alpha	$(0.5 \text{ to } 1.5) \times 10^{-8}$	--
100 Areas	beta	$(0.7 \text{ to } 9.6) \times 10^{-7}$	--
Pasco, Kennewick, McNary Dam	beta	$(0.5 \text{ to } 2.5) \times 10^{-7}$	--
Backwash Solids - Pasco Filter Plant	beta	$0.3 \text{ } \mu\text{c/g}$	+5
Backwash Liquids - Pasco Filter Plant	beta	4.6×10^{-7}	--
Sand Filter - Pasco Filter Plant	beta	$1.7 \times 10^{-4} \text{ } \mu\text{c/g}$	--
Anthracite Filter - Pasco Filter Plant	beta	$1.9 \times 10^{-4} \text{ } \mu\text{c/g}$	--

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Sample Type and Location	Activity Type	Average Activity Density /uc/cc	Trend* Factor
<u>Other Waters and Related Materials</u>			
300 Area Wells #1, 2, 3	alpha	(0.5 to 5.1) x 10 ⁻⁸	--
300 Area Well #4	alpha	3.3 x 10 ⁻⁸	--
Well #4 measured as uranium	U	2.6 x 10 ⁻⁸	--
Other Wells on the reservation	beta	(0.5 to 3.6) x 10 ⁻⁷	--
Columbia River - Hanford Ferry	beta	2.4 x 10 ⁻⁵	--
Columbia River - below reactors	beta	1.2 x 10 ⁻⁵	--
Columbia River - Patterson to McNary	beta	5.4 x 10 ⁻⁷	--
Columbia River - shore mud	beta	(0.2 to 1.3) x 10 ⁻⁴ /uc/g	--
Raw Water - Operating areas	beta	(0.05 to 3.2) x 10 ⁻⁶	+2
Reactor effluent retention basins to river	beta	14,000 to 24,000 /uc/sec/ reactor	--
Reactor effluent retention basins to river	alpha	(4.6 to 6.2) x 10 ⁻³ (0.03 /uc/sec/reactor)	--
I ¹³¹ in farm wastes to river	I ¹³¹	(5 x 10 ⁻⁹) 45 /uc/day	--
I ¹³¹ in Columbia River - Hanford	I ¹³¹	1.2 x 10 ⁻⁷ 1.4 x 10 ⁻⁷	-6 --
<u>Atmospheric Pollution</u>			
Gross Alpha Emitters	alpha	(4 to 7) x 10 ⁻¹⁵	-2
Gross Dose Rate - Separations Areas	beta - gamma	0.6 to 3.0 mrad/day	--
Gross Dose Rate - Residential Areas	beta - gamma	0.4 to 0.9 mrad/day	--
Active Particles - Separations Areas	beta	(4.4 to 6.2) x 10 ⁻¹³	-2
I ¹³¹ Separations Areas	I ¹³¹	(0.4 to 7.1) x 10 ⁻¹³	--
I ¹³¹ Separations Stacks	I ¹³¹	2.9 curies/day	+2
Ruthenium - Separations Stacks	Ru ^{103,106}	(0.06 curies/day)	+2
Active Particles - Wash., Idaho, Oregon, Mont.	--	0.006 to 0.07 ptle/m ³	-5
Active Particles - HAPO	--	0.01 to 0.13 ptle/m ³	--
Tritium (as oxides) - Reactor Stacks	T	0.56 curies/day	-2

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Sample Type and Location	Activity Type	Average Activity Density $\mu\text{c/cc}$	Trend* Factor
<u>Vegetation</u>			
Environs of Separations Areas	I^{131}	$(0.03 \text{ to } 1.2) \times 10^{-4} \mu\text{c/g}$	+3
Residential Areas	I^{131}	$(\leq 3.0 \text{ to } 6.4) \times 10^{-6} \mu\text{c/g}$	+2
Eastern Washington and Oregon	I^{131}	$(\leq 3.0 \text{ to } 4) \times 10^{-6} \mu\text{c/g}$	--
Non-volatile beta emitters- beta Wash. and Oregon		$(6.2 \text{ to } 8.0) \times 10^{-5} \mu\text{c/g}$	--
Alpha Emitters - Separations Areas	alpha	$(1.7 \text{ to } 8.7) \times 10^{-7} \mu\text{c/g}$	--
Alpha Emitters - 300 Area	alpha	$3.4 \times 10^{-6} \mu\text{c/g}$	+15

*The trend factor shows the n-fold increase (+) or decrease (-) from last month, where values of n less than 2 will not be noted.

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FINANCIAL DEPARTMENT MONTHLY REPORT
JANUARY, 1955

The Budgets and Measurements Section prepared a detailed list of measurements applicable to HAPO management for use by the General Manager in determining items for which each department manager will be held accountable and on which he will be measured in 1955. A comprehensive inventory of existing measurements at HAPO which should determine present strengths and weaknesses is in the course of preparation.

Financial Department personnel met with AEC Budget and Finance Division representatives on January 20 to review procedures for obligation of funds under the Contract.

A staff member of the Financial Department visited the facilities of the ASCO Sintering Company in Los Angeles to review records and assist in the settlement of a vendor's claim.

The Manager - Budgets and Measurements represented the Financial Department on a task force assigned to review existing training programs at HAPO and suggest methods of improving the position of first-line supervisors as representatives of the Company to their employees.

Agreements were reached with the local AEC Finance Division on several proposed changes in the Product Cost Report. The changes which we believe would provide most improvement are the placing pile production on a MWD basis rather than the gram basis now in use and the segregation of basin inventories between Low and High NGS without area segregation. These changes have been referred for approval to the Assistant Controller for Accounting, AEC, Washington, D. C.

Discussions were held by Engineering Cost with representatives of Transportation, Property Management, Plant Accounting, Manufacturing Cost, Minor Construction and HOO-AEC Budget and Finance Divisions relative to the possible consolidation of the responsibility for management and storage of all project automotive and heavy equipment. HOO-AEC requested that decisions arising from problems in connection with budgeting and accounting for the equipment await instructions from the Washington AEC Office as it is planned to treat all AEC sites the same. Such instructions are expected shortly after February 15.

Discussion was also held with representatives of Project Section, Property Management, Plant Accounts, Purchasing and Stores Section, and the Atomic Energy Commission relative to the storage and cost of moving to storage, that construction equipment (jigs, fixtures, etc.) to be held for future use. The Purchasing and Stores Section will accept custody and supervise storage with CPFF Construction Contractors furnishing the necessary labor and equipment to move equipment to storage areas. Any costs incurred by General Electric Company on this program are to be billed to the Atomic Energy Commission.

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A meeting was held on January 27 with representatives of AEC and GE Community Management and with Community Cost personnel to discuss, along with other utility problems, the rates to be charged the Army for water and sewerage following disposal of North Richland. A figure of \$40 per MM gallons for water and \$90 per MM gallons for sewerage was tentatively arrived at, and a discussion will now be held between AEC and the Army to see if this is acceptable.

Considerable effort was devoted during the month to bringing a booklet containing statistics on Community disposal up to date. These statistics are for possible use by the Plant Manager in the event he is called upon for information in connection with disposal legislation. The Accountant, Employee and Public Relations Cost is working directly with the Specialist - Community Transfer Study on this project.

An audit of cost accounting procedures and flow of costs was initiated during January by representatives of the General Accounting Office and considerable assistance is being given by Contract Cost personnel.

The invested capital and accumulated reserves for completed plant at each December 31 from 1947 to 1954 was prepared by the Property Accounting Section for use on the report, "1954 at HAPCO," as was a brief but comprehensive paragraph on past depreciation practices.

The utilization report for Project AEC-1114, Consolidation of Transportation Facilities (\$2,140,000) was completed and distributed in January. Charges have not been received from AEC, and therefore have not been posted to plant records.

Hanford Depreciation and Obsolescence Recommendation, Document HW-34278, was submitted for approval during the month. This recommendation indicates substantial revision in both method of depreciation and estimated process lives.

Automotive and heavy equipment parts (in Stores' custody) were physically inventoried on January 13 and 14. Tentative results of this inventory reflect a difference of \$1,449 over the reconciled book value of \$112,322. Final results will be made available during February after the IBM tabulations which show the pertinent physical inventory data have been analyzed and verified to custodial stock records.

Equipment to be held for future use upon the completion of the Kaiser contract will be stored in the White Bluffs heavy duty shop. Precision instruments will be stored in the 2101 Building vault and the remainder of the instruments in the Stores-controlled area of the 2101 Building. Expenses will be charged to AEC cost codes.

The Security Patrol's coverage of the 101 Building was discontinued on January 31 in order to effect savings in the Patrol Unit's costs. Since the Patrol had carried on pass inspection and around-the-clock watchman's service, this change has increased the responsibilities of the Accounts Payable and Plant Accounting Units in the way of providing adequate protection of records from fire, and in the matter of security.

A manual of authorizations held by Financial Department personnel, which has been in the course of revision for some time, was completed in January except for some minor corrections and will be issued in February.

The Department's quarterly organization directory was issued as of December 31 and Financial Department data was furnished for the HAPO plant organization directory.

The preparation of initial data for an office space survey to determine the department's present and anticipated future requirements got under way this month. The necessity for moving the Accounts Payable and Plant Accounting Units out of the 101 Building, which is to be transferred to the Army when it can be released, is one of the reasons for this survey. This data is also required for a study of the needs for office space in the 700 Area by all departments at HAPO.

A routine has been established to make certain advances and refunds in cash at the Works Cashier's office, instead of by check, and this will begin in February, when forms are expected to be available. This change has been inaugurated for the convenience of employees traveling on Company business who need cash for expenses and will eliminate the necessity of preparing checks for refunding credit accounts receivable balances.

