HW 31006 -Dc

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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

FOR

FEBRUARY 1954

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Compiled By
DEPARTMENT MANAGERS

March 23, 1954

R H Lusk
5/5/93

RICHLAND, WASHINGTON

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

FEBRUARY 1954

GENERAL SUMMARY

Production Operations

In the Metal Preparation Section production of normal charge material for the month was 79 percent of forecast. Production at a level short of forecast was due to the continued diversion of personnel to the accelerated P-10 program. The overall canning yield was 68.1 percent for February.

The total reactor input production of plutonium during February was 99.5 percent of forecast. The reactor output production was 101.5 percent of forecast. The forecast was exceeded due to a delayed discharge of P-10 material, and to higher operating levels and time operating efficiencies. A total of 15 regular uranium slugs failed in February. There were no failures of other types of slugs during the month.

The total production for the month from the Redox and T Plants was 86.2 percent of the forecast, with that of the individual plants being 86 percent and 129 percent of their respective forecasts. TBP production was 149 percent of forecast. Parallel operations were continued throughout the month and the equipment performance was generally satisfactory. The UO_3 facility production was 88 percent of forecast. The overall commitments for 234-5 production were met.

Engineering Technology

Design of the Hot Semiworks Conversion, CA-513-D, is 94 percent complete. This does not include the self-concentrator tank which is an addition to the original project scope. Detail design of the 300 Area Expansion Program, CA-514, was advanced to 81 percent completion in February.

Authorization for design of CG-575, Hanford 3X Program - P-10 Extraction Facilities, was received during the month and scope design is five percent complete. A preliminary project proposal requesting funds and authorization for the initiation of the P-10 Irradiation Project was prepared and submitted to the Commission early in February. Overall design for CG-573, Hanford 3X Program - 300 Area, is 66 percent complete, an increase of 41 percent during the month.

Packing of KW graphite began on the morning of February 16. The packing was substantially accomplished by the end of the month. (Actual completion was 11:02 AM, March 1).

Twenty-four informal, seven Class I, and one Class II radiation incidents were recorded.

Personnel and Services

One major injury, the third for the year, occurred on February 24. There were 310 minor injuries reported during the month.

The employee separation rate increased from .47 percent (adjusted rate) for January to .52 percent for February.

The total number of housing applications pending is 253.

STAFF

General Manager, Atomic Products Division	F. K. McCune
General Manager, Hanford Atomic Products Operation	W. E. Johnson
Manager, Administrative Practices	W. K. MacCready
Counsel	G. C. Butler
Manager, Finance	D. M. Johnson
Manager, Employee and Public Relations	C. N. Gross
Director, Radiological Sciences	H. M. Parker
Director, Medical	W. D. Norwood, MD
Manager, Engineering	A. B. Greninger
Manager, Manufacturing	J. E. Maider
Manager, Plant Auxiliary Operations	H. D. Middel
Manager, Community Operations and Real Estate	L. F. Huck

HANFORD ATOMIC PRODUCTS OPERATION

NUMBER OF EMPLOYEES

FEBRUARY 28, 1954

DEPARTMENT	EXEMPT		OTHERS		TOTAL	
	2-28-54	1-31-54	2-28-54	1-31-54	2-28-54	1-31-54
Engineering Department						
General	17	17	71	71	88	88
Design	176	173	125	126	301	299
Project	260	254	198	197	458	451
Technical Section						
General	6	6	2	2	8	8
Applied Research	121	122	53	52	174	174
Separations Technology	122	127	40	39	162	166
Pile Technology	101	100	62	64	163	164
Fuel Technology	70	65	68	68	138	133
Advance Technology	11	11	1	1	12	12
Manufacturing Department						
General	16	16	7	7	23	23
Reactor	255	252	1 052	1 047	1 307	1 299
Separations	292	293	1 208	1 200	1 500	1 493
Metal Preparation	98	94	447	439	545	533
Plant Auxiliary Operations Department						
General	1	1	1	1	2	2
Electrical Distribution & Telephone	31	31	138	137	169	168
Transportation	45	45	443	448	488	493
Purchasing & Stores	51	49	220	222	271	271
Plant Protection						
General	1	1	1	1	2	2
Patrol & Security	59	59	450	452	509	511
Safety & Fire	43	43	113	113	156	156
Office Services	20	20	287	285	307	305
Administration Main. Service	10	10	53	52	63	62
Operations Analysis	42	41	66	63	108	104
Community Operations & Real Estate Dept.	96	97	330	329	426	426
Financial Department						
General	4	4	4	5	8	9
Accounting	48	47	201	203	249	250
Payroll & Auditing	26	27	53	53	79	80
Employee & Public Relations Department	49	49	139	138	188	187
Radiological Sciences Department						
General	4	4	3	3	7	7
Records & Standards	28	27	140	141	168	168
Biophysics	58	59	62	61	120	120
Biology	36	36	35	36	71	72
Engineering	6	6	1	-	7	6
Medical Department	41	40	210	214	251	254
Law	3	3	2	2	5	5
General	12	12	26	27	38	39
TOTAL	2 259	2 241	6 312	6 299	8 571	8 540

AREA PERSONNEL DISTRIBUTION
FEBRUARY 28, 1954

	100-B AREA	100-D AREA	100-F AREA	100-H AREA	100-K AREA	101 AREA	200-E AREA	200-W AREA	300 AREA	700-1100-3000 AREA AND PLANT GENERAL	TOTAL
Engineering Department											
Exempt	30	77	-	12	48	-	70	56	258	333	884
Other	18	25	2	40	23	-	54	25	192	241	620
Total	48	102	2	52	71	-	124	81	450	574	1 504
Manufacturing Department											
Exempt	80	58	47	71	7	-	5	269	98	26	661
Other	281	246	393	157	-	-	92	1 086	445	14	2 714
Total	361	304	440	228	7	-	97	1 355	543	40	3 375
Plant Auxiliary Operations Department											
Exempt	26	9	9	8	7	-	16	18	14	196	303
Other	57	57	99	57	68	10	83	171	127	1 043	1 772
Total	83	66	108	65	75	10	99	189	141	1 239	2 075
Community Operations & Real Estate Dept.											
Exempt	-	-	-	-	-	-	-	-	-	96	96
Other	-	-	-	-	-	-	-	1	-	329	330
Total	-	-	-	-	-	-	-	1	-	425	426
Financial Department											
Exempt	-	-	-	1	-	-	1	1	2	73	78
Other	-	-	2	1	-	-	3	1	1	250	258
Total	-	-	2	2	-	-	4	2	3	323	336
Employee & Public Relations Department											
Exempt	-	-	-	-	-	-	-	-	-	49	49
Other	2	7	3	3	6	-	-	4	19	95	139
Total	2	7	3	3	6	-	-	4	19	144	188
Radiological Sciences Department											
Exempt	1	-	38	-	-	-	2	18	60	13	132
Other	10	-	37	-	-	-	6	16	158	14	241
Total	11	-	75	-	-	-	8	34	218	27	373
Medical Department											
Exempt	-	-	-	-	-	-	-	1	-	40	41
Other	1	4	4	1	-	-	1	5	2	192	210
Total	1	4	4	1	-	-	1	6	2	232	251

	100-B AREA	100-D AREA	100-F AREA	100-H AREA	100-K AREA	101 AREA	200-E AREA	200-W AREA	300 AREA	700-1000-3000 AR ND PLANT GENERAL	TOTAL
General	-	-	-	-	-	-	-	1	2	12	15
Exempt	-	-	-	-	-	-	-	-	19	9	28
Other	-	-	-	-	-	-	-	1	21	21	43
Total	-	-	-	-	-	-	-	364	434	838	2 259
Total Exempt	137	144	94	92	62	-	94	1 309	963	2 187	6 312
Total Other	369	339	540	259	97	10	239	1 673	1 397	3 025	8 571
GRAND TOTAL	506	483	634	351	159	10	333				

MANUFACTURING DEPARTMENT

FEBRUARY, 1954

METAL PREPARATION SECTION

The net production of acceptable slugs was 159 tons which was 79 percent of the official forecast. Production at a level short of forecast was due to the continued diversion of regular canning line personnel to the accelerated P-10 program. A total of 137 tons was canned as eight-inch pieces, and the remaining 22 tons as four-inch material with canning yields of 68.8 percent for the eight-inch and 64.6 percent for the four-inch. The overall canning yield was 68.1 percent. The canning yield for the eight-inch slugs dropped three percent below that of January due to a period when dark spots in the weld resulted in "poor bond" rejects.

There were no autoclave failures during this period.

Seventy tons of recovered slugs were canned by the lead dip method.

The cold press canning of P-10 slugs continued with an overall yield of 78 percent for the fuel slugs and 51 percent for the target slugs. The lower than average canning yields were attributed to inexperienced personnel and more rigid slug acceptance specifications.

The canning of slugs for the 3X program production test in C pile was completed during the month. Approximately 1000 enriched fuel slugs and 950 Li-Al alloy slugs were acceptably canned using the hot press and aluminum-silicon dip processes. Due to the lack of experience in the new technique, operating difficulties were encountered, and the reject rate was higher than anticipated. In order to compensate for the reject rate it is planned to hot press can additional target and fuel slugs in March for the production test.

REACTOR SECTION

The total reactor input plutonium production was 99.5 percent of the official forecast. The overall reactor operating efficiency, including the scheduled outages at F and B for the venturi installations, was 79.8 percent. Excluding these outages the operating efficiency was 83.3 percent. Major operating difficulties affecting production adversely were as follows: water leaks that resulted in a loss of reactivity and subsequent low power operation at the F Reactor; the outages caused by ruptured slugs, primarily at the C Reactor; and a 3X safety trip and subsequent removal of the balls from C Reactor.

The established maximum operating levels of the reactors increased 141 MW in February as follows: F - 110 MW, H - 19 MW, and C - 12 MW. At the F Reactor, the increase was attributed to the installation of venturis and double orifices; and, at the C and H Reactors, to the improved flattening resulting from minor poison adjustment.

REACTOR SECTION (Continued)

During the month, the AEC authorized a new maximum enrichment level equivalent to approximately one and one-half times the current average enrichment level. This authorization was a supplement to the low concentration authorization and request received in January. It is planned to begin raising enrichment levels in March. Approximately 75 tons of low concentration uranium was discharged during the month.

A total of 15 regular uranium slugs failed in February. Eleven eight-inch slugs failed at C Reactor and one at H; two four-inch slugs failed at B Reactor and one at D Reactor. The total outage time required for removal of these ruptured slugs was 186 hours. There were no failures of other types of slugs. It is significant to note that at the C Reactor ten of the eleven slug failures occurred in the high concentration tubes. Since six of the failures occurred in tubes charged on August 3, 1953, sixty of the tubes charged on this date that had reached 133 percent of goal concentration were discharged to minimize the potential number of failures.

The F Reactor outage, started in January for venturi and double orifice installation, was concluded on February 2 and resulted in a process water flow increase of about 5000 gpm along with a slight reduction (approximately 10 psi) in water supply pressure.

The forecast was exceeded due to a delayed discharge of P-10 material, and to higher operating levels and time operating efficiencies. A total of 141 (11 pair) J-N tubes were discharged at DR and 170 (20 pair) J-N tubes were charged. This was the first loading of the second P-10 cycle in DR Reactor. Five additional enrichment tubes were charged in DR to compensate for reactivity losses due to burnout. Sixty (20 pair) P-10 tubes were charged in the C Reactor on February 19, as part of a 3X program production test to investigate the effects of high tube power exposure on hot press and aluminum-silicon bonded P-10 fuel and target slugs.

On February 24, the B Reactor was shut down for a scheduled seven day outage for installation of venturis and double orifices and other unusual maintenance items. Work in progress at month end included removal of the remaining three of the original four rear-face catwalks, installation of "half rods" in No. 2 and No. 8 horizontal rod positions, installation of a new type horizontal rod in No. 9 rod position, rearrangement of tubes on cross-headers to redistribute water flow, the panellit gauge modifications to accompany the venturi installation program, installation of aluminum nozzles in place of the rear face fringe tube galvanized nozzles, and the installation of a Groves valve to afford automatic operation of the emergency export water supply system. The horizontal rod installed in No. 9 position is the first in the program to eliminate the necessity for the horizontal rod thimbles in the five oldest reactors.

Loss of reactivity at F Reactor resulted in an extended outage starting February 22 and a period of low level operation following startup on February 26. Investigation pointed to the possibility that leaks in both No. 8 horizontal rod and thimble had

REACTOR SECTION (Continued)

allowed boron from the rod to be carried into the graphite. On February 27 a reactivity gain occurred resulting in increased levels and water removal from the graphite.

During February, twenty-six reactor scrams occurred. Twenty-two were attributable to normal panellit system difficulties, two to partially plugged cone screens, one to a continuing high panellit pressure apparently caused by a broken gasket in the venturi assembly, and one to undetermined Beckman difficulties. Total outage time charged to these scrams was 13.4 hours.

SEPARATIONS SECTION

The total production for the month of Redox and T Plant was 86.2 percent of the forecast with that of the individual plants being 86 percent and 129 percent of their respective forecasts.

The Redox plant was shut down on February 3 to replace the H-2 centrifuge and D-12 waste concentrator pot. Startup was delayed until February 15 due to difficulties encountered with the 60 ton crane impact wrenches and optical system, a leaking coil in the new D-12 pot which necessitated its removal and installation of a second spare, and malfunctioning of the centrifuge electrical leads and hydraulic lines. Sustained operations were resumed on February 17 with feed rates for the balance of the month varying from 5 tons per day to 7 tons per day depending on the supply of feed. In an effort to minimize the ruthenium emission problem, the head-end treatment flow sheet was revised on a test basis. Refluxing is being employed in the oxidizer tower in an attempt to reduce the evolution of ruthenium from the Redox stack. Dissolver charging delays reduced feed supplies intermittently as well-car contamination problems arose and the second failure of the H-2 centrifuge occurred on February 21. Instead of replacing the centrifuge, a head-end step involving complete dissolution of manganese dioxide was put into effect. This type of operation was continued to the end of the month with normal rates being achieved but with some loss in decontamination efficiency. The down time for the plant was 363 hours during the month.