Agreements were executed between General Electric Company and the GESA and HAPO Federal Credit Unions covering employee payroll deductions for the purchase of shares in the credit unions. Payroll deduction authorization forms have been prepared and given to the credit unions. It is expected that deductions for credit union shares will be made for the first time from the monthly payroll for February, and from the weekly payroll for the week ending February 13, to be paid on February 18.

The new Exempt Salary Plan was made effective January 1 and required data on individual exempt employees was posted to payroll records and verified with Salary Administration records.

Proprietary responsibility for time clocks was transferred in January from the Personnel Accounting Section to the Office Equipment Unit, and agreement was reached with respect to clock maintenance work to be performed by the Office Equipment Unit, and charges to Personnel Accounting for such maintenance. Under the new arrangement, it is expected that charges to Personnel Accounting for clock maintenance will be reduced by approximately \$5,000 annually.

The SF Accountability Section completed its reorganization in January with the establishment of the Reactor Area SF Accountability Unit. A preliminary chart of accounts has been instituted, line flow diagrams of SF materials developed, and measurement points defined. The establishment of accounting procedures in conformity with standard audit requirements is being developed.

A six months' review of Metal Preparations SF accountability performance was developed and reviewed with Manufacturing operations and process units. Agreements were reached on revisions required to be effective February 1.

Revised SF accounting procedures relating to the TBP and UO_3 processes were completed through the planning and testing stages and were accepted for application February 1.

SF measurement method problems involving a number of significant points were reviewed, including; bias in the fluorimeter assay of depleted uranium; uranium content of nitric acid recovery at TBP; basis of charges to process solution, Metal Preparation Area; and the definition of status involving C-6 oxide and its potential transfer to TBP, as well as a review of underground storage in the 300 Area.

An audit program and schedule for SF materials was completed by the SF Accounting Unit. The program has been integrated with the activities of the Audit Section.

A special representative of the International Business Machines Corporation, John J. Kenney Jr., and James W. Pontius, consultant - Electronic Data Processing Development Services, Accounting Services Division, visited HAPD in January to discuss plans and progress toward installation of the 702 Electronic Data Processing Machine in June.

The Computing and Procedures Section was reorganized as of January 10 to set up a single Computing Unit in charge of two shift supervisors, in place of three units, as formerly.

An educational film prepared by Arthur Anderson, management consultant, explaining the basic principles of electronic data processing on large computers, was shown to all personnel of the Procedural Analysis Unit and to a large number of supervisors and interested personnel in the Financial and Engineering Departments. The Procedures and Computing Section also held voluntary evening classes in 702 programming for analysts not presently assigned to this work.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

Summary of Cash Disbursements, Receipts and Advances	I - 5
Auditing Section	I - 6
Budgets and Measurements Section	I - 7
Contract Cost Section	I - 8 through I - 11
General Accounting Section	I - 12 through I - 17
Personnel Accounting Section	I - 18 through I - 21
Procedures and Computing Section	I - 22 through I - 25
Property Accounting Section	I - 26 through I - 31
SF Accountability Section	I - 32 through I - 33
Personnel and Organization Statistics	I - 34 through I - 35

SUMMARY OF CASH DISBURSEMENTS,
RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of \$5,400,000 and \$6,000,000, respectively, by the Atomic Energy Commission) for the months of January, 1955 and December, 1954, is shown below:

<u>Disbursements</u>	<u>January</u>	<u>December</u>
Payrolls (net)	\$2 929 912	\$3 555 047
Materials and Freight	1 508 382	1 475 047
Payroll Taxes	636 814	535 896
Payments to Subcontractors	504 252	559 926
Group Insurance Premium	145 834	145 170
Pension Plan - Employees' Portion	133 952	113 307
United States Savings Bonds	97 090	226 389
Travel Advances to Employees	50 148	47 159
All Other	124 480	91 689
Total	6 130 864	6 749 630
<u>Receipts</u>		
Rent	151 545	135 938
Electricity	91 736	64 507
Telephone	58 127	49 538
Hospital	53 768	61 890
Sales to AEC Cost-type Contractors	17 963	12 553
Sundry Accounts Receivable	12 614	12 319
Bus Fares	9 012	8 209
Refund of Travel Advances to Employees	8 403	7 488
Refunds from Vendors	5 683	6 777
Other	6 782	3 721
Total	415 633	362 940
Net Disbursements	<u>\$5 715 231</u>	<u>\$6 386 690</u>

Outstanding advances as of January 31, 1955 and December 31, 1954 were as follows:

	<u>January</u>	<u>December</u>
Cash in Bank - Contract Accounts	\$1 543 779	\$1 859 010
Cash in Bank - Salary Accounts	15 000	15 000
Total	<u>\$1 558 779</u>	<u>\$1 874 010</u>

AUDITING SECTION
MONTHLY REPORT - JANUARY, 1955

Reports were issued for the completed audits listed below:

- Motor Pool Operations
- Plant Accounting Records for Motor Pool Equipment
- Receiving and Inspection
- Photographic Equipment and Operations

At month-end, reports were being prepared for audits of:

- Cost Accounting
- Management of Capital Assets
- Excess, Salvage and Scrap
- Accounts Receivable - Safety Shoes, AEC Cost-Type Contractors, Equipment
- Sales to Facilities, Loans to Employees, and Sundry

Field work was continued on the following audits:

- Classified Files
- Accounts Receivable - Kadlec Hospital
- Accounts Receivable - Rent

The following audits were started during the month:

- Accounts Receivable - Electricity
- Accounts Receivable - Telephone
- General Electric Insurance Plan
- General Electric Pension Plan

An auditor visited the offices of Hanson-VanWinkle-Munning Company in Matawan, New Jersey, for the purpose of auditing costs incurred for purchase order HWC7073 on which work has been held up until October 1, 1955.

Follow-ups were made to determine the extent of compliance with recommendations made as a result of the audits listed below:

- Printing, Duplicating and Reproduction Services
- Journal Entries to Inventory Reserve Accounts

Three employee information meetings of exempt employees were held during the month. One of these included safety, security and health subjects, and was attended also by the non-exempt employees.

BUDGETS AND MEASUREMENTS SECTION
MONTHLY REPORT - JANUARY, 1955

General

The Section Manager was appointed to represent the Financial Department on a task force assigned to review existing training programs at HAPO and suggest methods for improving the position of first-line supervision so that full recognition can be made of status as "Mr. General Electric". Three meetings were held in January with final report due to the General Manager on February 15.

The Section Manager, as Financial Department member of the Suggestion Board, attended the regular Board meeting on January 20. Two Financial Department suggestions were presented for Board action and were approved.

As Financial representative, the Section Manager visited the facilities of the ASCO Sintering Company in Los Angeles to review records and aid in settlement of a vendor's claim.

A meeting was held with the AEC Budget and Finance Divisions on January 20 to review procedures for obligation of funds under the Contract. Final responsibility has been assigned by the Manager - Finance to the Manager - General Accounting for future obligational determinations.

Budgets

Schedules were established and responsible supervision notified in writing relative to the FY 1956 Budget. At the request of R. M. Watkins, dates as originally set have been moved back one week allowing additional time for field preparation.

A revision of Organization and Policy Guide No. 18.7 - Overtime - was undertaken and new percentage controls developed. Official reissue of this Guide may be expected in February.

Bogeys were prepared on schedule and reviewed with management.

Measurements

A detailed list of measurements applicable to HAPO management was prepared for use by the General Manager in determining items for which each department manager will be held accountable and on which he will be measured during calendar year 1955.

Work continued on a comprehensive inventory of existing measurements at HAPO which should determine present strengths and weaknesses. A report on this inventory may be expected in March.

A meeting was held with all Measurements personnel and E. B. Montgomery of the Engineering Department to discuss work by the latter in developing measurements of Research and Development. Mr. Montgomery spent approximately three years on this work and is very familiar with measurement applications.

CONTRACT COST SECTION
MONTHLY REPORT - JANUARY, 1955

Summary

FY 1957 Program Assumptions and Budget and Reporting classifications for the Biology and Medicine Program were received from the HOO-AEC Budget Division on January 28, 1955. A major change in budgeting and cost reporting will be required if these instructions are to be followed. Comments are being prepared (including those of Radiological Sciences Department) for reply to the AEC.

Information was received from Budgets and Measurements Section on January 10, 1955 regarding instructions, assumptions and due dates for preparation and submission of the Budget for FY 1957 and Revision of the Budget for FY 1956.

Preparation of Operating Budget is underway as well as preparation of Plant and Equipment Budget. Schedule of Plant and Equipment project costs at December 31, 1954 was prepared and transmitted to Accountants and other budget personnel.

On January 17, 1955 a letter regarding the status of the FY 1956 Plant and Equipment budget as submitted to Congress was issued to Accountants and other interested personnel.

Top Secret Document XX-1365 titled "Product Unit Cost (Current Basis) Second Quarter FY 1955" was issued. This report shows in detail the calculations made in combining production quantities, conversion factors, SF Material costs, conversion and depreciation costs to determine both high and low G/T plutonium unit costs for the period.

Due to obvious shortcomings in the newly established work order procedure, a meeting of all interested personnel was held on January 21 to determine what changes should be made. Eight changes were proposed and investigation having proved the proposals to be sound, the procedure will be adjusted accordingly. The major change provides for the elimination of the weekly report of Expense Codes in favor of a single monthly report. (This particular adjustment will be included in February reports for the first time).

Arrangements were made between Engineering Cost and Manufacturing Cost to discontinue the use of work orders from CPFF Construction Contractors to cover the withdrawal of essential materials. Manufacturing will in the future accept stores tickets from the CPFF Construction Contractors to cover these withdrawals.

At the request of Wage Rates, supervision is in the process of preparing write-ups on all non-exempt jobs in the section. It is expected that these write-ups will be completed prior to the end of February.

Transfer of the Manufacturing Cost Unit office from the 717-A Building to the 722-A Building was made during the month. It is generally agreed by Cost Unit personnel that this move provided considerable improvement in working conditions.