The TBP Plant production was 149 percent of the forecast. Parallel operations were continued throughout the month and the equipment performance was generally satisfactory. Processing difficulties were experienced with feed batches prepared from water sluiced material due to the low salt concentration. Improvement was achieved by blending this material with the richer supernate solution. Processing of the shorter decay cycle feed necessitated two stage carbonate washing of the solvent to accomplish adequate decontamination of the RA column extractant. A build-up of solids in both lines was experienced at frequent intervals and required extensive column and vessel flushes each week. The total outage time for the A Line for the month was 124 hours, for the B Line 137 hours.

The UO_3 facility production was 88 percent of the forecast. The rates were limited by the availability of feed from the Redox and TBP Plants. A total of eight cars of powder were shipped off-site.

SEPARATIONS SECTION (Continued)

The metal removal from the waste tanks was adequate to accommodate feed for the TBP plant throughout the month. One Nagle pump failed at TX Farm. The TX and BX Farms supplied the major portion of the feed solution for the month. The sludge removal operation in C Farm was essentially completed during the month.

The 234-5 commitment of shapes and buttons was attained. The fabrication of the smaller model was discontinued at the request of the AEC early in the month, and the balance of the product allocated to this model was diverted into additional production of the larger type. The required nitrate production was also fulfilled.

The waste evaporators operated during the month on TBP waste with a volume reduction of 34.5 percent at B and 38.2 percent at T.

The P-10 feed material for the month consisted of P-10-A flattening material. Approximately 95 percent of the supply of this material has now been extracted. In addition,

In dismantling these tanks prior to inserting them in the metal line, about four liters of product that had diffused into the carrier escaped to the stack.

GENERAL

J. E. Maider and C. A. Priode assisted D. G. Sturges and A. T. Gifford of the AEC in conducting the members of the Dow-Detroit-Edison Power Study Committee on a plant tour on February 25 and 26.

Personnel

Total on Roll February 1, 1954	3347
Accessions	52*
Separations	22*
Total on Roll February 28, 1954	3377

*Does not include intra-department transfers.

J. E. Maider

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY
FOR
MONTH OF FEBRUARY, 1954

Richland, Washington
March 10, 1954

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

INVENTOR	TITLE
G. L. Helgeson, Separations Section	Dosage Rate Integrator

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

HW- 31006 Del

MONTHLY OPERATING REPORT

FEBRUARY 1954

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V. D. Donihee
V. D. Donihee

March 10, 1954

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
FEBRUARY, 1954

I. RESPONSIBILITY

There were no changes in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

	February	January	Year To Date
Acceptable Pieces Canned (4")(Tons)Gross	23	16	39
Acceptable Pieces Canned (4")(Tons)Net	22	15	37
Canning Yield (4")(%)	64.6	62.9	64.0
Acceptable Pieces Canned (8")(Tons)Gross	139	190	329
Acceptable Pieces Canned (8")(Tons)Net	137	188	325
Canning yield (8")(%)	68.8	71.9	70.5
Total Acceptable Pieces Canned (Tons)Gross	162	206	368
Total Acceptable Pieces Canned (Tons)Net	159	203	362
Acceptable Pieces Canned (4" and 8") (% of forecast)	79	90	85
Autoclave Frequency (4")(No./M)	.00	.01	.00
Autoclave Frequency (8")(No./M)	.00	.05	.03
J-3 Slugs Canned (pieces)	8487	1743	10230
N Slugs Canned (pieces)	6432	0	6432
Chem. 10-66 Canned (pieces)	321	125	446
Special Request (man hours)	486	790	1276

1. Statistics (Continued)

	February	January	Year To Date
305 Routine Tests (man hours)	171	144	315
305 Special Tests (man hours)	1745	1597	3342
Average Steam Generated (M lbs/hr)	46.4	53.3	
Maximum Steam Generated (M lbs/hr)	61.0	81.0	
Total Steam Generated (M lbs.)	31,200	39,800	
Coal Consumed (Tons)	2,005	2,535	
Sanitary Water from 3000 Area (Million gals.)	39.6	43.9	
Total Water from 3000 Area (gpm) Average Rate	982	984	
Chlorine Residual (ppm)	.45	.41	

2. Activities

The net production of acceptable slugs was 159 tons of which 86 percent were eight-inch. Production of normal uranium slugs was only 79 percent of the forecast for February. This forecast was made before knowledge of the P-10 program and was based on the assumed operation of four canning lines. Due to continuing demands of the P-10 program, only three canning lines were utilized. Approximately 30 operators, who were made available from the fourth canning line and from line relief, were trained in the P-10 operation which is now operating on a three-shift basis. The canning yield for eight-inch dropped approximately three percent due to dark spots in the weld which caused poor bond rejects. The cause of this difficulty was not conclusively determined but with the discontinuance of cast iron crucibles, the defect decreased rapidly and gradually disappeared.

Seventy tons of recovered slugs were canned by lead dip method. Failures of the ultrasonic tester resulted in two-shift operation of slug recovery facilities to reduce the accumulated backlog of material.

There were no autoclave failures during the month.

The handling of pickle rejects from canning was revised to permit loading of rejects directly into shipping boxes. This eliminated several transfer operations and will result in an estimated annual savings of $3600.

3. Special Operations

A total of 7258 J slugs were canned by the regular "C" process with an overall yield of 78 percent. A total of 5490 N slugs were canned by the regular "C" process with an overall yield of 51 percent. The low canning yield was attributed to inexperienced personnel and more rigid specifications.

A. Operating Experience (Continued)

4. Schedule Variance

Normal slug production was 21 percent below the forecast as a result of diverting personnel to the P-10 operation.

B. Equipment Experience

1. Operating Continuity

The electronic circuit of the ultrasonic tester failed three times during the testing of lead dip material Considerable backlog accumulated.

Difficulty with the slug machining lathe during the start up period resulted in 32 hours' lost production time in canning of N slugs.

2. Inspection, Maintenance, and Replacements

After using the Ajax induction furnace as a lead dip bath, the furnace was recharged with clean AlSi. It was discovered that lead had penetrated the furnace lining and was contaminating the bath. The vendor has been contacted with regard to a more suitable lining for handling lead.

C. Improvement Experience

1. Production Tests

PT-313-105-24M "Pile Evaluation of Tru-line Cans and Caps" (HW-28040). No change in status on this test. Further canning is indefinite because of possible diversion of the Tru-line components for other use.

PT-313-105-25M "Lead Dip Canning and Irradiation of Uranium Slugs Machined from Salt Bath Heat Treated Fernald Rolled Rods" (HW-28149). Approximately 4700 four-inch and 22,300 eight-inch recovered reject slugs were canned by the lead dip process on an extension of this test during the month. Poor bond rejection rate was abnormally high. During the month, 2505 four-inch slugs were forwarded to reactor.

PT-313-105-35M "Slug Evaluation at Increased Irradiation Levels for Tritium Production" (HW-30532). This test is designed to evaluate J and N slugs canned by different processes. The types of slugs are: (1) unbonded J's canned by the "C" process; (2) AlSi bonded J's canned by the Sevac process or single dip process; (3) diffusion bonded J's canned by the hot press method using thick wall, thick based cans; (4) diffusion bonded J's canned by the hot press method using thick wall, thin base cans; (5) unbonded N slugs canned by the "C" process; (6) diffusion bonded N's canned by the hot press method using thin wall, thin based cans. One hundred seventy-four J slugs were canned

C. Improvement Experience (Continued)

by the Sevac process. Because of faulty can wall bonds this method was abandoned and 724 J's were then canned by the single dip process. Forty-five percent of the single dip slugs were acceptable for shipment to reactor. Two hundred eleven of the 724 slugs were rejected because of poor bonds between the can wall and slug. Thirteen percent were rejected because of non-seats. The majority of the non-seats occurred while determining the most suitable operating temperature of the AlSi bath. It Approximately 1500 J slugs were canned by the hot press method. Nine hundred ten of these slugs were acceptable for shipment to reactor. Two hundred fifty-three of these acceptable slugs had marred surfaces of approximately four mils in depth or small blisters on the can wall. A majority of the rejects were due to marred surfaces, blisters, and pits in the aluminum can wall. Approximately seven percent of the slugs were rejected when ultrasonically tested for poor bonds. Approximately 1500 N slugs were canned by the hot press method. One thousand ninety-four of these slugs have been inspected and 942 were found to be acceptable. The slugs canned for this production test will be shipped to the reactor immediately.

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

Direct labor costs will remain relatively constant during February even though normal slug production will be decreased by approximately 21 percent. A transfer of operators to the 3X program will maintain the balance in the overall labor costs.

2. Material Variance

No significant change.

3. Other Costs

Indirect labor, IME and Within-Department Service Costs will increase 3 to 4 cents per unit for normal slugs as a result of a decrease in production. Maintenance costs are expected to remain essentially unchanged.

E. Plant Expansion

1. Project Status

Project CA-514 "Expansion of 300 Area Production Facilities." Detailed design for the overall project is 88 percent complete and construction

1. Project Status (Continued)

28 percent complete. A revised project proposal in the amount of $5,085,000.00 was approved by the A & B Committee on February 8, 1954 and has been submitted to the AEC. Total project costs to date approximate $1,035,000.

The renovation of the existing 313 building facilities is about 30 percent complete. Two temporary storage bays were constructed to provide adequate storage space and permit the release of the 303-F building for renovation as a process solution make-up facility.

Phase II construction on the 31e building addition is about 16 percent complete.

Design of non-process facilities is about 55 percent complete and construction one percent.

Bids were opened by the AEC on February 10 for the 3701-L Gate House addition, parking lot expansion and truck turnout. A contract has been awarded to the S.A. Moore Construction Company of Umatilla for the Gate House addition at a cost of $12,280.86. L.W. Vail Company of Pasco received the contract for the parking lot expansion and truck turnout at a cost of $27,691.50. Construction is expected to start on these items on or about March 8.

Project CG-573 "Hanford 3X Program-300 Area." Scoping on the 3X facilities is 85 percent complete, design 60 percent and construction 23 percent complete. Design of the additions to building 313 and 303-J was completed. The east and west additions to 303-J building are about 75 percent complete. Procurement of process equipment is being expedited to meet the May 1 start-up for hot press canning.

The status of other budget items remained substantially unchanged during the period because of emphasis on the 3X program.

Progress on appropriation requests was as follows:
AR-54-M-12 - "5" x 13" Planer." The order was placed for this planer and the vendor made delivery at month end from stock in Seattle.
AR-54-17 - "Fluorimeter." Fabrication of this instrument is being expedited for use by the Process Analytical Laboratory.

2. Plant Engineering

Preliminary specifications are being prepared for a proposed network recording system for the slug finishing and inspection lines to be installed under the expansion program. This system provides for recording the in-process inventory of slugs, number and types of rejects from each inspection station and throughput through each work station. Preliminary estimates indicate an equipment cost of approximately $20,000 and an annual savings in direct labor and clerical costs amounting to about $17,000.

2. Plant Engineering (Continued)

At the request of the Operations Sub-Section a study was conducted to improve methods of recording and reporting the fabrication, inspection and accountability data for the expanded 3X program.

Assistance is being given in a program to reduce marred surface canning rejects. An evaluation is being made of a plastic coating suggested by the Process Sub-Section to protect slug surfaces between the canning and welding operations. Preliminary results indicate that a split sleeve fabricated from laminated phenolic tubing appears most suitable for this purpose. Other investigations being made in connection with the marred surface problems include the development of a chip guard for the facing operation, the application of a polythene coating on the edges of files used to deburr slugs following facing and the coating of steel carraige guides on the frost test machine.

At the request of the Minor Projects Sub-Section of the Engineering Department, a study was made to determine the relative costs of shipping and storing bare and finished slugs in wooden containers versus non-flammable containers. This information was required in connection with fire protection measures being considered for storage facilities in connection with the expansion program.

The ball-type conveyors developed for the ultrasonic transformation testing of slugs were subjected to mock-up tests. Satisfactory operation is indicated when nylon balls and rubber-covered drive rolls are used.

F. Significant Reports Issued

1. Routine

Number	Title	Author	Date
HW-30720	Monthly Report, Process Sub-Section Metal Preparation Section, January, 1954	EW O'Rorke	2-1-54
HW-30914	Metal Preparation Section Evaluation of P-10 Slugs, January, 1954	TD Naylor	2-17-54
HW-30978	Metal Preparation Section Evaluation of J Slugs, January, 1954	TD Naylor	2-23-54

2. Non-Routine

HW-30707	Uranium Slug Specifications, Manfacturing Department	EW O'Rorke	2-8-54
HW-30749	Uranium Accountability in Slug Pickle Process	GF Yost	1-29-54

2. Non-Routine (Continued)

Number	Title	Author	Date
HW-30779	Evaluation of Crack Sensitive Caps	HG Henry	2-10-54
HW-30813	Chemical Specifications for P-10 Alloy	EW O'Rorke	2-8-54
HW-30915	Marred Bare Slugs	HG Henry & AC Barkoff	2-23-54
HW-30992	Manufacturing Department Radiation Incident Investigation, Incident #343	LP Henderson	3-2-54

III. PERSONNEL

A. Organization

No change.

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	4	4	0
Operations	214	221	7
Power and Maintenance	254	258	4
Process	37	39	2
Plant Engineering	24	24	0
Section Total	533	546	13

C. Safety Experience

There were no major or sub-major injuries during the month.

D. Radiation Experience

There were no radiation exposures in excess of 300 mrads per week during the month.

A Class I, Radiation Incident involving a fire in the burning ground was investigated. Apparently spontaneous ignition was caused by a light rain falling on pyrophoric material that had not been covered. Low level ground contamination resulted and was easily controlled.