General and Consolidations Cost

Considerable assistance was given Radiological Sciences personnel in compiling cost information for use in the recent meeting with the AEC Advisory Committee on the Biology and Medicine program.

A special analysis of the IBM machine rental accrual was completed in order to determine the proper accrual for the balance of the fiscal year so that all costs might be liquidated in the year in which they are incurred.

Reports issued during January by this unit were in nearly all instances from two to seven days earlier than issue dates for the preceding month.

Employee and Public Relations Cost

A series of 16 charts depicting cost-budget relationships for 16 operations or combinations of operations of the Employee and Public Relations Department were completed and will be presented to the manager of the department within the next few days. These charts provide room for adding information monthly through the end of this fiscal year, at which time it is planned that new charts will be developed for use in the ensuing fiscal year.

The Plant Activities Cost Sub-Unit has completed a work order procedure for submission to the field which will be reduced in size for inclusion in the cost code book issued to operating personnel. These will be distributed to all Employee and Public Relations Department foremen as well as other personnel interested in work orders.

Liquidation rates used in recovering costs of certain activities in the department were examined in the light of experience during the first half of this fiscal year and some minor changes were introduced to correct over-under liquidation patterns.

A study of personnel requirements in the Community Cost Sub-Unit indicated that it may be possible to reduce the number of people assigned by one. Arrangements have, therefore, been made to transfer as of February 14, 1955 one person to the General Books Unit without obtaining a replacement. This will entail a minor amount of additional overtime during certain periods, but a substantial over-all reduction in cost should result.

Engineering Cost

Efforts are being directed toward segregating official project estimates to estimated amounts for each individual cost code established for recording cost of the project. This should permit greater cost control and indicate possible overruns in time to institute corrective action.

Standard rates used to liquidate Project Section operating expenses were reviewed as of December 31, 1954 with representatives of the Project Section. Recommendations were made that the overliquidation of Reactor Engineering costs be reduced by \$36 000 and credit passed to Project CA-512, 100-K Reactor Facilities; also, that standard liquidation rates for Minor Construction Indirect Expense, CPFF Service Contractor Fees, Small Tools Maintenance, Project Warehousing, and Major Equipment Maintenance be reduced. These recommendations were based on Minor Construction's work load for the next two years and are being reviewed by Project Section.

A meeting was held with representatives of General Cost, Radiological Sciences and Project Section relative to the establishing of cost codes within Radiological Sciences which will clearly indicate work location for those employees furnishing monitoring services for construction projects. Codes were established and will become effective with February business.

During the month of January, the format of the weekly cost statement for the Design Section was changed by grouping sub-headings and related design orders together. In the past, sub-headings were listed in a group and design orders were grouped separately. By listing design orders under the sub-heading where they liquidate, more information is available plus the fact that one page of footnotes was eliminated.

Manufacturing Cost

The Financial Representative in the Metal Preparation Section performed a study on the cost of canning uranium slugs during Calendar Year 1955.

This study was based on assumed production and yield information furnished by the Metal Preparation Operations Sub-Section and provided a basis for the preparation of charts used by the Section in submitting annual performance comments to the Department Manager.

Each major piece of equipment in Radiochemistry Laboratory Building was assigned an expense code as part of a detailed cost coding system for equipment maintenance in the 300 Area. This program, mentioned in last month's report, should be complete by June 30, 1955.

The Separations Section Financial Representative participated in a fourth of a series of meetings held by the Manager of Separations Section with first line supervision. The meetings are designed to give the first line supervision a more complete picture of the functions of his Section.

A concentrated effort is being made to reduce the manhours expended in preparing the lengthy report on "Equipment not Included in Construction Projects." One step in this direction was to change from the ledger type system to cardex. This system is more flexible and still provides all the detail information necessary for equipment control.

Forms to be used for reporting activity within the frozen lunch inventories were supplied to area personnel. Inventories taken in 100-DR, F and KW were witnessed and an audit of the Separations Section frozen lunch procedure was made. Area Representatives will audit the accounts monthly to provide additional control on frozen lunch disbursements.

In accordance with the new Suggestion routine, suggestions prepared by Manufacturing Department employees with cost savings of over \$500 are referred to Area Representatives for review of the savings. Sixteen such suggestions were reviewed by the Financial Representatives during January.

Two suggestions were submitted by Manufacturing Cost personnel to the suggestion system during the month. As a result, acceptance of one suggestion, a new material transfer form to be used for miscellaneous applied materials was turned over to Forms Control for design.

GENERAL ACCOUNTING SECTION
MONTHLY REPORT--JANUARY, 1955

ADMINISTRATIVE PLANNING

A total of 37 new or revised organization and policy guides were issued during January. Of these, 30 were organization guides and seven were policies or instructions guides.

Included in the guides issued was 15.2, Control of Classified Documents, which is a 28-page Security guide replacing 16 obsolete issues. At the request of Security, 1,000 extra copies were published for distribution by Security to document custodians who do not receive OPG's.

Five complete books of OPG's were distributed to individuals newly placed on the distribution list; and a total of 107 extra copies of OPG's were sent to individuals requesting them.

A report was issued summarizing AEC transmittals received during December, 1954.

The HAPO Section of the Company Organization Directory was revised to reflect the organization as of February 1, 1955.

Two Office Letters, #206, Distribution of Withholding Statements for year 1954, and #207, GE Insurance Plan, were processed.

ACCOUNTS PAYABLE UNIT

Volume of vouchers booked in Accounts Payable during the month numbered 3991, amounting to \$3,138,295, which was an increase over December but less than the monthly average for 1954.

In working with a representative from the Auditing Section, a complete review was made during January in connection with procedures relative to the payment and distribution to cost of collect transportation charges. Certain revisions to the existing procedure were agreed upon and are to be effected February 1st.

Effective January 31st, checking of badges and "round the clock" security patrol coverage was discontinued at the 101 Building, 3000 Area.

Due to the fact that the Manufacturing Department is now furnishing frozen overtime lunches in the areas, the number furnished by the Mart Cafeteria has been substantially reduced. During January the Mart furnished 389 lunches at a cost of \$460 as compared to 803 lunches at a cost of \$970 furnished during December.

Active contracts handled by Accounts Payable, excluding requirements contracts, numbered 26, and contract commitments at the end of January amounted to \$635,556. Payments on these contracts in January totaled

ACCOUNTS PAYABLE UNIT (Continued)

\$144,591. Requirements contract purchase orders placed during January numbered 14 in the amount of \$404,308 and commitments at the end of January amounted to \$667,066. Payments under requirements contracts for the month were \$357,459.

Under Supply Contract No. SO-2 between General Electric and International Business Machine Corporation, dated November 2, 1954 and effective July 1, 1954, for electric accounting machine service, there was billed \$87,180 of which \$75,809 was paid during January, the difference of \$11,371 representing January service due in February.

Statistics for January and December are given below:

Accounts Payable:	January	December
Balance at beginning of month	\$ 717 281	\$ 764 224
Vouchers entered	3 138 295	2 937 840
Accrual for inventories	36 433	26 719
Cash receipts	5 683	6 777
	<u>3 897 692</u>	<u>3 735 560</u>
Less:		
Vouchers paid	3 103 870	2 968 194
Reversal of accruals	26 719	50 085
	<u>3 130 589</u>	<u>3 018 279</u>
Balance at end of month	<u>\$ 767 103</u>	<u>\$ 717 281</u>
Other Statistics:		
Number of vouchers recorded	3 991	3 801
Number of checks issued	2 439	2 570
Number of freight bills paid	1 489	1 687
Amount of freight bills paid	\$284 024	\$329 790
Number of purchase orders received	2 030	2 113
Amount of purchase orders received	\$2 112 840	\$2 735 700
Amount of cash discount earned	\$5 146	\$4 834

ACCOUNTS RECEIVABLE UNIT

In January, 1955, approximately 20,000 individual accounts receivable were active and the month-end net balance was \$258,331, \$3,000 less than that of the previous month.

The quarterly accounts receivable report was issued in January indicating a gross balance at December 31, 1954 of \$290,054. Total accounts receivable charges booked during the quarter amounted to \$1,822,024, while

ACCOUNTS RECEIVABLE UNIT (Continued)

collections aggregated \$1,841,092, or 101% of charges. The general ledger balance of \$290,054 reflected a decrease of \$19,071, or 6.2% as compared to the balance at the end of the previous quarter.

Accounts receivable balances were reviewed in January to determine adequacy of Reserve for Bad Debts. Expected future bad debt losses compared favorably with the reserve balance of \$28,743 at December 31, 1953; however, it appears that there may be an over-accrual for bad debts at Kadlec Hospital, and an under-accrual for community accounts. Accrual rates were adjusted, and, for the balance of FY-1955, \$700 per month will be accrued for rental and utility accounts, and no accrual will be made for Kadlec Hospital accounts.

The balance of Kadlec Hospital accounts receivable at January 31, 1955 amounted to \$109,134, reflecting an increase of \$15,336 in comparison to the balance of \$93,798 at December 31, 1954. This increase was due to the adult patient day census increasing from 60.6 in December to 74.0 in January and the resultant increase of \$13,087 in sales from \$59,184 in December to \$72,271.

The balance of electricity accounts receivable decreased \$22,183 during the month, from \$56,805 at December 31, 1954 to \$34,622 at January 31, 1955. Total charges during the month amounted to \$70,475 while collections amounted to \$92,657.

Statistics for Accounts Receivable activities are given below:

<u>Account</u>	<u>Balance 12-31-54</u>	<u>Net Charges</u>	<u>Collec- tions</u>	<u>Balance 1-31-55</u>	<u>Bills Issued in Jan.</u>
Kadlec Hospital:					
Active	\$ 83 605	\$ 71 639	\$ 57 333	\$ 97 911	1 346
Collection					
Agencies					
(105 Accounts)	10 193	1 184	154	11 223	
Sundry:					
Active	26 286	25 765	12 751	39 300	439
Collection					
Agencies					
(172 Accounts)*	8 148	227	70	8 305	
Telephone	35 983	55 460	59 247	32 196	6 836
Electricity	56 805	70 474	92 657	34 622	3 942
Equipment sales to					
Facilities					
(1 Account)	23 383		349	23 034	
Rent	25 684	422 644	419 378	28 950	6 847
Sales to Cost-type					
Contractors	18 413	11 877	18 739	11 551	20
Safety Shoes	1 085	2 880	2 009	1 956	486
Loans to Employees					
(2 Accounts)	469		214	255	
Sub-total	290 054	\$662 150	\$662 901	289 303	19 916

*Includes all utility and rental accounts.

ACCOUNTS RECEIVABLE UNIT (Continued)

<u>Account</u>	<u>Balance</u> <u>12-31-54</u>	<u>Net</u> <u>Charges</u>	<u>Collec-</u> <u>tions</u>	<u>Balance</u> <u>1-31-55</u>	<u>Bills</u> <u>Issued</u> <u>in Jan.</u>
Sub-total (Carried Forward)	290 054	<u>\$662 150</u>	<u>\$662 901</u>	289 303	<u>19 916</u>
Reserve for Bad Debts	<u>28 743</u>			<u>30 972</u>	
General Ledger Balance	<u>\$261 311</u>			<u>\$258 331</u>	

CONTRACT REIMBURSEMENTS

The December "Summary of Disbursements," transmitted to the Commission through the Chief of its Finance Division, covered disbursements totaling \$6,386,690 as follows:

Payrolls and Payroll Deductions Disbursed	\$4 510 053
Materials (including payments on requirements contracts) and Freight	1 975 685
Subcontracts and agreements	59 287
Advances for Traveling and Living Expense	47 159
Miscellaneous Payments	<u>157 446</u>
Gross Disbursements	\$6 749 630
Less: Revenue	<u>362 940</u>
Net Disbursements	<u>\$6 386 690</u>

In preparing this report, a review was made of each of 212 items which comprised "Miscellaneous" to establish their propriety, while all other disbursements were analyzed, classified and summarized to disclose the nature of all of the expenditures made by HAPO during the month.

Seven letters, written in accordance with O.P.G. 05.4 ("Work or Expenditures Which Require AEC Reimbursement Authorization or Letter Approval"), were approved by the Commission in January. The Contract Reimbursements group handled 16 inquiries on reimbursement problems during the month.

Organization and Policy Guide No. 24.3 ("Reimbursement for Contaminated Personal Effects") was reviewed and a letter written to the Commission to obtain approval for the replacement of contaminated personal property through stores without prior AEC authorization for each individual case.

Administrative assignments completed included the editing and issuance of the Financial Department's quarterly organization directory and the preparation of the departmental data for the plant organization directory;

CONTRACT REIMBURSEMENTS (Continued)

the issuance of summaries for section managers of the Training and Development courses attended by their respective employees; and the preparation of initial data for an office space survey to determine the department's present and estimated future requirements.

GENERAL BOOKS UNIT

As a result of a review of the functions performed by the General Books Unit, a reassignment of work brought about a reduction of personnel by one employee and the elimination of approximately 70 hours a month overtime in the Cashier's Office. One employee was transferred to the Budgets and Measurements Section on January 31.

A procedure for disbursing cash through the Works Cashier's Office to employees obtaining travel advances and to terminating employees for accounts receivable refunds was established and will become effective in February, when newly-designed forms for this purpose will be printed.

Average daily bank balances during January totaled \$2,119,000, consisting of \$1,589,000 in the Seattle-First National Bank and \$530,000 in the National Bank of Commerce. However, month-end balance fell below the desired balance of \$2,000,000, decreasing from \$1,874,010 to \$1,558,779 as the result of disbursements made in January which had been anticipated would be made in February.

The first direct billings to HAPO under a revised procedure for the "Assistance to Hanford Program" were received from the General Engineering Laboratory. The new method eliminates considerable bookkeeping. Under the routine previously in effect, all work performed by other General Electric departments on this program was billed to KAPL, which in turn obtained payment from the Schenectady office of the AEC. The latter transferred the charges to the Hanford Operations Office and the local AEC office made a final transfer to HAPO.

Charges of \$4,834, to be paid from the Overhead Allowance, were billed to Schenectady in January. These charges represented travel and living expense variation and conference expense booked during the second quarter of the fiscal year 1955.

Statistical data for January and the previous month follows:

	<u>January</u>	<u>December</u>
Advances from A.E.C.		
Balance at beginning of month	\$1 874 010	\$2 260 700
Advances received from A.E.C.	5 400 000	6 000 000
Other cash receipts	415 633	362 940
	<u>7 689 643</u>	<u>8 623 640</u>
Less disbursements	<u>6 130 864</u>	<u>6 749 630</u>
Balance at end of month	<u>\$1 558 779</u>	<u>\$1 874 010</u>
Advances requested for subsequent month	<u>\$8 650 000</u>	<u>\$5 400 000</u>

GENERAL BOOKS UNIT (Continued)

	<u>January</u>	<u>December</u>
Travel Advances to Employees		
Balance at beginning of month	\$ 54 395	\$ 64 020
Advanced to employees	50 247	47 452
	<u>104 642</u>	<u>111 472</u>
Less:		
Travel, living and conference		
expenses reported by employees	47 893	49 588
Cash refunded by employees	8 403	7 489
	<u>56 296</u>	<u>57 077</u>
Balance at end of month	\$ <u>48 346</u>	\$ <u>54 395</u>
Outstanding Travel Advances to Employees		
Current	\$ 45 060	\$ 45 014
Outstanding over 30 days	3 286	9 381
Total	<u>\$ 48 346</u>	<u>\$ 54 395</u>
Travel, Living and Conference Expenses		
Travel and living expenses		
Off-site inspectors	\$ 18 198	\$ 22 750
Others	29 165	25 113
	<u>47 363</u>	<u>47 863</u>
Conference expenses	530	1 725
Total	<u>47 893</u>	<u>49 588</u>
Less:		
Expenses for trips which included		
attendance at Association Island		
conferences, temporarily transferred		
to Undistributed Costs	\$ (940)	\$ -0-
Expenses transferred to A.E.C.	-0-	-0-
Expenses charged to other G.E.		
components and carriers	4 348	1 938
Living expenses in excess of \$9 per diem	991	1 074
Conference expenses	530	1 725
	<u>4 929</u>	<u>4 737</u>
Amounts determined to be payable by A.E.C.	<u>\$ 42 964</u>	<u>\$ 44 851</u>
Number of expense reports submitted by employees	226	244

PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT - JANUARY, 1955

Withholding Statements, Form W-2, covering earnings and tax deductions for the year 1954 were prepared and delivered to all employees on Wednesday, January 12, 1955.

Quarterly and annual reports of state and federal payroll taxes were prepared and forwarded to the various governmental agencies. Reports were prepared for government taxing jurisdictions in 18 states and 2 cities, covering federal and state income taxes, social security taxes, and unemployment compensation taxes.

All employees were asked to file new withholding exemption certificates in December, 1954. The filing of these new certificates by employees was completed in January.

Agreements were executed between General Electric Company and the GESA and HAPO Federal Credit Unions covering employee payroll deductions for the purchase of shares in the credit unions. Payroll deduction authorization forms have been prepared and given to the credit unions. It is expected that deductions for credit union shares will be made for the first time from the monthly payroll for February, and from the weekly payroll for the week ending February 13, to be paid on February 18.

Collections of union dues by payroll deductions under the check-off provision of union agreements amounted to \$75 535 in 1954. Total charges to the union for these collections amounted to \$515.

The new Exempt Salary Plan was made effective January 1, 1955 and required data on individual exempt employees was posted to payroll records and verified with Salary Administration records. Salary Review Sheets were prepared and distributed to Department Managers on January 21.

Statistics covering changes during the fourth quarter of 1954 in the HAPO College Graduate Index were forwarded to the Accounting Services Division for consolidation with the Company Index.

Proprietary responsibility for time clocks was transferred in January from Personnel Accounting Section to Office Equipment Unit, and agreement was reached with respect to clock maintenance work to be performed by Office Equipment Unit and charges to Personnel Accounting for such maintenance. Under the new arrangement, Personnel Accounting will be charged approximately \$8 per month per clock, whereas under the previous arrangement, a fixed hourly rate of \$4 was charged to Personnel Accounting for all hours worked on maintenance of clocks. It is expected that as a result of this change, the charges to Personnel Accounting for clock maintenance will be reduced by approximately \$5 000 annually.

Increases in employee contributions to the Insurance Plan were made effective in January for those insured employees whose personal life insurance coverage had been increased since July 1, 1954, as a result of increases in their annual salary rates. Office Letter No. 207 covering this subject, was issued on January 17, 1955.

Representatives of the Wage Rates Unit began an evaluation study of nonexempt jobs in Personnel Accounting Section during the month of January. In connection with their study, supervisors of units are preparing job descriptions for review by these Wage Rates representatives.

Reimbursement Authorization No. 239, covering the new Vacation Plan effective January 1, 1955, was issued by the HOO-AEC on January 14, 1955.

Supervisors of all units in Personnel Accounting Section conducted round-table discussions with nonexempt employees during the month.