E. Personnel Activities

1. Visits and Visitors

E. W. O'Rorke visited the Savannah River Plant at Aiken, South Carolina; the Aluminum Company of America at Edgewater, New Jersey; and the Olin Industries at East Alton, Illinois to discuss the procurement of components for the 3X program. He also attended the Metal Quality Working Committee Meeting at the Mallinckrodt Chemical Works, St. Louis, Missouri.

T. B. Correy, accompanied by representatives of the Engineering Department, visited the Ohio Crank Shaft Company and the National Acme Company. The purpose of these visits was to review specifications for frost testing and facing equipment being provided by these companies for project CA-514.

H. H. Uhlig, Professor of Metallurgy at MIT, J. R. Driear and M. S. Bloomsburg of E. I. duPont De Nemours and Company, visited HAPO during the month for discussions on canning problems.

2. Exempt personnel in the Section attended an information meeting conducted by T. L. Lindgren of Purchasing and Stores on "Stores Inventory Control."

March 10, 1954

MANUFACTURING DEPARTMENT
REACTOR SECTION
FEBRUARY, 1954

I. RESPONSIBILITY

Responsibilities assigned to the Reactor Section were not changed during February.

II. ACHIEVEMENT

A. Operating Experience

The total reactor input plutonium production during February was 99.5 percent of forecast. Production was 17.7 percent lower than the record month of January due to the 10 percent shorter month and low time operated efficiency. Venturi outages at B and F Reactors, an outage at F Reactor due to loss of reactivity, slug rupture outages, and an unusual number of normal scheduled outages were the principal factors adversely affecting operating efficiency which was 7 - 10 percent below recent experience.

Reactor plutonium output production was 101.5 percent of forecast. At the request of the AEC, major changes have been made in regard to discharge concentration of uranium metal. Details are given under "Activities."

The P-10 program at DR Reactor was continued with the initial charging of material in the second cycle being performed. Also, at C Reactor, 60 J-M tubes were charged on a production test basis to investigate exposures at high tube powers.

Forecast was exceeded due to postponing discharge of DR Reactor P-10 material, to higher DR Reactor operating level and time operated efficiency, and to initiating P-10 irradiation at C Reactor. Total input production devoted to the P-10 program was 38.4 percent at DR Reactor and 1.5 percent at C Reactor.

A. Operating Experience (Continued)

Increases in established maximum operating levels (Pu and P-10 only) during January were 110 MW at F Reactor, 19 MW at H Reactor and 12 MW at C Reactor. At F Reactor, the increase was attributed to the installation of venturis and double orifices and at C and H Reactors to improved flattening resulting from minor poison adjustments.

A total of 15 regular uranium slugs failed during February. Eleven eight-inch slugs failed at C Reactor and one at H Reactor; two four-inch slugs failed at B Reactor and one at D Reactor. Total outage time required for removal of these ruptured slugs was 186.0 hours. There were no failures of other type slugs during the month. It is significant to note that 10 of the 11 failures at C Reactor occurred in high concentration tubes; the tube concentrations ranged from 126 to 176 percent of goal concentration. Since six of the failures occurred in tubes charged on August 3, 1953, all other tubes charged on this date which had reached a concentration of 133 percent of goal were discharged to minimize the number of failures.

One additional broken eight-inch uranium slug was found during inspection of metal discharged during January at H Reactor. This brings the total of such slugs to nine, eight others having been reported last month. Investigation into the reason for this new phenomenon is continuing.

F Reactor's venturi outage, in progress at the end of January, was concluded on February 2. A similar outage was begun at B Reactor on February 24 and was continuing at month end with startup expected about March 4.

Loss of reactivity at F Reactor resulted in extensive outage time and a period of low level operation. Leakage of water from a horizontal rod into the moderator is believed to have caused this incident. The possibility also exists that some soluble boron was carried from the rod into the moderator, however, the incident had not been fully investigated at month end.

The use of activated silica was begun during February at all 100 Area Water Plants except the B Water Plant which is still using the ferric sulfate process. This is a planned part of the alum water treatment process which requires addition of silica during periods of high river water turbidity.

Details of reactor and water plant operation are set forth below:

1. Statistics

	B	C	D	DR	F	H	Total or Average
Reactor Time Operated Efficiency (%)	67.8	69.4	87.8	94.1	70.0	89.6	79.8

1. Statistics (Continued)

	B	C	D	DR	F	H	Total or Average
Reactor Outage Time (Hrs)							
Plutonium Production	213.6	181.4	54.7	19.8	187.1	43.6	700.2
Special Irradiations and Tests	3.0	24.0	27.0	20.0	14.5	27.0	115.5
Total	216.6*	205.4	81.7	39.8	201.6*	70.6	815.7
Reactor Unscheduled Outage Time (Hrs)	119.6	173.1	0.9	-	98.6	2.2	394.4
Metal Discharged (Tons)	44.7	57.0	49.7	12.9	33.4	23.3	221
Water Quality (ppm Iron)							
Raw Water - Average	0.24	0.25	0.24	0.28	0.05**	0.07**	-
Raw Water - Maximum	1.85	1.50	1.50	1.99	0.27	0.37	-
Process Water - Average	0.009	0.004	0.004	0.004	0.003	0.004	-
Process Water - Maximum	0.020	0.015	0.014	0.011	0.012	0.020	-
Water Pumped (MM gals)							
Bldg. 190 to reactor	1274	2527	1763	1685	1494	1988	10731
Bldg. 182 to 200 Areas	-	-	245	-	-	50	295
Bldg. 181	4532		4164		1788	2316	12800
Steam Generated (MM lbs)	123		207		116	107	553
Coal Consumed (Tons)	7876		11860		6761	6683	33180

*Venturi outage time during February was 48.7 hours at F Reactor and 97.0 hours at B Reactor.

**F and H Water Plants were at low flow during periods of iron surges so that greater settling out occurred in the reservoirs before sampling.

2. Activities

The F Reactor venturi installation outage which began on January 25 was concluded on February 2. The work outlined in last month's report was satisfactorily completed with the exception of replacement of some galvanized rear face fringe tube nozzles. The installation of venturis and double orifices resulted in a process water flow increase of approximately 5,000 gpm and a slight reduction (approximately 10 spi) in water supply pressure. As noted above, 110 MW increase in F Reactor's established maximum operating level was attributed to this venturi and double orifice program.

On February 24, B Reactor was shut down for the scheduled one-week outage for installation of venturis and double orifices and other unusual maintenance items. Work in progress at month end included removal of the remaining three of the original four rear-face catwalks, installation of "half rods" in No. 2 and No. 8 horizontal rod positions, installation of a new type horizontal rod in No. 9 rod position, rearrangement of tubes on crossheaders to redistribute water flow, the panellit gauge modifications which accompany the venturi installation program, installation of aluminum nozzles in place of the rear face galvanized fringe tube nozzles, and in-

2. Activities (Continued)

stallation of a Groves valve to afford automatic operation of the emergency export water supply system. The horizontal rod being installed in No. 9 position is the first in the program to eliminate the necessity for the horizontal rod thimbles in the five oldest reactors. The cross section of this type rod approaches an oval shape and permits a gas seal at the face of the reactor. At month end, the scheduled outage work was progressing satisfactorily.

The B Reactor venturi and double orifice program involves essentially the same pattern as installed at F Reactor except that the outer 190 venturi tubes have an orifice in addition to the venturi. As at F Reactor, the new type cone screens were installed on the process tubes and the new long-vane mercoids were utilized in the panellit gauges. (Details are available in the January report.)

On February 22, F Reactor was shut down due to loss of reactivity. Investigation during the following several days pointed to the possibility that simultaneous leaks in both No. 8 horizontal rod and thimble had allowed soluble boron from the rod to be carried into the moderator by water from the leaking rod. This seemed to be the only explanation since attempts to remove significant quantities of water from the moderator by the hot water recirculation system and operating the reactor were unsuccessful. However, on February 27, after a period of low level operation, a gain in reactivity occurred and it appeared that heat was beginning to drive out moisture from the poisoned zone. On February 26, 27 and 28, water removed from the reactor was 22, 51 and 34 gallons, respectively. The final explanation of this incident will depend on future operating experience. It is estimated that production equivalent to approximately 125 hours of operation has been lost to date due to this incident of which 87.8 hours was shutdown time.

At the request of the AEC, significant changes have been made in the discharge concentration of uranium. The new program calls for all four-inch metal to be exposed to the present goal concentration, a portion of the eight-inch metal (governed by plant capacities) to be exposed to approximately 1/3 goal concentration, the remaining eight-inch metal to be exposed to approximately 1-1/2 goal concentration. The four-inch metal is being held to goal concentration due to rupture experience. During February, approximately 75 tons of low concentration metal and 8 tons of high concentration metal were discharged. However, as a result of slug rupture experience during February, it is planned to discharge the bulk of the high concentration metal at an average of 121 percent of goal and a maximum of 133 percent of goal. This will apply to all except test lots of material which will be utilized to investigate the feasibility of higher exposure.

In connection with the P-10 Program, 141 J-N tubes were discharged at DR Reactor and 170 J-N tubes were recharged, initiating irradiation of the

2. Activities (Continued)

second P-10 cycle. A new tube loading is being utilized which increases the amount of J-N material in each tube by 80%. Also, at C Reactor, 60 J-N tubes were charged on a production test basis to investigate exposures at high tube powers. Results of this test will be utilized in determining future loadings of P-10 material; five additional enrichment tubes were charged at DR Reactor to compensate for reactivity losses due to burnout.

The following tabulation indicates activities during February associated with special irradiations other than the P-10 Program noted above:

	Tubes Charged	Tubes Discharged	Casks Shipped
Chemical 10-66	9	13	-
Chemical 72-60	-	12	-
Production Tests	84	61	4
Total	93	86	4

B. Equipment Experience

During February, 26 reactor scrams occurred. Twenty-two were attributable to normal panellit system difficulties, two to partially plugged cone screens (gasket material in one case and rust in the other), one to a continuing high panellit pressure which may have been caused by a split "O" ring gasket found in the venturi assembly although this cause does not fully explain the difficulty, and one to undetermined Beckman difficulties. Total outage time charged to these scrams was 13.4 hours.

Extensive work was performed on horizontal rods and thimbles during February. Leaks have recently developed in the thimbles of rods No. 8-B, 9-B, 7-H, 8-H, and 8-F and were either repaired by thimble replacement or taking other appropriate temporary corrective action. Rods No. 7-D and 8-F were found to have water leaks necessitating repairs. Rod No. 8-H was replaced with a "half-rod" and similar changes are scheduled for rods No. 2-B and 8-B during the venturi outage in progress at month end. This is the third "half-rod" to be installed at H Reactor. Also, at B Reactor, a new type rod which does not require a thimble was being installed in No. 9 rod position at month end.

During the F Reactor reactivity difficulties, a leak was repaired in the steel reactor effluent line between Buildings 105-F and 107-F. This leak had developed earlier and was apparently the result of line expansion caused by effluent water temperatures which are now above the original design specifications.

An outage of 31.6 hours occurred at C Reactor on February 19 and 20 for removal of the 3X system balls from the reactor. The 3X System is believed to have been tripped as a result of repairing a water leak in the impulse line to the Ball 3X low-pressure mercoid, although the exact cause could not be established.

B. Equipment Experience (Continued)

Failure of the stainless steel bellows type pigtails at the rear face of C Reactor continued with twelve pigtails requiring replacement. Visual examination indicates that the mechanism of failure is probably corrosion attack on the outside of the bellows due to chlorine being liberated from the neoprene jacket.

The thrust bearing of No. 12 process pump speed increaser in Building 190-C was found damaged during an inspection and was replaced. Process pump motor No. 4 at Building 190-B failed, necessitating rewinding of the stator. No. 2 pump unit at Building 190-B was out of service at month end for repair of damaged high pressure turbine blades which were found to be causing bearing heating. The comprehensive Building 190-C process pump unit inspection program, begun last month, was continuing.

C. Improvement Experience

The most significant Production and Process Test activities are reported below along with other items of "Improvement" significance.

PT-105-506-E (Recirculation Studies)
Recirculation tube 0961-H was replaced at H Reactor and extensive piping revisions were made to permit increasing the operating pressure from normal process pressure to 600 psi for high pressure and temperature studies. Leaks in the system have necessitated returning to normal pressure until modifications can be made.

PT-105-517-E Supp. A (100 Areas Filter Plant Tests)
Necessary alterations have been made in the D Water Plant for this test. Flow rates of 50,000 gpm were achieved through the north half of Building 183-D.

PT-105-529-E (Increasing Power Levels at H Pile by Raising Permissible Exit Water Temperature)
PT-105-530-E (Full Pile Burnout Experiment)
PT-105-531-A (Enrichment of H Pile)
PT-MR-105-12 Supp. A (Operation of H Reactor with Maximum Protection from the Panellit System)
The above four tests continued to govern operation at H Reactor. Eight tubes of "C" enrichment material were discharged after reaching the 30 percent burnout limit. Five enrichment tubes were recharged leaving a current total of 53 such tubes.

PT-105-532-A (Irradiation of Enriched Uranium Slugs)
Thirty-six eight-inch and four four-inch "E" slugs (enriched uranium) were charged at C Reactor.

C. Improvement Experience (Continued)

PT-105-549-E (Exposure Increase in High Power Tubes at C Pile) Forty-five tubes which had reached a concentration of approximately 150 percent of goal were discharged during the month. Due to rupture experience, this material is now being discharged at a maximum of 133 percent of goal concentration.

PT-105-562-A (Slug Evaluation at Increased Irradiation Levels for Tritium Production) Sixty tubes were charged with J-N loadings at C Reactor during the month to evaluate slug performance. The test results will be utilized to determine which reactor(s) will be involved in the expanded P-10 program.

Equipment for "fast" discharge of ruptured slugs functioned satisfactorily during February and made possible eight recoveries within the scram time limitation.