STATISTICS

Personnel Accounting Section

	<u>Total</u>	<u>Monthly Payroll</u>	<u>Weekly Payroll</u>
<u>Number of HAPO Employees</u>			
<u>Changes during month</u>			
Employees on payroll at beginning of month	8 893	2 277	6 616
Additions and transfers in	99	2	97
Removals and transfers out	(74)	(20)	(54)
Transfers from weekly to monthly payroll	-	-	-
Transfers from monthly to weekly payroll	-	(3)	3
Employees on Payroll at end of month	<u>8 918</u>	<u>2 256</u>	<u>6 662</u>
	<u>January</u>	<u>December</u>	
<u>Overtime Payments During Month</u>	<u>Number</u> <u>Amount</u>	<u>Number</u> <u>Amount</u>	
Weekly Paid Employees	6 034 \$102 577-a)	6 755 \$104 400-b)	
Monthly Paid Employees	350 31 022	378 33 827	
Total	<u>6 384</u> <u>\$133 599</u>	<u>7 133</u> <u>\$138 227</u>	
<u>Number of Changes in Salary Rates and Job Classifications</u>	<u>January</u>	<u>December</u>	
Temporary Changes	126	107	
Retroactive Changes	20	22	
Normal Changes	921	927	
Total	<u>1 067</u>	<u>1 067</u>	
<u>Gross Payroll Paid During Month</u>	<u>January</u>	<u>December</u>	
Engineering	\$ 793 715	\$ 845 081	
Manufacturing	2 288 805	2 723 485	
Other	1 123 237	1 335 702	
Total	<u>\$4 205 757 -a)</u>	<u>\$4 904 268 -b)</u>	

- (a- Payments to weekly paid employees are for four week periods.
(b- Payments to weekly paid employees are for five week periods.

	<u>Number Participating</u>	<u>Percent Participation</u>	
<u>Employee Benefit Plans</u>	<u>January</u> <u>December</u>	<u>January</u> <u>December</u>	
<u>Participation in Benefit Plans at Month End</u>			
Pension Plan	7 964 7 956	98.2% 98.1%	
Insurance Plan			
Personal coverage	8 859 8 835	99.3 99.4	
Dependent coverage	6 289 6 254	- -	
U. S. Savings Bonds			
Stock Bonus Plan	4 525 4 399	50.7 49.5	
Savings Plan	1 194 1 156	13.3 13.0	
Both Plans	5 153 5 011	57.8 56.3	

	<u>January</u>	<u>December</u>
<u>Pension Plan</u>		
Number retired	5	1
Number who became eligible for participation	37	34
Number who applied for participation	36	32
Number who elected not to participate	0	2
Replies not received	1	0
 <u>Insurance Plan - Number of Claim Payments</u>		
Employee Life Insurance	2	3
Employee accident and health insurance	479	427
Dependent accident and health insurance	408	375
Total	<u>889</u>	<u>805</u>
 <u>Good Neighbor Fund</u>		
Number participating	6 324	6 296
Percent of participation	70.9%	70.8%
 <u>Suggestion Awards</u>		
Number of awards	2	88
Total amount of awards	\$460	\$1 285
 <u>Preferential Rates</u>		
Number (eliminated) or added	(1)	3
Number currently in effect	560	561
 <u>Number of Military Allowance Payments</u>	10	3
 <u>Number of Payroll Deductions - Other than Taxes</u>		
Barracks rent	14	5
Dormitory rent	512	531
Good Neighbor Fund	11 004	13 535
Hospital	417	527
House rent	5 051	5 078
Insurance	8 969	8 933
Pension	25 200-a)	30 900-a)
Safety shoes	473	534
Savings Bonds	15 607	19 095
Trailer space	140	136
Union dues	2 068	2 025
Other	174	174
Total	<u>69 629</u>	<u>81 473</u>

(a- Approximate number rounded to nearest hundred.

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT -- JANUARY 1955

GENERAL

Mr. John J. Kenney, Jr. Special Representative of the International Business Machine Corporation to the General Electric Company visited the Hanford Atomic Products Operation on January 17 and 18, 1955. Mr. James W. Pontius, Consultant - Electronic Data Processing Development Services, Accounting Services Division, visited HAP0 on January 18 and 19. The purpose of these visits was to discuss HAP0 organization, plans and progress toward installation of the 702 Electronic Data Processing Machine in June.

Reorganization within the Procedures and Computing Section was accomplished during the month. Effective January 10, 1955 the Computing Operations Unit was organized with two Shift Supervisors responsible for operation of the Unit. This made possible the transfer of one Shift Supervisor to the Procedural Analysis Unit. In addition to this, three Clerical Working Leaders were appointed to assist the Shift Supervisors with the operation.

PROCEDURAL ANALYSIS

An educational film, prepared by Arthur Anderson, Management Consultants, explaining the basic principles of Electronic Data Processing on large computers was shown to all personnel of Procedural Analysis and to a large number of supervisors and interested personnel in Financial and Engineering.

A review of security practices was conducted with Atomic Energy Commission and General Electric Security representatives. Necessary precautions have been taken to prevent disclosure of classified information to unauthorized personnel. Entrance and exit doors have been equipped with locks, signs to direct casual traffic have been placed in strategic locations, floor stands with chains for roping off equipment processing classified reports have been obtained, and general security meetings have been held with all personnel of the Unit to discuss security regulations now in force in the 713 Building.

Forms Control reviewed 461 orders for forms during January covering 720,107 forms; 23 orders, totaling 20,650 forms were rejected; 104 new forms were designed.

"702"Program

Systems for flow charting 702 general procedures for an entire application, as well as detailed 702 logical steps, were developed in January.

Four programmers are now working approximately full time on payroll conversion. Progress to date includes completion of a generalized chart of the entire payroll, flow charting of submitted deductions procedures in detail, with assembly of the 702 loading cards in progress.

The master reports 702 pass has been block diagrammed and flow charted and is in process of being programmed. As of the end of January, approximately 25% of the total payroll procedure has been flow charted and 20% of the programming completed.

A punched card machine assembly routine is being developed which will permit the conversion of symbolic programs to direct machine loading cards by using current machines. This will reduce testing time for error checking of programs at Poughkeepsie, New York.

A "pseudo print" sub-routine was developed by the programming staff which will be suitable for incorporation in most commercial problems. The development of this routine will reduce programming effort by a factor of five to ten percent on each pass.

Voluntary evening classes in 702 programming were conducted during January for analysts not presently participating in programming during regular hours.

Employee & Public Relations Department

Quarterly and year-end reports for Salary Administration required special work requests and the wiring of one 407 panel to replace a 403 panel. Card forms were revised to shift data to new fields and to include an annual gross salary figure in the card. The new file was then arranged in salary order within levels and new zone codes punched in the file.

Revisions and improvements to this file provided a new series of six reports to Salary Administration. On the basis of these revisions and tests, new routine monthly and quarterly procedures can be developed to meet reporting requirements of Salary Administration, and the procedure is in proper form for 702 programming.

Two special reports were issued for exempt monthly payroll, both requiring wiring of special 407 panels. One was required for exempt salary review and one for producing a special report on Fair Labor Standards Act.

Engineering Department

Inventory cards were supplied for controlling Research and Development reports at HAPO. Long range plans were developed for recording and reporting these reports by holding meetings with the Classified Files supervisor.

The last of the old transaction records concerning "Offsite Documents" were returned to Classified Files for assembly into the "offsite" file. Plans were developed to bring this file into formal control beginning February 12, 1955.

A review of the Document Control system was held with members of Security and Patrol, Internal Audit, and a representative from Phillips Petroleum Company. Four separate sessions were held to discuss the system in detail.

Financial Department

Special requests initiated in December and completed during January included the following:

1. Preparation of W-4 Forms (Employee Withholding Exemption Certificate) and two statistical listings, one by payroll number and one by marital status. Both reports covered exempt and nonexempt payrolls.
2. A listing of paid up insurance deductions during 1954 was prepared for Employee Benefits Unit.
3. The number of exemptions carried in the weekly payroll records was corrected to facilitate the correct computing of withholding taxes in 1955.

PROCEDURAL ANALYSIS (continued)

PROCEDURES AND COMPUTING SECTION

4. Listings were prepared for exempt and nonexempt payrolls showing the amount of state taxable earnings per employee during 1954. IBM card forms were punched for forwarding to the State Office of Unemployment and Replacement.

Work order procedures were extensively revised during January to meet customer requirements. Revised procedures will become effective February 1, 1955. Revisions include the following reports:

1. Work Order Summaries
2. Weekly Costs to Date
3. Charges to Motorized Equipment
4. Monthly Expense Code
5. Monthly Foreman Code

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Employee and Public Relations Department	77	Standard Storage Cartons
Engineering Department	52	" " "
Financial Department	256	" " "
Manufacturing Department	183	" " "
Radiological Sciences Department	126	" " "
	<u>694</u>	

Thirty cartons of records were destroyed.

Requests for Authorization of Records Disposal Number 203, "Biology Laboratories Records" consisting of twenty-seven individual records was submitted to the Atomic Energy Commission for approval.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-34631-W.

COMPUTING OPERATIONS

During the month of January the following non-routine assignments were completed for customers:

Financial	42
Employee & Public Relations	6
Manufacturing	17
Engineering	13
Staff	7
Radiological Sciences	1
Operations Research	2
TOTAL	<u>88</u>

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COMPUTING OPERATIONS (continued)PROCEDURES AND COMPUTING SECTION

Service charges for the month amounted to \$46,559.73. Services, by customer, were as follows:

Atomic Energy Commission	\$ 817.37	2%
Employee & Public Relations	1 183.24	3
Engineering	10 834.03	23
Financial	31 200.95	66
Manufacturing	1 718.25	4
Operations Research	237.96	1 *
Radiological Sciences	567.93	1
	<u>\$46 559.73</u>	<u>100%</u>

* Less than 1%

PROPERTY ACCOUNTING SECTION
MONTHLY REPORT - JANUARY 1955

Plant Accounting Unit

The unitization report for Project AEC-114, Consolidation of Transportation Facilities, was completed and distributed in January. The final cost of the project is \$2,140,000. Charges for this project have not been received from AEC, therefore have not been posted to plant records.

Unitization of Purex Facilities has been progressing satisfactorily. The estimated completion date has been moved forward from September 30 to June 30, 1955. Unitization of 100-K facilities is scheduled for completion by April 30, 1955.

All 200 Area buildings were inventoried during January at the request of the landlord. This inventory has been reconciled to our records and the final adjustment will be made during February.

The 108-B facility was inventoried and reconciled to plant records preparatory to the transfer of this facility from Reactor Section to Separations Section.

A meeting was held with the property control unit custodians of the 200 Areas to further explain their function in regard to property control. Meetings have been arranged with each custodian in order to assist them in processing control cards assigned to them.

The invested capital and accumulated reserves for completed plant at each December 31 from 1947 through 1954 was supplied to K. G. Grimm during the month. This information will be used in the report "1954 at HAPO". A brief, comprehensive paragraph on past HAPO depreciation practices was prepared for Warren Lewis at the request of W. E. Bridges. This was also in connection with "1954 at HAPO".

The inventory of the hospital equipment was completed during the month. This inventory was made in accordance with the Major Movable Equipment check list of the American Hospital Association. This inventory will serve as a basis for a hospital capitalization policy that will be comparable to that used by other hospitals of similar size.

An inventory of the community telephone system was completed during the month. Inventory of the plant telephone system is progressing satisfactorily.

The annual fire evaluation report on Plant and Equipment was transmitted to the AEC during the month.

Aging of accounts that are over- or under-depreciated is being carried out. Recommended changes will be submitted during the month of February.

Plant Accounting Unit - continued

Plant and Equipment Values at January 31, 1954, are:

	(In Thousands)		
	<u>ASSET</u>	<u>RESERVE</u>	<u>NET</u>
Completed Plant and Equipment	\$738,194	\$298,657	\$439,537
Construction Work in Progress	38,009		38,009
Total Cost Recorded (G.E. Books)	<u>776,203</u>	<u>298,657</u>	<u>477,546</u>
AEC and Other Contractor Costs			
Land and Land Rights	5,476		5,476
Construction Work in Progress 1)	<u>202,493</u>		<u>202,493</u>
Total	<u>\$894,172</u>	<u>\$298,657</u>	<u>\$685,515</u>

	(In Dollars)	
	<u>This Month</u>	<u>Last Month</u>
1) Kaiser	\$122,416,242	\$120,350,470
Blaw Knox	57,313,588	49,408,684
AEC	<u>22,762,883</u>	<u>23,536,385</u>
Total	<u>\$202,492,713</u>	<u>\$193,295,539</u>

Hanford Depreciation and Obsolescence Recommendation, Document HW-34278, was submitted for approval during the month. This recommendation indicates substantial revision in both method of depreciation and estimated process lives.

One Secretary C was transferred to General Books during the month and one Field Clerk B was added to the Plant Accounting Unit, leaving the over-all number of personnel assigned to the Unit at 41, 7 exempt and 34 non-exempt.

Inventory Accounting Unit

Automotive and heavy equipment parts in Stores' custody were physically inventoried on January 13 and 14, 1955. Tentative results of this inventory reflect a difference of \$1,449 over the reconciled book value of \$112,322. Final results will be made available during February after the IBM tabulations which show the pertinent physical inventory data have been analyzed and verified to custodial stock records.

Preparatory work was begun during the month and final arrangements were made with Transportation Section personnel for taking the third annual physical inventory of fuels and lubricants in the custody of Transportation. This inventory is scheduled to be taken on February 10, 1955.

Inventory Accounting Unit - continued

Several meetings were attended during the month with Office Sub-Section personnel and other interested individuals to develop a procedure for taking the initial physical inventory of office machine repair parts which are warehoused in the 722-C Building and to formulate a procedure governing the accountability and control of the parts after they have been established in an inventory account. The physical inventory is scheduled to be completed and the value of the inventory booked during the latter part of March 1955.

As a result of several conferences with AEC finance personnel regarding the problem of accounting for the value of contaminated special materials which are shipped offsite, a decision was reached by the AEC that the value of contaminated materials which are physically transferred to the AEC New York Operations Office, including credits received on new purchases for materials furnished vendors by NYOO, should be transferred to the AEC. In this connection our special materials inventory account was relieved during the month of \$67,414, as summarized below.

	Platinum		Gold		Total
	Grams	Value	Grams	Value	Value
Offsite Shipments to NYOO	25,819	\$80,852	5,370	\$7,036	\$87,888
Credits Allowed on New Purchases	7,947	20,474	-0-	-0-	20,474
Total	17,872	\$60,378	5,370	\$7,036	\$67,414

By letter dated January 24, 1955, the AEC Finance Division informed us that they concurred with our recommendation to classify in the general ledger deposits on returnable containers as Deposits and Advances rather than Inventory. Accordingly, arrangements were made with the General Books Unit to make the reclassification effective with the month of January 1955.

Following is a summary showing inventory account balances for the months of December 1954 and January 1955, together with the amount of change.

	(In Thousands)		
	Book Balance		Increase
	<u>12/31/54</u>	<u>1/31/55</u>	<u>(Decrease)</u>
Current Inventories			
General Supplies	\$ 1,563	\$ 1,560	(3)
Fuel and Lubricants	70	73	3
Essential Materials	3,660	3,823	163
Total Current Inventories	<u>5,293</u>	<u>5,456</u>	<u>163</u>
Special Materials	1,410	1,352	(58)
Spare Parts	2,915	3,133	218
Standby	48	48	0
Excess Materials	449	445	(4)
Total Inventories - Gross	<u>10,115</u>	<u>10,434</u>	<u>319</u>
Less: Spare Parts Inventory Reserve	664	726	62
Standby Inventory Reserve	12	12	0
Excess Inventory Reserve	157	150	(7)
Total Inventories - Net	<u>\$ 9,282</u>	<u>\$ 9,546</u>	<u>\$ 264</u>
As a Memo: Excess Equipment	\$ 519	462	(57)
Excess Equipment Reserve	(171)	(241)	70

Inventory Accounting Unit - continued

The total number of employees in Inventory Accounting at January 31, 1955, was 12 (4 exempt and 8 non-exempt), a reduction of one below the total number at December 31, 1954.

Property Management Unit

Equipment to be held for future use upon the completion of the Kaiser contract will be stored in the White Bluffs heavy duty shop. Precision instruments will be stored in the 2101 Building vault and the remainder of the instruments in the Stores-controlled area of the 2101 Building. This equipment will be under the custody of Stores and will be carried in a special asset account in the Plant Accounting Unit. Expenses will be charged to AEC cost codes.

A decision is still to be reached as to whether the equipment temporarily in storage at the Bremerton Navy Yard will be returned to Hanford. If so, tentative plans are to store it in the White Bluffs heavy duty shop.

The AEC has approved a proposal that reduces the number of scrap segregation categories from twenty-two to three.

Property Management has recommended to Manufacturing Department that steps be taken to establish a community warehouse in each of the three major areas, under the control of the Stores Sub-Section, to provide for storage under properly controlled conditions of equipment being held by various activities throughout the plant for possible future use.

Effective February 1 the 101 Warehouse will be taken over by the Stores Sub-Section and utilized as a warehouse for the storage of certain specially held excess contaminated equipment.

In connection with the AEC proposal to establish a Consolidated Equipment Pool consultations have been held by interested personnel as to the administrative, accounting and budget problems that will be involved, especially if we attempt to commingle operations equipment, construction equipment and standby AEC pool equipment. Further discussions and decisions are awaiting AEC-Washington instructions relative to the status of AEC standby pools.

The question of the control of capital types of equipment purchased as expense items with Research and Development funds is under study with the Engineering Department.

Ninety-seven requests for the disposal of property were investigated, processed and approved during the month.

Appropriations Unit

Project proposals and informal requests which were processed by Appropriations Unit and directives issued by the Commission during the month of January are shown in the following list:

Appropriations Unit - continued

CG-496 - Recuplex Installation - Building 234-5

Project proposal requesting additional funds in the amount of \$328,000 (total project funds requested \$1,928,000) to complete the installation of the Recuplex facility was forwarded to the Commission November 16, 1954. Directive dated December 10, 1954, approved an interim authorization of \$1,650,000. Directive dated December 31, 1954, authorized total funds requested - \$1,928,000.

CA-513 - Expansion of 200 Area Facilities

Revision to the proposal requested GE authorized funds be increased from \$6,040,000 to \$6,565,000 for procurement of two additional concentrator units to be retained as spare equipment. Directives issued January 21, 1955, authorized the requested procurement and increased GE funds to \$6,665,000 to include clean-up of construction exceptions.

CG-574 - Hanford 3X Program - Irradiation

Revision to proposal presenting the reduced project scope and requesting the authorized funds of \$600,000 be reduced to \$170,000 was approved by the AEC January 26, 1955.

CG-587 - TBP Waste Scavenging

Revision to the proposal requested permission to incur additional costs in the amount of \$45,000 to construct four additional cribs (total of eight as originally proposed). Directive dated January 20, 1955, increased total project funds from \$200,000 to \$245,000 and authorized change of scope as requested.

CG-602 - Remote Sampling Equipment - Hot Semiworks

Revision to the project proposal, dated December 27, 1954, requesting an increase of \$10,000 (total funds requested \$40,000) to the funds previously authorized was approved by the AEC December 31, 1954.

CA-606 - Additional Office Space - Central Stores Warehouse

Project proposal requesting \$125,000 (GE \$10,000) for building modifications required to consolidate Purchasing, Stores, Accounts Payable and Inventory Accounting activities in one central location was forwarded to the AEC for approval November 3, 1954. AEC letter dated January 18, 1955, advised proposal would be held in abeyance pending completion of a study of office space.

CA-607 - Additional Records Storage Facilities - 712 Building

Project proposal requesting \$96,000 (GE \$11,000) for increasing the Hanford record storage space by constructing an addition to the existing 712 Building was forwarded to the Commission October 22, 1954. Directive dated January 14,

Appropriations Unit - continued

1955, authorized AEC management responsibility of the project. Field engineering and other miscellaneous project functions will be assigned to GE by work order.