Six revised Process Standards - Reactor were approved during the month. These were standards titled, "Process Tube Water Temperature Rise Limits - Trip Before Boiling," "Reactor Water Pressure and Flow during Shutdown," "Water Pressure Trip Settings," "Panellit System Control," "Make-Up of Uranium and Uranium - Alloy Tube Charges," and "Total Irradiation Limit for Process Slugs." The most significant change involved a plan whereby eight-inch slugs can now be charged in some locations of the top thirds of B, D, and F Reactors after appropriate probe testing. Previously only four-inch metal could be charged in the top third of these reactors. The major reason for this change is the more favorable rupture experience with eight-inch slugs.

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

D. Events Influencing Costs

The short month, increased reactor outage time, and warmer weather resulted in reduced steam demand. As a result, coal and associated freight charges during February are expected to be $47,500 (13.5 percent) lower than during January. An anticipated increase in steam consumption as a result of the F Reactor venturi program was minimized during February by extensive outage time.

Water filtration chemical costs increased approximately $4,350 (27.4 percent) as a result of the raw water turbidity increase which accompanies the spring run-off. This increase occurred in the face of a 10 percent reduction in water treated.

The use of helium for controlling reactor startup reactivity transients

D. Events Influencing Costs

has approximately doubled gas consumption. This represents a material cost increase of approximately $8,000 to $9,000 a month.

Other major items affecting costs during February were the Building 190-C process pump inspection program, the large amount of horizontal rod work performed and the work during venturi outages.

Reactor input plutonium production decreased 17.7 percent during February. This was the major factor in increasing the Reactor Section plutonium irradiation unit cost by approximately 17 percent.

E. Plant Development and Expansion

1. Project Status

The most significant Reactor Section project activity is reported below. Further details concerning projects may be found in the report, "Status of Reactor Section Projects, Informal Requests and Budget Items," F. A. R. Stainken to J. H. Warren, dated February 17, 1954.

CA-431 (100-C Plant)
A new type rear face pigtail has been selected for installation at C Reactor to replace the present stainless steel bellows type pigtails which have failed excessively. The new pigtails will be made of one-inch aluminum tubing. Authorization of additional funds is being requested of the AEC to rectify deficiencies of C Reactor and Water Plant which have become apparent since approval of previous punch list items. Items included are an effluent sewer vent near Building 105-B, replacement horizontal control rods, replacement rear face pigtails and punch list items for the metal examination facility.

CA-512 (100-K Facilities)
Stacking of the KW Reactor graphite was begun on February 16. A strike of millwrights on February 23 caused some delay in this work. Also, during February, the first startup of a 10,000 hp process pump motor at Building 190-KW was made. The scoping of a four-tube, high pressure recirculation system for KE Reactor has been stopped pending review of justification by the AEC. Construction of the biological side shield at KE Reactor is approximately 80 percent complete.

CG-558 (Reactor Plant Modification for Increased Production)
Scope design of this project was approximately 54 percent complete at month end. The small change in percentage is attributed to recent increases in scope of the project by addition of the horizontal rod replacement program and

1. Project Status (Continued)

facilities for charging and discharging poison during operation. A project proposal covering detailed design and material procurement ($9,500,000) has been approved by department management and submitted to the A and B Committee.

RDS-D-10 (Reactor and Water Plant Design Development)
RDS-D-11 Efforts to formulate a specific plan of action for dual purpose reactor development continued. Six cases of design for comparison of alternate lattice spacings have been defined by the Engineering Department (HW-30482).

2. Plant Engineering

A number of engineering and development studies were active in the Section during February. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in documents HW-30962 and HW-31003. Several items of interest are reported below:

Follow-up work on coal utilization standards recently prepared was in progress. An evaluation was made at the request of management of the probable savings that may result from adoption of these standards.

Study of Building 105-F effluent line stresses due to high temperature conditions has been initiated. Calculations have been made and stress readings on the line were being taken at month end.

Process water pressure decay tests were performed at Building 190-C to determine the possibility of reducing from nine to eight pumps for normal operation. Based on preliminary evaluation of test data, eight-pump operation was begun on February 25.

F. Significant Reports

1. Routine

Monthly operating reports issued for January were:

HW-30423-A	Reactor Section	JH Warren	2-10-54
HW-30817	Operations Sub-Section	RO Mehann	2-1-54
HW-30721	Process Sub-Section	OC Schroeder	2-1-54
HW-30704	Plant Engineering Sub-Section	FAR Stainken	2-1-54
HW-30752	Radiation Monitoring Sub-Section	PC Jerman	2-3-54
--	Maintenance Sub-Section	EE Weyerts	2-3-54
--	Power Sub-Section	JC McLaughlin	2-2-54

1. Routine (Continued)

Other routine reports issued during February included:

HW-30929	"Monthly Progress Report, Reactor Section Expansion, February, 1954"	HT Wells	2-25-54
--	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	FAR Stainken	2-17-54
HW-30750	"Reactivity Balance and Associated Data - Period December, 1953 and January, 1954"	AP Vinther	2-2-54

2. Non-Routine

HW-30846	"Effect of New Flow Devices on Tube Flow Characteristics"	JE Robb	2-15-54
HW-30584	"Storage Periods for Irradiated 'J' Slugs"	OC Schroeder	2-1-54
--	"Report of Investigation - Heating and Ventilating in Radiation Monitoring Office - 105-F Building"	HC Lee	2-11-54
HW-30747	"Panellit Gauge Incident - H Reactor"	RO Mehann	2-3-54
--	"Design Change Authorization" (Procedure for authorizing an electrical design change)	EJ O'Black	2-5-54

III. PERSONNEL

A. Organization

Effective February 1, the Operations Sub-Section was reorganized with each of the reactors as a separate unit and with Production Planning established as a unit. This plan eliminates one level of supervision. Previously four units existed, each headed by a superintendent with the areas having two reactors reporting to one unit. Appointments made were:

Unit	Superintendent	Unit	Superintendent
B	RG Clough	DR	JT Baker
C	AR Maguire	H	CG Lewis
D	EJ Filip	F	DS Lewis
Production Planning	SL Nelson		

B. Force Summary

	Beginning of Month	End of Month	Net Change
Section General	3	3	0
Operations	269	267	- 2
Maintenance	482	485	3
Plant Engineering	31	32	1

B. Force Summary (Continued)

	Beginning of Month	End of Month	Net Change
Power	415	416	1
Process	40	42	2*
Radiation Monitoring	58	62	4*
Section Total	1298	1307	9

*Additions for 100-K Area expansion.

Changes during February consisted of 1 termination, 6 new hires, 2 deactivations, 1 reactivation, 1 transfer out and 6 transfers into the Section.

C. Safety Experience

There was one Major Injury and one Sub-Major Injury in the Reactor Section during February. The Major Injury, No. 104, occurred at Building 105-H on February 24 when a Mechanical Unit employee cut off part of his right ring finger. The injured was assisting two other employees in manually moving a horizontal rod into the reactor when his finger was caught at a point of close tolerance between the mechanical stop on the rod rack and a rod guide. The Sub-Major Injury, No. 251, occurred at the 100-F Area maintenance shop on February 17 when a welder-trainee's toe was fractured by a falling 50 lb. lead pig. The employee was removing one pig from a stack and dislodged another which fell onto his foot. He was not wearing safety shoes.

Three Near-Serious Accidents occurred in the Section. No. 54-4 involved a radiation inspector almost stepping into a hole in the deck of a well car at Building 105-F. The hole had been covered with paper due to contamination. No. 54-5 involved scramming of a horizontal rod at C Reactor while repairs were being made. No. 54-8 was caused by a steam trap slipping from a vise at Building 190-DR while being disassembled. A portion of the trap struck the mouth of the employee performing this work.

D. Radiation Experience

Two Class I Radiation Incidents, Nos. 342 and 347, occurred in the Reactor Section during February. Incident No. 342 occurred at F Reactor when a Technical Section employee entered the "0' Near" location at the side of the reactor during a shutdown and remained there for approximately 1.6 hours following startup. The employee was not aware of the new conditions and received an exposure of up to 100 mrads/hr. as a result of radioactive gas escaping from the front face of the reactor. No. 347 occurred at B Reactor as the result of a Project Section employee performing several jobs involving radiation without following radiation monitoring timekeeping procedures. The employee's badge indicated an exposure of 220 mr. Investigations of these incidents are contained in HW-30824 and HW-31013, respectively.

III. PERSONNEL (Continued)

E. Personnel Activities

At month end, 14 employees are receiving on-the-job training for engineering or supervisory assignments in the Section; 8 of these are on assignment under the totational training program.

Six additional General Electric employees from KAPL began a four-week training period in the Operations Sub-Section of the Reactor Section on February 8. Six other employees from KAPL concluded a similar training period in February.

Principal item of interest during February in connection with employee communications was the fifth and sixth in the series of non-exempt employee information meetings in which the Process Sub-Section Superintendent is discussing the reactor venturi and orifice program and the Radiation Monitoring Sub-Section Superintendent is discussing radiation monitoring experience and plans.

F. A. R. Stainken assisted the Technical Personnel Section by recruiting employees at Santa Clara and Stanford Universities during the week of February 22. He also addressed a combined meeting of the Stanford Chapters of A.I.Ch.E. and A.S.M.E. on "Nuclear Engineering - A New Frontier."

H. G. Harder attended a conference in Detroit on February 15 with representatives of the American Blower Company. The conference was in regard to operating difficulties which have been experienced with the Building 190-C process pump fluid drive assemblies.

R. L. Richardson, technical graduate assigned to the Electrical Unit presented a paper on "Electronic Analogue Computers" to members of the Richland Section of the A.I.E.E. on February 15.

[redacted]

HW-31006 Rev

March 10, 1954

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
FEBRUARY, 1954

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	February		January	
	Normal	Acid Wash	Normal	Acid Wash
Charges started in Canyon Bldgs.	55	0	68	0
Charges completed in Conc. Bldgs.	51	0	68	0
Special charges - Conc. Bldgs.	20		15	
Charges completed - Isolation Bldg.	153	0	150	1
Average Waste Losses, %	2.47		2.50	
Special charges - Isolation Bldg.	48		52	
Material balance, %	100.37		97.6	
Yield through Process, %	97.9		95.1	
Average cooling time (days)	89		66	
Minimum cooling time (days)	75		53	

[redacted]

b. Redox Operations

	February	January
Equivalent charges started	119.0	97.0
Charges completed	119.0	97.5
Tons Uranium delivered to storage	85.3	67.4
Average Production Rate per operating day, Tons	6.6	4.7
Average Daily Operating Rate for the month, Tons	3.1	2.2
Average yield, %		
Uranium	100.35	96.9
Plutonium	101.43	97.7
Total Waste Loss, %		
Uranium	0.29	1.16
Plutonium	0.40	1.17
Average cooling time, days	94	83
Minimum cooling time, days	77	77
Percent down time	54.1	53.5

c. 234-5 Operations

	February	January
Batches completed through Task II	168	157
Runs completed through Task III	105	102
Reduction yield, RM	96.8	96.6
Waste disposal, units	3.5	2.07

d. UO_3 Operations

	February	January	To Date
Uranium drummed, Tons	231.71	261	4968
Uranium shipped, Tons	259.12	223	4927
Average cooling time, days (Redox)	96	91	
Minimum cooling time, days (Redox)	90	83	
Waste loss, %	0.29	0.2	

e. THP Operations

	February	January	To Date
Tons received from Metal Removal	172	192	2897
Tons shipped to UO_3 Plant	166	185	2767
Average Production Rate per operating day, Tons	7.34	7.15	
Average Daily Operating Rate for the month, Tons	5.92	5.98	

e. TBP Operations (Continued)

	February	January
Average yield, %	98.64	96.69
Total Waste Loss, %	1.48	1.28
Ratio Waste Volume returned to Volume removed	1.03	1.40
Percent Down Time	38.82	32.59

f. P-10 Operations

	February	January
Charges Started	7	83
Vacuum Tanks Filled	13	23
Product loss to stack, liters	4.2	0.4

g. Power

	200 East	200 West
Raw Water Pumped, gpm	1 212	6 173
Filtered Water Pumped, gpm	419	928
Steam Generated, lbs/hr	66 296	187 566
Maximum Steam Generated, lbs/hr	102 000	256 000
Total Steam Generated, M lbs.	42 960	121 543
Coal Consumed, tons (est.)	2 900	8 216

h. Waste Storage

	Equivalent Tons U	
	February	January
Metal Waste reserve storage capacity - T Plt.	738	829
1st Cycle reserve storage capacity - T Plt.	107	141
Metal Waste reserve storage capacity - B Plt.	145	145
1st Cycle reserve storage capacity - B Plt.	4	4
Redox Waste reserve storage capacity	419	481

2. Activities

a. Redox Processing

The Redox plant was shut-down on February 3 to replace the H-2 centrifuge and D-12 waste concentrator pot. Start-up was delayed until February 15 due to difficulties encountered with the 60 ton crane impact wrenches and optical system, a leaking coil in the new D-12 pot which necessitated its removal and installation of a second spare,

a. Redox Processing (Continued)

and malfunctioning of the centrifuge electrical leads and hydraulic lines. Sustained operations were resumed on February 17 with feed rates for the balance of the month varying from 5 tons per day to 7 tons per day depending on the supply of feed. In an effort to minimize the ruthenium emission problem, the head-end treatment flow sheet was revised on a test basis to employ reflux in the oxidizer tower in an attempt to reduce the evolution of ruthenium from the Redox stack. Dissolver charging delays resulting from well car contamination problems and another failure of the H-2 centrifuge on February 21 reduced feed supplies intermittently. Instead of replacing the centrifuge, a head-end step involving complete dissolution of manganese dioxide was put into effect.

b. TBP Processing

Parallel operations were continued throughout the month, equipment performance was generally satisfactory, feed was in good supply, and the production commitment was exceeded in the TBP plant. Processing difficulties were experienced with feed batches prepared from water sluiced material due to the low salt concentration of such material. Operations were improved by blending this feed on a half and half ratio with supernatant blends. Processing of shorter decayed feed necessitated two-stage washing of the solvent to accomplish adequate decontamination of the RA column extractant. A build-up of solids in both lines was noted at rather frequent intervals, and required extensive column and vessel flushes each week. Product rework due to insufficient decontamination was experienced during the first and third weeks of the month.

c. UO_3 Processing

Operations were essentially normal in the UO_3 plant with production rates being limited only by the availability of feed from the Redox and TBP plants. A total of eight cars of UO_3 was shipped during the month.

d. Waste Metal Removal

Adequate supplies of blended feed to accommodate the TBP plant were produced in the metal removal farms. Normal equipment difficulties consisting of pump failures and plugged lines were experienced, but total production was not seriously affected. The TX and BX farms were the major producers of blended feed. Sludge removal operations are essentially complete in the CR farm.

e. T Plant Processing

Production through T Plant continued at a high level as the result of diverting feed material initially scheduled for the Redox plant. No unusual processing difficulties were experienced in T Plant and equipment performance was generally satisfactory.

f. Isolation and Metal Fabrication Processing

Operations were essentially normal in the Isolation and Metal Fabrication Plants as production commitments for nitrate, buttons, and final shapes were attained and the material was accepted by the AEC.

g. P-10 Processing

P-10 feed material consisted of P-10-A flattening material. Approximately 95% of this material has now been extracted, including all above 20% of the goal concentration.