CG-611 - Mobile Laboratory for Environmental Monitoring

Project proposal requesting \$26,000 to provide mobile laboratory facilities for monitoring environmental samples in the field was forwarded to the Commission November 12, 1954. Proposal returned unapproved by AEC January 6, 1955. GE letter dated January 11, 1955, requests permission to resubmit the proposal.

CG-613 - Hanford 4X Program - Metal Conversion Plant

Project proposal requesting \$340,000 for design and procurement of critical materials and equipment required to increase Hanford metal conversion capacity was approved by the Commission January 15, 1955.

CA-615 - Mechanical Maintenance Shop Centralization - 100 Areas

Project proposal requesting \$92,000 (GE \$42,000) for centralizing the 100 Areas maintenance shop work within the 1717-H Shop was forwarded to the AEC January 12, 1955.

CG-616 - Installation of Acid Feed Equipment

Request for interim authorization of \$15,000 for design scope and initiation of design for installation of acid feed equipment in the 100-B, C, D, DR, F and H Areas was approved by the Commission January 18, 1955.

CG-617 - Additional Air-Drying Facilities - Building 234-5

Project proposal requesting \$42,000 for the design, procurement and installation of additional air-drying facilities in Building 234-5 was approved by the Commission January 18, 1955.

CG-618 - Replacement of Steam Line Support Poles

Proposal requesting \$95,000 for replacement of approximately 415, and the repair of approximately 300, steam line support poles in the 100-B, D and F Areas was forwarded to the Commission January 17, 1955.

SF ACCOUNTABILITY SECTION
MONTHLY REPORT - JANUARY, 1955

Organization

The Reactor Areas-SF Accountability Unit was established as of January 17, 1955 with Mr. Fred W. Richardson as Supervisor. The unit is now engaged in the establishment of working quarters and in the definition of the SF Accountability problems applicable to the Unit. Staff meetings have been conducted, line flow of SF materials established, preliminary accounts defined and the content of required source data has been established.

Metal Preparation Area-SF Accountability Unit

Consolidated reports covering the performance for the period July-December 1954 were prepared and distributed to Metal Preparations-Operations and Process. Following detailed review by all interested parties a round-table discussion was conducted for the purpose of results evaluation, definition of process changes and schedules of delivery and process. Action taken consisted of the agreement to revise factor weights and to review the process solution account which has shown consistent overages of SF material recovery.

Preliminary contacts on the feasibility of transfer of C-6 oxide to TBP indicate this is not practical under present operating conditions. The C-6 oxide as currently produced has a silicon content in excess of TBP process tolerance. Opportunities for revision of metal preparation process control appear feasible and SF Accountability has formally requested that this problem be investigated. Potential advantages to be gained are the reduction of inventory, prompt return of inactive material to production channels and elimination of protracted periods of storage, inventory and accounting.

The standard reporting form devised for Technical Custodians was accepted by these units and is now in use. This single form replaces numerous forms of varying format and will simplify the consolidation problem.

Separations Area-SF Accountability Unit

Preliminary investigations have been initiated covering Task I and Recuplex processes and their effects on existing SF Accountability control. Material Balance Reports have been prepared in rough draft form and are now under review for adequacy.

A review of significant figures used in the posting of TBP and UO_3 accounts has been completed with appreciable reduction of work load. Following the development of data which defined potential error as nil-adoption of standard tare weights for drums used in UO_3 shipments was initiated. This eliminates the reweighing of drums reducing this operation to half of its previous level and in addition, eliminates the error arising from crossed drum stickers.

Forms for month end control have been prepared for elimination of repetitive handwritten items and will in addition provide improved security control.

SF Measurements Unit

Investigations of the Redox-MIF for Depleted Uranium have developed one source of error associated with the fluorimeter assay for wastes. This error has been common to all assays employing this method and applies to Redox, TBP and UO_3 accounts. The error is due to a systematic bias in that assay provides results less than actual content as shown by parallel assay of standard samples. As is common to all problems involving bias, the isolation of the cause is extremely difficult as is the correction. The analytical laboratories report progress and indicate elimination is expected applicable to February results.

A Manual of Inventory Verification - Redox (HW-34110) was published during January. Review by other sections has indicated general acceptance as to the adequacy and completeness of the report as issued.

SF Accountability Section - Monthly Report-January, 1955

SF Measurements Unit - continued

Conferences were held with the representative of Phillips Petroleum Company on the subject U-235 burnout and U-236 generation of J metal shipped to that company by HAP0. The importance of these determinations were technically related to burnout during pile operation and the results indicate a systematic overstatement of SF material shipped by HAP0. A significant variance is anticipated at the time of Receiver's Report. The error based on Phillips Petroleum Company measurements amounts to 11%.

Preparation of the blue data sheets for transfer to Classified Files, who are now taking over this document storage problem, have proceeded ahead of Classified Files inventory and we are now waiting on Classified Files for official transfer. This move will appreciably reduce the custodial responsibilities of the SF Accountability Section for classified documents.

Study of the Uranium content of nitric acid recovery in UO_3 disclosed appreciable error in the metered volumes as reported. Corrective action is now in progress.

Revised formulas and procedures for the calculation of control limits on unaccounted for SF material in 200 Area plants were issued (HW-34534).

An investigation into the underground waste storage by Separations Technology Section, in the 300 Area, disclosed 28,622.45 pounds of Normal Uranium and 1,440.55 pounds of Depleted Uranium being held. Transfer of this material to Recovery Operations, 200 Area, is currently being investigated.

SF Accounting Unit

Appreciable reduction in work load associated with the reporting requirements for Technical field SF materials was accomplished by the successful proposal of a single reporting procedure which replaced three separate reports containing appreciable duplication. These activities were conducted with the USAEC-Hanford Operations Office and resulted in acceptance of the proposals as originally submitted.

An Audit Schedule and Program was prepared and provided a completed organizational program for audit content and scheduling. It was accepted as presented. This program was integrated with the activities of the G. E. Internal Audit Section and has their approval.

Time schedule studies were conducted for the purpose of defining the problem involved in earlier submission of the SF Monthly Material Balance Report. Based on this guide, the field units are now attempting to expedite the reports provided for consolidation. It is anticipated that approximately three months will be required prior to the full application of the schedule which calls for submission several days prior to current reporting practice.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION

JANUARY, 1955

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Changes During Month</u>		
Employees at beginning of month	467	466
Additions and transfers in	9	7
Removals and transfers out	(7)	(6)
Employees at end of month	<u>469</u>	<u>467</u>
 <u>Personnel by Component at Month - End</u>		
<u>General</u>	<u>10</u>	<u>10</u>
<u>Auditing Section</u>	<u>17</u>	<u>17</u>
<u>Budgets and Measurements Section</u>	<u>8</u>	<u>8</u>
<u>Contract Cost Section</u>		
General and Consolidations Cost Unit	11	11
Engineering Cost Unit		
General	4	5
Design Cost	7	6
Project Cost	17	15
Technical Cost	11	11
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	10	10
Community Cost	6	6
Medical Cost	3	3
Manufacturing Cost Unit		
General	2	2
Financial Representatives	7	7
Budgets and Control	17	17
Reports and Records	19	19
Analysis and Studies	3	3
	<u>119</u>	<u>117</u>
 <u>General Accounting Section</u>		
Accounts Payable Unit	26	27
Accounts Receivable Unit	21	21
General Books Unit	19	19
Administrative Planning	3	3
Contract Reimbursements	5	5
	<u>74</u>	<u>75</u>

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Accounting Section</u>		
Payroll Planning and Analysis Unit	6	7
Weekly Payroll Unit	18	18
Monthly Payroll Unit	11	12
Benefit Plans Accounting Unit	12	11
Payroll Reports Unit	7	7
Weekly Payroll Records Unit	8	8
	<u>62</u>	<u>63</u>
<u>Procedures and Computing Section</u>		
Computing Operations Unit	23	24
Numerical Analysis Unit	11	10
Procedural Analysis Unit	14	15
Scheduling Unit	26	25
Records Unit	8	8
	<u>82</u>	<u>82</u>
<u>Property Accounting Section</u>		
Appropriations Unit	5	5
Inventory Accounting Unit	12	12
Plant Accounting Unit	40	40
Property Management Unit	4	4
	<u>61</u>	<u>61</u>
<u>SF Accountability Section</u>		
Reactor Area - SF Accountability Unit	2	1
Separations Area - SF Accountability Unit	11	11
Metal Preparation Area - SF Accountability Unit	8	7
SF Accounting Unit	6	6
SF Measurements Unit	7	7
	<u>34</u>	<u>32</u>
<u>Rotational Trainees</u>	<u>2</u>	<u>2</u>
	<u>469</u>	<u>467</u>

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PROCEDURES & COMPUTING SECTION
MONTHLY REPORT - JANUARY 1955

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GENERAL

Mr. John J. Kenney, Jr., Special Representative of the International Business Machine Corporation to the General Electric Company, visited the Hanford Atomic Products Operation on January 17 and 18, 1955. Mr. James W. Pontius, Consultant - Electronic Data Processing Development Services, Accounting Services Division, visited HAPD on January 18 and 19. The purpose of these visits was to discuss HAPD organization, plans and progress toward installation of the 702 Electronic Data Processing Machine in June.

Reorganization within the Procedures and Computing Section was accomplished during the month. Effective January 10, 1955 the Computing Operations Unit was organized with two Shift Supervisors responsible for operation of the Unit. This made possible the transfer of one Shift Supervisor to the Procedural Analysis Unit. In addition to this, three Clerical Working Leaders were appointed to assist the Shift Supervisors with the operation.

PROCEDURAL ANALYSIS

An educational film, prepared by Arthur Anderson, Management Consultants, explaining the basic principles of Electronic Data Processing on large computers was shown to all personnel of Procedural Analysis and to a large number of supervisors and interested personnel in Financial and Engineering.