This material was first produced during the original P-10 program at Hanford and, as the result of failure of the O-ring Fulton-Sylphon tank valves, the product was contaminated with air. The tanks were enclosed in plastic bags after sealing the valves and valve connection with tar prior to their being returned to Hanford. In dismantling the tanks prior to inserting them in the metal line, a substantial quantity of product which had diffused into the carrier and plastic bags escaped to the stack. Radiological Sciences air monitoring of the stack during the dismantling period disclosed that 4.1 liters of product were lost.

3. Special Operations

a. Waste Evaporators

February operating data for the 242-B and 242-T waste evaporators are as follows:

Evaporator	Gallons Feed	Gallons Bottoms	Gallons Condensate	% Volume Reduction
242-B	507 375	332 500	174 875	34.5
242-T	123 635	76 483	47 152	38.2

Feed for both evaporators was current TBP wastes. The 242-T waste evaporator operated until February 9 at which time the bottoms

a. Waste Evaporators (Continued)

tanks, 116-TX and 117-TX, reached capacity. A plugged line prevented the transfer of evaporator bottoms from tank 117-TX to tank 108-T until February 26, when evaporator operations were resumed.

b. Pu Recovery - 234-5

The equivalent of 12.8 bottles of product was processed in Metal Recovery (Hood 40), the equivalent of 21.0 bottles was processed in Powder Recovery (Hood 41), and the equivalent of 38.5 bottles of material was transferred to the Concentration and Isolation Buildings for reprocessing.

4. Schedule Variance

February production variance from the January Annual Forecast is as follows:

Redox plutonium and uranium production were both low with 77% and 82%, respectively, of the forecast being attained.

T Plant production was 128% of forecast. The combined plutonium production of the two separations plants was 87% of forecast.

The TBP Plant produced 151% of the forecast.

The UO_3 Plant produced 88% of the forecast.

The Metal Fabrication Building produced 100% of the February commitment for buttons and final shapes.

B. Equipment Experience

1. Operating Continuity

Redox down time totalled 363 hours and was primarily caused by the successive loss of two D-12 waste concentrator pots within a space of five days, and two H-2 centrifuge failures within thirteen days.

The total down time for the TBP Plant lines was 124 hours for A Line and 137 hours for B Line. These outages were required for column and vessel flushes to improve decontamination performance.

2. Inspection, Maintenance and Replacement

a. D-12 Waste Concentrators - Redox

Complete failure of the waste concentrator pot (no. 4 since start-up) was detected on January 30 when the leakage rate was measured

a. D-12 Waste Concentrators - Redox (Continued)

at 29 gallons/minute under full steam pressure. D-12 pot number 5 was installed during the first week in February, but hydrostatic testing of this unit detected a coil leakage rate of 15 gallons/minute. This vessel was then removed and installation of pot number 6 was completed on February 15. Pot number 4 was removed to the burial grounds, and number 5 will be transferred to the 221-B canyon for decontamination and inspection to determine cause of failure.

b. H-2 Centrifuge - Redox

The H-2 centrifuge which failed on January 28 was replaced on February 8 after resolving considerable difficulties with the power jumper and hydraulic lines to the plow. This unit was operated until February 21, when the plow jammed and reduced bowl rotation such that normal operation was impossible. Since a second replacement was not immediately available, operations were continued by revising the head-end treatment procedure to preclude feed clarification by centrifugation.

c. 60 Ton Crane - Redox

The left hand optical system and impact wrenches failed twice, and caused considerable delay in performing maintenance work in the canyon cells. The units were repaired during the third week in February, and electrical and mechanical inspections as well as lubrication of the most essential parts of the crane were completed on February 24.

d. Nagle Pump Failure - 241-TXR

Nagle pump #39 in tank 101-TX failed on February 8 after a total of 414 hours operation, and the cause is believed to be bearing failure. The failed pump was stored in tank 105-TX and Nagle pump #25 was installed in the 101-TX tank on February 10. Operation of this pump has been satisfactory.

e. Process Pump Failures - TBP

There was a total of six process pump failures during the month. Bearing failure was responsible for the loss of three of the units; loosened impellers caused the loss of two; and slinger ring failure was the cause of the sixth failure.

f. Calcination Furnace Kettle Inspection - UO_3

The kettle from calcination furnace number 9 was removed and inspected for corrosion penetration by the Plant Metallurgical Engineer. Investigation revealed penetration of one-eighth inch during the two years the unit has been operated. Approximately three-fourths inch of solid metal is still free from corrosion.

g. Liquid Nitrogen Storage Tank - P-10

Due to an excessive consumption of liquid nitrogen, the storage tank was disassembled and examined on February 7. One portion of the outer wall of the Dewar type unit had collapsed and made contact with the inner wall. The collapsed section was reformed, reinforced and reassembled.

C. Improvement Experience

1. Process Tests and Revisions

a. Control of Ruthenium - Redox

The metal feed preparation procedure was revised to reduce the sparging rate and employ reflux in the oxidizer tower during the ruthenium volatilization step in an attempt to minimize the evolution of ruthenium from the stack. Prior to the centrifuge failure on February 21, seven runs were processed with various modifications of this procedure, and samples taken down-stream of the J-1 filter indicated considerable improvement in ruthenium emission. Further testing and sampling is planned after replacement of the failed centrifuge permits use of normal feed preparation procedures.

b. Temporary Head-End Treatment Procedure - Redox

A temporary head-end procedure was resorted to during the latter part of the month to sustain operations after the failure of the H-2 centrifuge on February 21. A spare centrifuge was not immediately available so head-end procedures were altered to provide ruthenium volatilization followed by complete dissolution of manganese dioxide (normally utilized for the scavenging of zirconium and niobium). Settling and decantation procedures are also being employed to remove as much solid material as possible prior to introducing the treated feed to the columns. Subsequent operation has been satisfactory and normal rates have been achieved even though there has been some loss in decontamination efficiency.

c. Organic Treatment - TBP

Processing of feed material having a lower effective cooling age increased the residual activity in the TBP Plant decontamination column extractant (RAX) such that two-stage carbonate washing was necessary during February. The gamma activity of the extractant was reduced from an average of 50 uc/gallon to 20 uc/gallon by this change in procedure.

d. Mixed Gas Pre-heaters, Task II - 234-5

Mixed gas pre-heaters for all Task II furnaces were placed in operation on February 17. The pre-heaters, designed to heat the

d. Mixed Gas Pre-heaters, Task II - 234-5 (Continued)

process gasses (HF, O_2, and process air) to approximately 600° C, have reduced the average refluorination rate by 8% on runs processed to date.

2. Inventions or Discoveries

There was one invention reported during the month:

Inventor	Title
G. L. Helgeson	Dosage Rate Integrator

D. Events Influencing Costs

Although the over-all Section production attainment in February was increased over that attained in January, the total costs of operations are expected to reflect a reduction from the January total costs. This reduction is the result of reduced labor charges, due to the shorter working month, and reduced essential materials costs, due to more February production being processed in the more economical Redox process.

Total force of the Separations Section increased by eight as personnel additions were made in the Operations, Power and Maintenance, and Process Sub-Sections.

E. Plant Development and Expansion

1. Project Status

a. Project CA-513-A, Purex

The Project Representatives approved the basic design of the alternate fractionating facilities for nitric acid in the Purex Plant, with the features of 100 mm. low-pressure operation and installation outside of the canyon in a contact-maintained zone. The new outside equipment will be fed with 30 percent acid to be produced in the initially-scoped fractionator which will be operated as a stripper within the canyon. This revision eliminates objections to installing the fractionator inside where its operation and maintenance would pose serious problems.

b. Projects CG-496 (Recuplex); CG-549 (Task I) 234-5 Building

Construction on Recuplex facilities in the 234-5 Building is scheduled to be resumed on March 8, 1954. A review of construction and procurement schedules for Task I indicates that the ready-for-use date will be moved from September 1, 1954, to the early part of 1955.

c. Project CG-562, TBP Modifications

Adequate organic cleaning is being obtained with the "Stage I" system for organic treatment. Additional clean-up facilities do not appear to be urgently required.

d. Project CA-539, Additional Waste Storage Facilities, 241-SX

The design schedule has been revised to include the condenser-system scope change and is now 89 percent complete. Construction is 59 percent complete and 19 percent behind schedule. The ready-for-operation date has been extended to April 15, 1954 and present production forecasts indicate that this date will be satisfactory.

e. Project CG-187-D-II, Redox Production Facilities

1) Sample-Gallery Ventilation Improvements

Duct-work installation and revisions to prototype riser flush and holddown-clamp device have been completed. The project is in process of re-evaluation to determine remaining costs to install hoods, trays, flush and holddown devices, and to make necessary changes to existing sample-gallery ventilation fans. It is likely that approximately $10,000 additional funds will be needed, due to the cost of flush and holddown-clamps which were not included in original estimate. This job is approximately 50 percent complete and a realistic completion date is July 1, 1954.

2) Backcycle of 2DW and 3DW as 1A Scrub

Design of 3DW backcycle is complete. At present, it is scheduled to be installed with Stage I of Project CA-535 at the end of April. Design of 2DW backcycle provision is scheduled for March with installation in August.

f. Project CA-187-D-III, Redox Waste Water Disposal Basin

The lump-sum portion is complete and has been accepted. A work release has been issued to Minor Construction to make all tie-ins and backfill the old swamp. The tie-ins will be completed in March if Redox Plant down-time is available.

g. Project CA-535, Redox Capacity Increase, Phase II

The "ready-for-use" target date for this project is still May 1, but extraction column fabrication has fallen two weeks behind schedule. Connector heads are now being received on schedule. Minor Construction fabrication of vessels is slightly behind schedule, but is expected to be brought in line rather soon.

Construction of the final product concentration facility, 233-S Building, was delayed one month in the hope that ground contami-

g. Project CA-535, Redox Capacity Increase, Phase II (Continued)

nation conditions at the construction site would improve. This hope was not realized, and the desirability of delaying construction for an additional two months is being examined at month-end.

A proposal by the Design Section for installation of equipment in the North Sample Gallery to eliminate the need for 233-S Building was reviewed by all parties concerned and a decision was made to reject the proposal on operability, safety, and maintenance considerations.

h. AR-54-M-20, Redox Recycle Facility

Design was completed on February 26 for the recycle facility required in connection with the program for processing low MWD material. Procurement of critical items is under way and completion of the facility is scheduled for April 1.

F. Significant Reports Issued

1. Routine

Number	Title	Author
HW-30968	Separations Section-Operations Sub-Section Monthly Report	V. R. Chapman
HW-30969	Separations Section-234-5 Operations Monthly Report	V. R. Chapman
HW-31051	Separations Section-Plant Engineering Sub-Section Monthly Report	C. P. Cabell
HW-31017	Separations Section-Process Sub-Section Monthly Report	W. N. Mobley
HW-31014	Separations Section-Radiation Monitoring Sub-Section Monthly Report	A. R. Keene
Official Use Only	Separations Section-Power & Maintenance Sub-Section Monthly Report	R. T. Jessen
HW-30982	Separations Section-P-10 Extraction Unit Monthly Report	O. V. Smiset
None	Monthly Progress Report, Plant Expansion, Plant Engineering Sub-Section, Separations Section, February 1954	F. A. Hollenbach
HW-31057	Separations Section-Essential Materials	J. P. McBride
HW-30848	Separations Process Council Meeting	O. F. Beaulieu

2. Non-Routine

HW-30785	Basic Information for Essential Materials Standards, Metal Recovery Unit, P.E. Report No. 74	R. H. Silletto

DECLASSIFIED

2. Non-Routine (Continued)

Number	Title	Author
HW-30739	Radiation Incident Class II, No. 69 (reclassified from Class I, No. 340)	D. R. Koberg
HW-30908	Radiation Incident Class I, No. 337	D. R. Koberg
HW-30974	Radiation Incident Class I, No. 340	W. G. Westover
HW-30185	A Mathematical Approach to Surface Dosage Rate Problems	G. L. Helgeson
HW-29047	Surface Dosage Rate Studies of Task III Feed Material	G. L. Helgeson

III. PERSONNEL

A. Organization

There were no significant organizational changes in the Separations Section in February.

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	5	5	0
Operations Sub-Section	592	594	2
Power and Maintenance Sub-Section	558	562	4
Process Sub-Section	202	205	3
Radiation Monitoring Sub-Section	73	73	0
Plant Engineering Sub-Section	28	27	- 1
P-10 Extraction Unit	35	35	0
Section Total	1493	1501	8

C. Safety Experience

One sub-major injury occurred in the Separations Section on February 3 to a Pipefitter Journeyman. The terminal phalanx of his left middle finger was nearly amputated as it was caught between two flanges while he was installing a siphon tube in a process vessel.

D. Radiation Experience

Two Class I radiation incidents were experienced in the Section. These involved an uncontrolled exposure in the Redox craneway when an employee received 80 mr while walking to the crane during the time a process cell was open and cell equipment was on the canyon deck (No. 337); and an overbatch size condition in a process vessel in the 231 Building where the quantity of material present was 150% in excess of normal operating limits (No. 340). No excessive exposure rates occurred in either incident.