A review of security practices was conducted with Atomic Energy Commission and General Electric Security representatives. Necessary precautions have been taken to prevent disclosure of classified information to unauthorized personnel. Entrance and exit doors have been equipped with locks, signs to direct casual traffic have been placed in strategic locations, floor stands with chains for roping off equipment processing classified reports have been obtained, and general security meetings have been held with all personnel of the Unit to discuss security regulations now in force in the 713 Building.

Forms Control reviewed 461 orders for forms during January covering 720,107 forms; 23 orders, totaling 20,650 forms were rejected; 104 new forms were designed.

"702 Program"

Systems for flow charting 702 general procedures for an entire application, as well as detailed 702 logical steps, were developed in January.

Four programmers are now working approximately full time on payroll conversion. Progress to date includes completion of a generalized chart of the entire payroll, flow charting of submitted deductions procedures in detail, with assembly of the 702 loading cards in progress.

The master reports 702 pass has been block diagrammed and flow charted and is in process of being programmed. As of the end of January, approximately 25% of the total payroll procedure has been flow charted and 20% of the programming completed.

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PROCEDURES & COMPUTING SECTION

HW-34631-W

PROCEDURAL ANALYSIS (continued)

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2. A listing of paid up insurance deductions during 1954 was prepared for Employee Benefits Unit.
3. The number of exemptions carried in the weekly payroll records was corrected to facilitate the correct computing of withholding taxes in 1955.

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PROCEDURES & COMPUTING SECTION

PROCEDURAL ANALYSIS (continued)

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HW-34631-W

4. Listings were prepared for exempt and nonexempt payrolls showing the amount of state taxable earnings per employee during 1954. IBM card forms were punched for forwarding to the State Office of Unemployment and Replacement.

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NUMERICAL ANALYSIS

Two sets of flow data from DR Reactor were processed in connection with the forthcoming reorificing program at this reactor. Individual tube flows and tube film indices were computed and listed. In addition, frequency distributions of flows and indices by zone were made, and a two-digit map prepared, using the special map-printing form.

Additional work was done on procedures for calculating "trip before instability" limits for D Reactor. This involved fitting a rational function to the relationship between rear header pressure and saturated temperature, and investigating procedures used in the past to determine their applicability to the present problem.

Due to a delay in the start-up of KW Reactor, the procedures developed for processing data from this reactor will now be used to process data from KE Reactor. The procedures are almost complete, including the wiring of several control panels. The first data is expected late in February.

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NUMERICAL ANALYSIS (continued)

Data from the single-column experiment at C Reactor is now being calculated to yield the exposure of the column. Exposure in megawatt days will be calculated for some 30,000 points of data, which have been fully investigated for their statistical reliability.

Routine processing of foil data from standard reactors was initiated this month. Due to the nature of the expressions involved, the calculations are being carried out on the card-programmed-calculator. Approximately 1,000 sets of data have been processed to date.

Additional work on the calculation of plutonium cross section factors has been requested. Previous work consisted of using plutonium fission cross sections in the necessary integrals. In the present work the corresponding absorption cross sections are to be used. The tabulation of these cross sections at suitable intervals is presently being carried out.

A considerable amount of work on the calculation of multiple collision densities was completed. Difficulty in interpolating the second generation density function was traced to machine errors committed in the calculation of various kernels. The latter were recomputed and used to recompute the second generation density function, which was then used successfully to calculate third generation density function. The general behavior of these successive generations indicates that it may be necessary to go to higher generations than previously expected. The accuracy of the computations was strikingly exhibited by calculating collision probabilities by two independent methods; the agreement in general is better than 1 part in 10,000. Incidental work involved listing previous results in form suitable for reproduction and distribution.

A tabulation of Bessel function ratios J_0/Y_0 and J_1/Y_1 was made for the Design Analysis Group. These functions are retained in the permanent card table file of the Numerical Analysis Unit.

Additional calculations are being made on cross section integrals for the exponential pile group. New cross sections have been submitted and are being used in the present calculations.

The results of an extensive experiment on corrosion in process tubes will be received for analysis in the near future. The corrosion phenomenon under consideration is called "burnout" in actual reactor operation and is believed to be a function of neutron flux, water quality, and flow. A great deal of data on burnout has been accumulated, but attempts at correlating these data with empirical relations have been unsuccessful so far.

An analysis of surface wind speed and direction is being made on data from Wind Station No. 5 for the year 1952. The problem requires the conversion of wind speed from miles per hour to kilometers per hour, and the calculation of the percentage of total time that the wind blew in each of 16 directions during the year.

Data from an experiment in oil fog diffusion in the atmosphere has been received. These data were taken from photographs made of a plume of oil fog at different times and from different positions. Calculations will involve finding the width and position of the

PROCEDURES & COMPUTING SECTION

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NUMERICAL ANALYSIS (continued)

plume, and averages and standard deviation of these quantities as a function of the recording time and position.

Work is continuing on the development of a general purpose assembly routine for use in 702 coding. Flow charts and programming of the routine have been completed and are presently being checked. Further testing will be carried out next month on the 702 at Poughkeepsie. Six subroutines for scientific calculations have been assigned, and four have been completed. It is expected that some of these subroutines will be tested on a 702 at the same time that the general purpose routine is tested.

COMPUTING OPERATIONS

During the month of January the following non-routine assignments were completed for customers:

Financial	42
Employee & Public Relations	6
Manufacturing	17
Engineering	13
Staff	7
Radiological Sciences	1
Operations Research	2
TOTAL	<u>88</u>

Service charges for the month amounted to \$46,559.73. Services, by customer, were as follows:

Atomic Energy Commission	\$ 817.37	2%
Employee & Public Relations	1 183.24	3
Engineering	10 834.03	23
Financial	31 200.95	66
Manufacturing	1 718.25	4
Operations Research	237.96	1 *
Radiological Sciences	<u>567.93</u>	<u>1</u>
	\$46 559.73	100%

* Less than 1%

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OPERATIONS RESEARCH STUDY

MONTHLY REPORT
JANUARY, 1955

The following is the month end summary of personnel:

	<u>As of 12-31-54</u>			<u>As of 1-31-55</u>			<u>Net Change</u>		
	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>
General	1	1	2	1	1	2	0	0	0
Operations Research Analysts	5	0	5	5	0	5	0	0	0
TOTAL	6	1	7	6	1	7	0	0	0

Mr. P. M. Thompson visited the RAND Corporation of Santa Monica, California on January 10 and 11 to use the RAND Corporation computing equipment and discuss the mathematical formulations on the production planning operations research program.

Mr. C. A. Bennett gave an invitational talk for the Inland Empire Section, of the American Chemical Society in Spokane, Washington on January 12.

Mr. L. W. Smith visited the Major Appliance Division, Home Laundry Department at Louisville, Kentucky; the Aircraft Gas Turbine Division, Aircraft Gas Turbine Development Department and the Atomic Products Division, Aircraft Nuclear Propulsion Department at Cincinnati, Ohio, to discuss operations research, planning and computing techniques. He also visited with the Atomic Energy Commission Operations Analysis group in Washington, D. C. While in Washington, D. C., Mr. Smith attended the United States Air Force-National Bureau of Standards Linear Programming Symposium held on January 27, 28, and 29, 1955.

Mr. C. A. Bennett acted as a member of the staff for an Intensive Short Course on Statistical Methods for Research Workers in Industry and the Physical Sciences on January 22, 23, and 24 sponsored by the Institute of Statistics, North Carolina State College, Raleigh, North Carolina.

Mr. B. F. Butler visited the Management Consultation Services Division in New York City on January 24, and visited the Atomic Energy Commission Operations Analysis group in Washington, D. C. on January 25, 1955.

Mr. R. Y. Dean attended the United States Air Force-National Bureau of Standards Linear Programming Symposium held on January 27, 28, and 29, in Washington, D. C.

Production Planning

On January 11 the third large computer test run was made on the Operations Research Production Planning program on the IBM 701 computer at the RAND Corporation, Santa Monica, California. The machine solution required seven hours, approximately the same time as the previous two runs. The mathematical model had been modified to

provide more desirable terminal conditions. The results obtained did not differ significantly from the previous runs except in the final period scheduled. The new model is more exacting mathematically thereby requiring 93 iterations to produce a feasible solution compared to 71 iterations for the previous model. The optimal solution, however, was obtained in 138 iterations compared to 166 for the previous run. Results from the three test runs indicate that this method of production planning is sufficiently developed to be used by the Manufacturing Department for future production planning. Training of Manufacturing Department personnel in the use of the mathematical planning techniques will start during February.

New development relative to production planning included: (1) a method of generating large segments of the matrix directly by IBM machines (previously this was done by hand) based on logical interrelationships between row and column vectors; and (2) an editing procedure by IBM machines to assure the accuracy of the final assembled IBM card matrix deck.

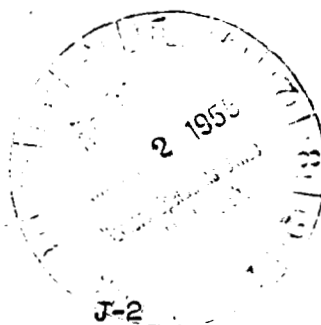
Cost Allocation

A precise method of cost distribution has been developed in principle. The method insures a complete balance between out of pocket costs (input costs) and charges to final products (output costs). Cross charges between functions are obtained in completely balanced form, thereby eliminating variance between actual cost and cost distribution. More accurate cost figures are obtained, more meaningful reports are possible, final reports can be obtained directly from the machine procedures, and can be made available several days earlier than is possible now.

Transportation

Nearing completion is a report of operations research relative to the transportation of General Electric employees between Richland and the outer areas by bus and by motor vehicle. A management decision table has been organized which illustrates the effects which can be expected from various combinations of operating revisions. This table, and the supporting material in the report, is intended to give management a basis on which to decide what changes, if any, it should make in our transportation system.

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