D. Radiation Experience (Continued)

Repeated cases of cask-car and locomotive contamination occurred in the contaminated T Plant and Redox railroad cuts. Excessive frequency of train crew clothing contamination necessitated close surveillance by Radiation Monitoring and Radiological Sciences personnel and indicated a need for further training of the train crews for work in contaminated zones. A case of clothing contamination to a train crewman, which was reported last month as Class I incident (No. 340), indicated a possible localized exposure to the skin above the permissible limit. The incident was reclassified as Class II, No. 69.

In the Redox Plant, airborne deposition of ruthenium on crane surfaces decreased markedly with use of the cell air filter and as the result of strict observance of cell work procedures.

The metal shelters installed over the "burping" self-concentrating condensers on the 101-S and 104-S tanks, prevented further spread of air-borne contamination and reduced the threat to the 241-SX Tank Farm Construction program. Within the 241-S Tank Farm area, the contaminated ground was either backfilled or covered with road oil to prevent contamination spread.

E. Personnel Activities

1. Emergency-Disaster Training

Ten Separations Section non-exempt personnel completed the Technical Rescue training course and forty non-exempt personnel completed the standard Red Cross First Aid training course.

2. Report Writing Course

Six Separations Section exempt personnel completed the course in report writing offered by Technical Information on February 8 and 10.

3. Conference Leading Program

On February 15, seven Separations Section personnel completed the Conference Leading training course conducted by Training and Development personnel.

4. Process Training Course

Twenty-three non-exempt Separations Section personnel completed the Process and Special Hazards Training course offered on February 9 and 16.

5. G.E. Supervisory Selection Program

Evaluation was completed for five Power and Maintenance personnel during the month.

E. Personnel Activities (Continued)

6. Visitations

O. P. Amacker spent February 1 and 2 at the University of Washington recruiting technical personnel.

R. W. Ritchey visited the Applied Research Laboratories in Glendale, California on February 13 - 18 for consultation on analytical instruments and their application in Process Sub-Section laboratories.

[redacted]

ENGINEERING DEPARTMENT

FEBRUARY 1954

At the meeting of the Metal Quality Working Committee in St. Louis during the last week in February, Mallincrodt and National Lead indicated that processing improvements, including the pickling of uranium derbies and the casting of larger ingots free from central pipe, would be incorporated in their operating schedules by this summer. Test quantities of material of this type will be available in the form of slug cores in March. The process improvements should definitely afford uranium cores superior to present production material.

Approximately 1500 "J" pieces (U-235 aluminum alloy) and 1500 "N" pieces (lithium-aluminum alloy) were hot pressed canned for testing of tritium production at increased irradiation levels. About 650 of each had been charged in the hot spot of C pile.

About one-third of the J slugs canned had to be rejected because of blistering of the can wall. The blisters appeared to be caused by gas evolution from the J core material. Contacts have been made with Oak Ridge for production of additional test quantities of J slug cores that are extruded from sound billets rather than individually cast. It is anticipated that these will can with a higher yield and that performance under irradiation should, if anything, be better than that of material already canned.

The apparent yield of N pieces successfully canned was about 90 percent. Marring the surface or damaging the slug during the removal from the die was the major cause for rejections. Destructive testing of the N slug pressure welded closure showed that some of the cap-can interfaces were not bonded. An investigation showed that components were occasionally being contaminated with oil from the finishing lathe or sizing die lubricant. These organic materials prevented adequate bonding. Since no non-destructive test is available at present to distinguish satisfactory cap-can pressure welds from unsatisfactory welds, it was necessary to fusion weld the closures of all of the N slugs before charging in the piles. Steps are being taken to arrange the process so that contamination of the components cannot occur.

During the month, H Pile level was restricted by either a graphite or corrosion limit; C Pile was limited by maximum allowable tube power; all other piles were limited by tube outlet temperature.

Fifteen (15) ruptures occurred at all piles during the month. Ten of these originated in the "hot spot" (935 KW/tube) at C Pile and were split-type ruptures. Eight of the ten ruptures occurred at exposures in the range of 840 to 1056 MWD. The remaining two ruptured between 750 and 800 MWD. Operation at 935 KW/tube for material exposed up to 600 MWD has not resulted in a significantly high rupture rate.

[redacted]

An irradiation of J-N columns for P-10 production in the "hot spot" at C Pile was started. Approximately sixty of the planned 110 tubes were loaded with "hot-press" canned J and target slugs. This test will determine whether P-10 material can be produced in C Pile at the elevated tube powers.

Processing rates were restored to 7.0 t/d in the Redox Plant with a modified process which omits MnO_2 scavenging (essentially a Zr-Mb removal step) to compensate for the loss of the H-2 centrifuge. The head-end treatment scheme was modified to utilize reflux in the H-4 oxidizer on a trial basis with the objective of retaining ruthenium in the process system rather than displace it forward to the H-5 caustic scrubber system by sparging action in the H-4 oxidizer as normally practiced. The ruthenium emission to the stack was normal during operation under either scheme. The quality of plutonium and uranium product streams was within specifications throughout the month although fission product activity in the product exhibit a gradual increase throughout the month.

The operation of the Waste Metal Recovery Plant was continued on a single cycle parallel line basis throughout the month with continued low losses from the RA columns and marginal decontamination of the uranium from three year aged metal extraction wastes. Rework requirements to achieve adequate decontamination were erratic and varied from a few percent to 23 percent of the material processed during a weekly period. Modifications to the solvent treating system were placed in operation which permit more thorough washing of the recycling solvent with 3.0 percent sodium carbonate by a series treatment in counter current flow packed columns and an agitated tank. The residual fission product activity in the recycling solvent has shown a distinct improvement. Further plant studies have indicated that the addition of 0.1 percent (uranium basis) of sulfamic acid results in a 30-35 percent increase in the reactivity of the product UO_3.

Process studies of a preliminary nature have indicated the processing rate limitation for enriched uranium fuel elements (1.5 to 5.0 percent U^{235}) will occur in the strip columns of a Purex type process due to safe geometry considerations at rates of 4.5 to 3.4 t/d.

The Pu-240 content of plutonium product is by no means uniquely determined by total exposure. At the present and contemplated higher power levels of the piles, the irradiation time for production of 200 MWD material is not overwhelmingly long with respect to the half-life of Np-239, thus an appreciable fraction of the Pu-239 recovered is formed after pile discharge and is not vulnerable to conversion to Pu-240. On the other hand, if the neutron capture cross-section of Np-239 is large, formation of Pu-240 via this route and subsequent Np-240 decay will increase with power level. Considering only the former mechanism, uranium exposed at present and higher power levels to 250 or 275 MWD/T should yield a plutonium product with a Pu-240 concentration no greater than that experimentally found in 200 MWD/T material produced several years ago at lower power levels. Since the absorption cross-section of Np-239 is unknown, the net effect cannot be predicted.

Limited data on pile exposure of uranium specimens of different diameters,

hence, different temperatures, under identical exposure conditions, indicates that bumping is more pronounced under low temperature irradiation.

Plastic analysis of stress-strain conditions in 1.36" and 1.66" diameter solid slugs and 1.36" O.D. - 0.354" I.D. and 3.45" O.D. - 1.8" I.D. cored slugs, assuming 600° C maximum uranium temperature and 212° C coolant temperature, indicates (1) that coring a slug reduces the stress intensities throughout the slug, (2) there is negligible size effect for different solid slugs, and (3) the larger cored slug has the lowest stress intensities of the four cores considered; it would also have the highest specific power.

Study of the preparation of plutonium tetrafluoride by reaction of plutonium oxide and ammonium bifluoride has been completed. Bomb reductions of this material produced a regulus of excellent shape and in normal yield.

DESIGN SECTION

During the month direct engineering effort for the Section was distributed approximately 30% to Expansion Program activities, 35% to Research and Development studies, 8% to the 3X Program, and 27% to other projects and design orders. This reflects a gradual decrease in Expansion Program activity and a corresponding increase in other projects and design orders, notably 3X Program andReactor Plant Modification for Increased Production.

Design for 100-K Reactor Plant is substantially complete. Remaining effort for the Section will include scope review, design revisions, bid review, checking vendor's drawings, design field liaison, and preparation of as-built construction drawings.

Design of the Hot Semiworks Conversion, CA-513-D, is 94% complete, an advance of 4% during the month. This does not include the self-concentrator tank which is an addition to the original project scope.

Detail design of the 300 Area Expansion Program, CA-514, was advanced 2% during the month to 81% complete. The small advance resulted from the emphasis on the 300 Area 3X Program. Revised drawing and design progress schedules were issued indicating that design will be complete about May 15, 1954.

Design work on Project CG-549, Activate Task I, Building 234-5, is 85% complete, an advance of 17% during the month.

Over-all design on Project CG-551, Expansion of Building 234-5 Facilities, was advanced 9% during the month to 85% complete.

Over-all work on Reactor Plant Modifications for Increased Production, CG-558, advanced to approximately 9.4% complete. Detail design is 5% complete, an increase of 2% during the month.

Design of the modifications to the solvent recovery systems of the Waste Metal Recovery Plant is 85% complete, an advance of 60% during the month.

Design of Project CG-567, Alum-Activated Silica Water Treatment Facilities, was advanced 8% during the month to 98% complete.

Authorization for design of CG-575, Hanford 3X Program - P-10 Extraction Facilities, was received during the month and scope design is 5% complete. A preliminary project proposal requesting funds and authorization for the initiation of the P-10 Irradiation Project was prepared and submitted to the Commission early in February. Over-all design for CG-573, Hanford 3X Program - 300 Area, is 66% complete, an increase of 41% during the month.

PROJECT SECTION

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

Project No.	Title	Scheduled Completion	Actual Completion
CG-496	Recuplex	86%	33%
CA-512	100-K Area Facilities		
	KW - Water Plant	76%	68.2%
	Reactor & Bldg.	71%	61.7%
	KE - Water Plant	49%	44.6%
	Reactor & Bldg.	36%	38.3%
	General Facilities		62.4%
CA-513	Purex Facility, Part "A," overall	46%	21.4%
	Part "B"		100%
	Part "D"	25%	17%
CA-514	300 Area Expansion, overall	63%	30%
CG-535	Redox Capacity Increase, Phase II	28%	11%
CA-539	Redox 241-SX Tank Farm	79%	62%
CA-546	Fuel Element Pilot Plant	4%	2%
CG-573	Hanford 3X Program - 300 Area		41%

Three jurisdictional disputes at Hanford interfered with construction during the month. Two half-day work stoppages at KW Water Plant were caused by millwrights and pipefitters. Another stoppage in 165-KW involved millwrights, fitters, and electricians. A direct result was interruption of graphite packing at KW on February 23-24. At least three off-site labor disputes in vendors' plants have delayed delivery of essential equipment.

After five months of delay on Recuplex Installation, deliveries of vessels and equipment began so that construction is to be resumed in March 1954.

Inspection was completed on 28 orders, and 182 new orders which will require inspection were received. At the end of the month there were 1086 orders for items which required inspection.

All preliminary arrangements were satisfactorily completed, and packing of KW graphite began on the morning of February 16. The packing was substantially accomplished by the end of the month. (Actual completion was at 11:02 A.M., March 1, 1954.) Other installations accompanied the packing

of graphite. Two subcontractors began installation of the Storage Basin monorail system and steel rolling doors in the 105-K Buildings. Installation of crates in 105-KE was stopped until additional information can be obtained from mock-up of graphite which is now being fabricated. The #4 pump at 181-KW was put into service February 25 to fill the 183.4-KW clear well. Two sedimentation basins and two filters were put into service at reduced flow rates for filling the clear well. Installation of primary and secondary process water pumps has been delayed by jurisdictional disputes and by discovery of more cracked castings. The secondary pump #5 was returned to the vendor because of un-repairable cracks in the casing. In spite of continued labor problems, some progress was made toward installation of the first secondary process pump drive assembly in 190-KW, switchgear and boilers in 165-KW, and the turbine generator units in 165-KW. Construction work in KE Water Plant buildings is proceeding closely behind the schedule for corresponding KW buildings. Boiler erection and switchgear installation have been started in 165-KE.

ORGANIZATION & PERSONNEL

Total on Roll, February 1, 1954	1,497
Accessions	22
Separations	15
Total on Roll, February 28, 1954	1,504

A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

ENGINEERING ADMINISTRATION SUB-SECTION

FEBRUARY 1953

A new procedure was agreed to with the AEC concerning the purchase of multiple copies of reprints and pamhplets. Individual AEC approval is no longer required for purchases amounting to less than $50. Expenditures under this blanket approval are limited to a maximum of $500 for the remainder of the current fiscal year.

Area Extension Files at 1717-D Bldg., 100-D Area, and 2704-Z Bldg., 200-W Area, were opened on February 15. Pending procurement of another full-time messenger, only one complete delivery run has been made in each area daily, although the work load has been kept current. Opening of the Files Extensions has not yet had a noticeable effect on document issuance in the 300 Area, tlhough it is expected that issuance of monthly reports through the Extension Files will make a perceptible difference in the 300 Area work load.

The annual inventory (required by GM-Sec-5) of Research and Development reports classified SECRET was completed during the month. A total of 33,148 documents were inventoried, and there remains only the problem of accounting for some 24 copies for which accountability discrepancies exist. A complete summary of this inventory is to be submitted to Security on March 15, for presentation to the AEC by April 1. As the entire inventory crew of five persons devoted full time to this project, no routine inventories were conducted during the month, although the usual inventories for transferred andterminated employees were maintained.

The conversion of basic classified document accountability records to IBM, a program begun in January, continued throughout the month. IBM has completed the key punching of all documents with "HW-" prefixes, and started punching of "3-" documents during the last week of February. Two members of the Files staff have been assigned full-time to reconciling discrepancies in the IBM key punching records.

During the month the following major contract activities were handled:

1. Special Agreement No. G-39 between General Electric and Telefilm, Inc., covering the processing of movie film, was conditionally approved by the Commission February 24, pending elimination of the requirement for guard service at the Telefilm plant.

2. The original Modification No. 5 to Special Agreement No. G-12 between General Electric and Union Carbide and Carbon Corporation covering changes in specifications and quantity range was not completely executed due to the decision not to manufacture graphite bars from Cleves coke at this time.

3. Modification No. 5 to Subcontract No. G-283 between Sheppard T. Powell and General Electric covering an extension of time was approved by the Commission February 2.

4. Modification No. 4 to Subcontract No. G-107 between General Electric and the Swedish Hospital of Seattle, Washington, covering an extension of time was rewritten at the request of AEC and executed by General Electric and sent to AEC for approval on February 15.

5. Modification No. 1 to Consultant Agreement No. 118 between General Electric and Joseph P. Dieves covering an extension of time was approved by the Commission February 4.

6. Consultant Agreement No. 120 between General Electric and Applied Research Laboratories covering consultant services in connection with the quantometric analysis of standard samples was executed by the Consultant February 15.

7. Modification No. 2 to Special Agreement No. G-2 between General Electric and Washington Transit Advertising covering fabrication of aluminum signs for the safety program has been executed by General Electric and transmitted to AEC for approval February 15.

8. Special Agreement No. G-40 between General Electric and Morrison, Fenton and Johnson, Inc. covering the appraisal of residential units in Richland was executed by the Subcontractor February 23.

9. Modification No. 1 to Consultant Agreement No. 110 between General Electric and Dr. Raymond E. Zirkle covering an extension of time of his subcontract was sent to the Commission for approval February 15.

10. Special Agreement No. G-41 between General Electric and Mary J. Williams covering her services as anaesthetist at Kadlec Hospital was sent to AEC for approval February 23.

11. Special Agreement No. G-42 between General Electric and Applied Research Laboratories covering servicing of laboratory equipment was sent to AEC for approval February 19.

12. Special Agreement No. G-43 between General Electric and the University of Washington covering graphite drying studies was sent to AEC for approval February 23.

13. Special Agreement No. G-38 between Morgan Wheeler and Company and Hugh H. Russell covering appraisal services in connection with certain mutual church and residential properties in Richland was approved by General Electric and forwarded to the Commission for approval late in February.

14. Modification No. 8 to Special Agreement No. G-5 between General Electric and National Carbon Company covering price redetermination for the final increment of production and certain specifications covering final experimental runs was drawn for G-E execution February 25, 1954.

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DECLASSIFIED

PILE TECHNOLOGY SUB-SECTION

MONTHLY REPORT

FEBRUARY, 1954

DECLASSIFIED

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VISITORS AND BUSINESS TRIPS

W. Lindsey visited L. P. Bupp and P. H. Reinker from the Atomic Energy Commission in Washington, D.C., February 15 through 19, 1954, for technical consultations on plutonium.

L. P. Bupp visited Oregon State College, Corvallis, Oregon, February 3 through 5, 1954, to recruit technical personnel.

D. R. deHalas attended the National Association of Corrosion Engineers Short Course at Washington State College, Pullman, Washington, February 1 through 5, 1954.

A. G. Dunbar visited Telecomputing Corporation, Burbank, California, February 15 through 19, 1954, to acquire technical data regarding specialized equipment.

P. M. Jackson and R. C. Lovington visited Huntington Rubber Company, Portland, Oregon, February 5, 1954, to discuss fabrication of molded washer seals.

R. S. Paul visited Brookhaven National Laboratory, Long Island, New York, February 1, 1954, and Knolls Atomic Power Laboratory, Schenectady, New York, February 2, 1954, for technical consultations on physics problems.

ORGANIZATION AND PERSONNEL

Personnel totals are as follow:

	January	February
Administrative	4	4
Pile Engineering	74	72
Pile Materials Development	59	60
Special Irradiations	24	23
Technical Liaison	4	4
Total	165	163

Pile Engineering: One Engineer II transferred to Separations Technology, one Junior Engineer transferred to Manufacturing-Reactor-Process, one Engineering Assistant terminated, and one Junior Engineer transferred in from Applied Research.

Pile Materials Development: One Engineering Assistant was reactivated, and one Technical Graduate was converted to Junior Engineer.

Special Irradiations: One Steno-Typist transferred to Plant Auxiliary Operations-Operations Analysis-Applied Mathematics, and one Technical Graduate was converted to Junior Engineer.

PROCESS TECHNOLOGY

Power Level Limits

During February, H Pile was limited by graphite temperatures with 30 per cent helium or corrosion limit; C Pile was limited by maximum allowable tube power; and all other piles were limited by tube outlet temperatures determined by corrosion effects. D and H Piles are authorized by production tests to operate at 95 C and other piles at 90 C.

Slug Rupture Experience for February

Fifteen slug failures occurred during the month. In addition, one C Pile "hot spot" tube was discharged as a suspect; however, no rupture could be found in the metal from this tube. Data on the failures are presented in the following table:

Tube No.	Failure Date	Exposure	Orifice Zone	Type Failure	Metal Group
3284-H	2/1/54	581	.313	Side	11
3684-B	2/2/54	487	.240	Split	12
2190-C	2/4/54	483	.385	Split	9
4067-D	2/5/54	832	.283	Split	**
2474-C	2/6/54	888*	.385	Split	11
2471-C	2/6/54	1056*	.385	Split	11
2372-C	2/7/54	885*	.385	Split	11
2182-C	2/7/54	840*	.385	Split	11
2672-C	2/8/54	884*	.385	Split	11
3880-B	2/9/54	487	.240	Non-Classified	8
2473-C	2/10/54	927*	.385	Uninspected	
2273-C	2/12/54	953*	.385	Split	11
2374-C	2/14/54	793*	.385	Uninspected	
2472-C	2/19/54	758*	.385	Split	9
2377-C	2/25/54	828*	.385	Uninspected	

* These tubes were in the C Pile "hot spot", and were being irradiated to an exposure of approximately 900 MWD/T under PT-105-549-A.

** This tube was being irradiated to an exposure of 900 MWD/T under PT-313-105-13-M.

Tube 4067-D was one of five tubes which had been charged with regular uranium pieces and 0.4 atomic per cent uranium-chromium alloy pieces under PT-313-105-13-M. The other tubes had been discharged at exposures between 150 and 700 MWD/T. Tube 4067-D was scheduled for irradiation to 900 MWD/T. Half of the alloy slugs in the tube were low carbon pieces (20-50 ppm), and the other half were high carbon pieces (800-1000 ppm). The failure occurred in one of the low carbon pieces.

The rupture rate for Group 11 Metal remains higher than the Group 9 rate for metal irradiated to 600 MWD/T.

Ruptured Thorium Slug from Tube 3884-H

One thorium slug, which ruptured and caused a water leak in tube 3884-H on January 21, 1954, was removed from the process tube and was examined by the Radiometallurgy group this month. The rupture was a side failure. When the can was stripped from this piece, a "step" of approximately 1/16 inch in height was noted at the middle of the piece. It appeared as if the slug had been machined to a cylindrical shape and then half of the piece had been machined while positioned "off center" in the lathe, giving roughly an elliptical cross section. A hole in the thorium itself extended for about 1/2 inch from the "step" to about 1/2 inch from the reduced sized end, and was in the region where the defect had its greatest height. This hole was filled with corrosion products.

Another piece which was stuck in this tube has not yet been examined.

Broken Pieces at H Pile

A total of ten broken eight-inch pieces have been found in the metal discharged from H Pile on January 6, 1954. All of these slugs were broken, transversely, into two pieces. One of these slugs also appeared to have a pinhole in the jacket at the cap end. There had been no indication of failure while these pieces were in the pile. One of the pieces, when picked up after the discharge, appeared to have a break in the uranium although the can appeared to be intact. While being handled, this piece was dropped and broke into two pieces.

Two other of these pieces appeared to be intact when first picked up and placed in a bucket. However, when next examined, these pieces were broken.

Higher Specific Power

Production Test 105-533-A - The effects of increased tube powers localized in a central region of C Pile are being investigated by changes in the poison arrangement. Operation at tube powers up to 935 KW was without incident for tubes exposed up to 600 MWD/AT.

Production Test 105-549-A - This test authorizes the exposure of 200 tubes covered by Production Test 105-533-A to a concentration of 900 MWD/AT. During February, ten slug failures occurred in these tubes, bringing the total number to fourteen and giving a rate of approximately 0.15 ruptures per tube for metal irradiated to 900 MWD/T. This rate is based primarily on the performance of Group 11, Fernald rolled, metal which comprised the bulk of the material under this test. The greater part of the metal charge in the "hot spot" in September, however, was Group 9 (Simonds rolled). For this reason, the September charge was scheduled to be irradiated for another month although all previous charges (Fernald metal) were discharged on the basis of the large number of ruptures. It is expected that this continued irradiation of the September charge will furnish data for a comparison of the performances of these two metal groups at high exposures.

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Production Test 105-532-A-4 - Increased slug powers are being investigated by irradiating uranium enriched to 1.75 per cent U-235. Three columnar charges, each containing a total of twelve enriched pieces, were charged in the C Pile "hot spot" on February 14. The maximum slug power is calculated to be 78 KW/ft of uranium. If no allowance is made for any decrease in the thermal conductivity of uranium with irradiation, and no allowance is made for film, it is calculated that this slug will be operating at roughly 675 C core temperature of slightly above the alpha-beta transformation temperature.

Manufacture of Other Products

U-233 Production - A recommendation regarding the production of 30 Kg of U-233 by April 1, 1955, was issued as HW-39864. It was recommended that DR Pile be used if at all possible; it now appears that this will not be possible since the most recent estimates are that the material will not arrive on-site until May. Another study, based on these new conditions, will be made.

Production Test 105-551-A, "High Exposure Thorium" - As the exposure of thorium pieces proceeds, heat generation per slug increases because of the formation of U-233. This test authorizes the irradiation of six tubes of thorium used for flattening to 1500 MWD/AT to obtain data on rate of heat generation as a function of exposure. Some material has been exposed above 1000 MWD/AT with heat generation rates about 25 per cent of that in the surrounding uranium.

Production Test 105-562-A, "P-10 Irradiation at C Pile" - The choice of piles to be used for any future P-10 production will depend on the ability of the fuel and target slugs to operate successfully at high tube powers. This is being investigated at C Pile in the pilot zone. Sufficient material was available to charge 60 of the planned 110 J-N tubes authorized under this production test. Forty of the tubes contain hot-pressed fuel slugs, the balance of the fuel pieces being cold-canned and Al-Si canned. Charging was completed February 18, 1954. Preliminary operational data indicate these tubes to be operating somewhat below the tube powers of adjacent uranium columns.

To investigate graphite heating effects caused by the fuel slugs, thirteen tubes were charged in a diamond-shaped block at the edge of the "hot spot".

At a power level of 1100 MW and 85 per cent helium, the maximum graphite temperature was 324 C in the diamond and 328 C in the "hot spot". At 1250 MW and 40 per cent helium, the hottest graphite was 524 C in the diamond, with comparable temperatures in the "hot spot".

Production Test 105-550-A, "Exposure of Bismuth Slugs in Hot Water" - Bismuth pieces have routinely been exposed in full columns and, causing no heat generation, have been exposed in relatively cool water. Some increase in loading efficiency could be made by loading B pieces downstream of enrichment tubes. Two tubes were charged at H Pile on February 22 to investigate the effects of this type of loading on B slug performance.

Pile Studies

Segmented Discharge - A study investigating the economics of segmental discharge and proposing a new method has been prepared cooperatively with Mechanical Development personnel and is completed to rough draft form. Large cost savings appear possible for P-10 and U-233 production and some savings for 200 g/T plutonium.

Use of Enriched Uranium for P-10 or U-233 Production - The possibility of using uranium enriched in U-235 for fuel slug loadings is being investigated.

PILE PHYSICS

Safety Aspects of Special Loadings

A sub-committee of the Reactor Safeguard Committee met at Hanford on February 8 and 9, 1954, to discuss the nuclear safety aspects of full-pile loadings for P-10 production. The material presented for discussion with the sub-committee has since been issued as document HW-30841.

Because the P-10 loading lacks the negative metal coefficient associated with resonance absorption in natural uranium, an inherent fail-safe characteristic of natural uranium loadings is absent. Process specifications are currently being written specifically for the hot startup in a full-pile P-10 load; slow rates of horizontal rod withdrawal and reduced Beckman trip settings will be specified for this case.

The problem of water loss is also inherently less safe in the case of a P-10 loading than in the case of natural uranium because of the tendency for the P-10 loading to become more reactive on melting, whereas the natural uranium would tend to become less reactive on melting. In this respect, the difference in safety factor between partial and full-pile P-10 loadings is small compared to the difference between partial P-10 loadings and natural uranium. The problem here is regarded mainly as that of providing emergency cooling or insuring against interruption of the pile coolant flow.

Recommendations of the Reactor Safeguard Committee members included institution of supplementary cooling or control in the event of water loss after the pile had been shut down, encouragement of the development of the nuclear safety fuse, and investigation of the long-term possibility of P-10 production with low enrichment uranium fuel slugs such that heating effects would still have fail-safe reactivity effects.

Oak Ridge reports on the J-slug critical experiments are being reviewed in conjunction with a joint Manufacturing-Technical investigation of the ramifications of the increased handling problems associated with full-pile P-10 loadings.

Reactivity and Exposure Studies

The best information available indicates that the present 6.0 inch 1066 slug length is close to the ideal length for use with standard J slugs in full J-1066 columns. A U-233 yield figure of 0.64 grams per column MWD has been estimated for planning purposes for meeting a short range goal; this figure is based on observed atom per atom conversion in P-10 loadings and on observed flattening column yields. Actual yield figures may be somewhat higher due to resonance effects and neutron per fission effects not taken into account in this estimate.

Two additional discharge factor formulae have been developed for inclusion in process specifications to control the quality of high and low exposure plutonium, namely 200 g/T and 800 g/T material. These formulae are based essentially on weighting the discharge exposures such that the effect of contaminant buildup, proportional to the square of the exposure, is properly averaged.

Experimental Control Studies

Because the metal temperature effect observed during the free period rises to approximately 50 MW in the scram transient tests (PT-105-554-A), a correction must be made which complicates the scram analysis. The D Pile data obtained last month have, therefore, not been completely analyzed, but indicate a value for the 29-rod VSR system in the range of 1300 to 1500 ih.

A sample of irradiated "ink" solution (~one per cent potassium tetraborate) was obtained from the facility located in tube 2488-DR (PT-105-529-A) for a spectrum analysis. The initial sample obtained was not diluted sufficiently nor made small enough to permit the evaluation of very short half-life components. The test will be re-run shortly, completing the physics measurements contemplated for the present experimental facility.

Shield Attenuation Studies

The attenuation studies on magnetite, magnetite-limonite, and iron-limonite slabs now make it possible to estimate gamma attenuation characteristics for concretes of similar composition but of varying density. It was found in all three of the materials studied that an "effective" absorption coefficient could be calculated which would treat the shielding phenomena as consisting entirely of absorption of incident radiation (whereas in the actual case the attenuation characteristics are dependent also on gamma scattering and local formation). The "effective" coefficient corresponded in all three cases to that expected on the basis of total cross sections at 9 Mev. Although this concept is empirical in nature rather than being based on the true physical picture, it provides a method for making extrapolations over a limited range of densities in concretes with high iron and oxygen contents. The density range of the materials tested ranged from 3.36 to 4.24 gm/gm^3.

The shield test facilities at D, DR, and C Piles were all discharged during the month and reloaded with various neutron detectors; as a result of the

effort required to make use of these facilities when they were accessible, little time was available for analysis of recent data. The third phase of the simulated masonite burnout experiment is now under way; all but one inch of the twelve inches of masonite from the inner three cycles has now been removed and, in addition, fractional amounts have been removed from the fourth and fifth laminations. Due to partial melting and subsequent uncertainty as to the exact position of enclosed detecting foils, the paraffin "integrator" placed above the outer masonite lamination has been replaced with one made of lucite.

Shield Damage Studies

An evaluation of the condition of the masonite in the top and side shields at the H and F Piles based on radiation and thermal exposure data from small samples has been completed. The evaluation obtained in this manner can then be compared to direct observations in the case of step plugs which were discharged after significant exposure periods. While corroborating the expected trend that hydrogen content should decrease, density should increase, and compressive strength should drop off with increasing temperatures, the observed damage data were quite scattered; the data were not unreasonable, however, in the light of the unique temperature conditions which may exist around step plugs and the treatment to which such plugs are subjected in discharge.

The following table gives the results of the analysis of the H Pile C test hole step plug, removed in December, 1952; these data should be conservative in showing the condition of the center of the side shields at that time:

Sample	Compressive Strength, psi	Per Cent H	Per Cent C	Density, gm/cm^3
Unexposed	23,500	6.19	49.4	1.28
Layer 1 (outer cycle)	22,700	5.96	51.3	1.29
Layer 2	22,300	5.84	52.3	1.30
Layer 3	21,500	5.62	54.1	1.31
Layer 4	20,400	5.31	56.6	1.33
Layer 5	18,500	4.9	60.0	1.36
Layer 6 (inner cycle)	11,200	4.38	64.2	1.39

The shrinkage in volume (of the order of 10 to 20 per cent in the inner cycle samples) also must be taken into account in order to obtain a true picture of the amount of reduction of moderating material.

A report is currently being written presenting the data and resulting conclusions from masonite damage studies carried out to date.

HEAT STUDIES

Tube Flow Studies

Studies have been continued to evaluate the technical feasibility of cooling slugs by the vaporization of water at their surfaces. The full scale process tube mock-up was used to determine the minimum flows which would provide adequate slug cooling for various simulated pile operating conditions. For a B, D, F type process tube, an inlet water temperature of 10 C, a tube power of 500 KW, and constant heat generation along the length of the tube, it was found that the flow rates could be reduced as low as 6.5, 5.8, 5.2, and 5.1 gpm for rear header pressures of 100, 200, 250, and 300 psig, respectively. The calculated steam qualities at the end of the heated section for the above cases were 26, 28, 35, and 34 per cent by weight, respectively. Reductions in flow rates to values below those indicated above were accompanied by rapidly rising heater tube or "slug" surface temperatures; analysis indicates that the heater tube, or "slug jackets", would have melted in a few seconds had the unit not been shut down. The exact maximum surface temperatures for equilibrium operation were not determined but measurements indicated that they probably did not exceed the local water temperature by over 30-40 C.

In order to determine the effect of annulus size on minimum flow rate, the B, D, F process tube was replaced with a C tube. Some of the tests were repeated, and quite similar (but not identical) results were obtained.

An additional test was performed at 250 KW/tube with the C annulus to determine the effect of tube power on minimum flow rate. For a 250 psig rear cross-header pressure, it was found that the flow rate could be reduced to about two gpm. This corresponds to a steam quality of 62 per cent by weight at the end of the heating zone. It is probable that the flow rate could be reduced to somewhere between this two gpm and the 5.2 gpm above if the uniform heater tube were replaced by one in which heat were generated in accordance with a cosine curve.

Operation of the mock-up at back pressures above 300 psig has been undesirable because of probable failure of some of the components. Consequently, plans have been made and equipment is being procured to modify the mock-up to permit operation at at least 500 psig back pressure. Present indications are that pressures much above 500 psi cannot be reached without major modifications to the equipment.

A survey of the existing literature on boiling heat transfer has continued, and particular emphasis has been given to determining a method for calculating maximum steam qualities. Although the literature data are hazy, they indicate that qualities of 30-35 per cent by weight are about the maximum that can be obtained. Since qualities of 62 per cent have been obtained on the mock-up, it becomes apparent that the literature data cannot be used to predict mock-up results with any consistent degree of accuracy. It should be noted, however, that this does not represent an indictment of the data; rather, the literature data are based on test conditions so different from ours as to almost prevent correlation.

Any use of the cooling-by-boiling technique will be accompanied by moderately extensive problems involving steam-water mixture pressure drops in both the process tube and effluent piping. Some effort has been devoted to trying to simplify the normally tedious pressure drop calculations. So far, this has proved unsuccessful. Consequently, arrangements are being made to utilize IBM machines in the calculations. Extensive use was made of these machines for "boiling-disease" calculations, and, since the present calculations are quite similar to the previous ones, it is anticipated that the arrangements will prove successful.

In order to study both cooling-by-boiling at higher pressures and to study liquid phase cooling at high pressures (on the order of 1500 psi), a new mock-up is being designed. The present mock-up would require almost 100 per cent replacement if it were modified for the pressures being considered; in addition, the use of it would be lost during the modification period. The new unit will be constructed in parallel with the old and will utilize the same generators. Several heater tubes have been ordered for use in both the old and the new units. These tubes will be made of nickel and will present cosine heat generation for powers up to 750 KW per tube and for local water temperatures of 600 F. Inquiries have also been made concerning the possibility of obtaining tubes of zircalloy 2, and the results are encouraging.

Construction of the 189-D Hydraulics Laboratory is progressing.

Fuel Element Studies

The axial thermocouple slug of enriched uranium installed in C Pile has continued to perform reasonably satisfactorily during the month. The highest temperature recorded was 635 C, and this is very close to the maximum value recorded any time during the exposure. It has been impossible to make a close comparison between measured and calculated temperatures since the specific powers have not been known due to the presence of control rods in the region. It is not expected that this situation will change until slugs in an adjacent tube are discharged and weasled. The thermocouples themselves appear to be deteriorating slowly, but it is hoped that they will remain operable for the remainder of the test. The slug has received over 1/3 of the exposure specified in the production test.

Moderator and Other Studies

Arrangements were made to obtain experimental graphite temperature data at C Pile for the case of J-N loaded tubes and helium concentrations of 75 to 100 per cent. For this test, thirteen such tubes will be loaded in a diamond pattern to provide conditions similar to those expected if the pile were fully loaded with J-N material.

Preliminary studies of a scoping nature were made with respect to pile safety under proposed new operating conditions. Some of the conclusions which were reached (based on 1000 KW/tube operation) are as follows (all

time values should be interpreted as "on the order of"):

(1) If the cooling were suddenly lost from a tube and if the power level remained constant, the aluminum jacket would melt in five seconds and the uranium would melt in 45 seconds;

(2) For the conditions of (1), the time required for the jacket of a J slug to melt would be a little longer than that for a U slug, but the time required for the J slug itself to melt would be a little less than that for a U slug;

(3) If the pile were scrammed upon loss of water (rupture of all risers, for example), it is probable that the aluminum jackets would melt in ten minutes, that the uranium would begin melting in sixteen hours, and that the VSR's would begin melting in 25 hours;

(4) If the water were lost 24 hours after shutdown, it is probable that most of the jackets would not melt until several hours after water loss.

MECHANICAL DEVELOPMENT

Charging and Discharging Studies

As a result of the renewed interest in the potentialities of segmented discharge, particularly with respect to different exposures of uranium and various target slug loadings, a detailed economic and mechanical study is being made of this system of operation. Several new approaches to segmentally discharging a tube loading are being studied. These methods involve holding the upstream portion of the charge in place by a suitable spline or lock, and flushing the downstream portion of the charge from the tube. Document HW-30867 will be issued which outlines the results of this study and makes recommendations for development work.

Work continues on the revision of the present charging machines at all areas in accordance with the suggestions outlined in HW-28996.

The design test to determine the flushing characteristics of the poison column control system for the K Piles will commence in the next two weeks.

Horizontal Rod Studies

The rod tip extrusions for the horizontal rod conversion program were received from Alcoa early this month. The boron coated cooling tubes were assembled in the tip without trouble and the complete rod tested in the 189-D mock-up. Under conditions far exceeding those expected to be encountered in any of the piles, the rod was found to operate satisfactorily in every respect. As a result of these tests, it has been decided that the elaborate graphite removal

phase of the conversion program will not be necessary. The new rods will ride up and over the graphite spacer blocks in the bottom of the horizontal slots without difficulty. The new tip was installed in the No. 9 rod opening at B Pile at the end of the month.

A built-up washer seal is used on the first installation at B Pile. Final design has been completed on the molded washer seal to be used for the complete program, and an order placed for several prototypes to be used for testing.

Present plans are to complete enough sintered boron carbide rings of the new, pure material to complete another full rod as well as a half rod. The full rod will be assembled with thermocouples installed on it to determine the temperatures reached at the surface. It is anticipated that this rod will be installed at H Pile during March.

The horizontal rod mock-up in the 189-D laboratory is now being modified to permit the design testing of the K horizontal rod. Alterations are being made to the support framework, and some of the rod components have already been installed.

Vertical Rod Studies

A report discussing the results of tests adapting the K vertical rod to permit air acceleration during drop is in rough draft form and will be issued during March.

Several of the molded washer seals to be used on the vertical rods at K Pile were received from the vendor. These seals were either over-sized or under-sized and, as a result of our testing, the tolerance limit can be relaxed to limits within the fabrication capabilities of the vendor. The difference in these limits had no measurable effect on the seal leakage rate.

The built-up washer seal installed on VSR-16C continues to operate satisfactorily. No leakage or apparent damage has occurred to date.

As a part of the design test for the K Pile Ball 3X system, a lining has been inserted in the graphite structure at the White Bluffs Test Tower. Several tests have been performed to measure the flow rate of the balls in the K slot. Inclement weather conditions have interfered with the performance of the tests.

Supplemental Control

A rough draft of the report on the BF_3 Supplemental Control System was reviewed during the month and, as a result of several suggestions, it is being altered to enlarge the scope of the programs which are being proposed. Further development work on this system as a means of supplying additional control to the old piles will be performed.

As a result of the visit to Hanford by members of the Reactor Safeguard Committee, a study has been accelerated to assess the value of an emergency control system whose primary purpose would be the introduction of large quantities of water directly into the reactor core. The use of the system is contemplated only as a last ditch measure in the prevention of a catastrophe resulting from loss of cooling water. A preliminary report on this study will be issued during March and will outline the conditions under which this system is expected to operate and will recommend programs of development work necessary to its complete evaluation.

Process Tube Assembly and Piping

Little progress was made in the program to determine the maximum allowable tube inlet pressures during the month because of the higher priority of other work.

Equipment to perform the design test on cross-header strainer pressure drop is being installed in 189-F. All parts which required fabrication have been completed and Maintenance forces are presently installing the equipment at the test location.

Work on the design test to determine the effects of temperature and irradiation on the rubber bellows to be used as gunbarrel gas seals at K Pile continued during the month. Those seals which had been placed in an oven at 225 F have evidenced considerable hardening over a one month period as well as some indication of deterioration. The seals which were placed on the rear face of 105-H will not be examined until sometime in April or May.

Flexure testing of various connector designs for K Pile continued during the month. To date, the failures incurred have all been in the flared ends of the tubing, and the design is being altered to prevent this. Several experimental pigtails for use at 105-C and Program CG-558 were also flexure tested during the month.

Materials Testing Reactor Test Facility

Materials Testing Reactor personnel gave final approval to all of our designs during the month. Mock-up of the facilities has been started in the 189-D laboratory and will proceed as the equipment is received from the vendors. At the present time, delivery of equipment is approximately three to four weeks behind schedule, and, on this basis, it is apparent that startup of this facility will be delayed until approximately June 1, 1954.

Physical Constants Testing Reactor

Fabrication of the prototype horizontal control-safety rod was completed during the month. Testing and evaluation will start as soon as the necessary electrical work has been completed. Initial tests on the vertical safety disk have indicated that the compression spring shock absorbers are not adequate. Air or hydraulic shock absorbers will be incorporated in the design. A stress analysis

of the deflections in the steel framework of the movable front face carriage was completed during the month and is being used as the basis for the design. Preliminary drawings of the packing have been received from Design Section. Comments are being prepared and will be forwarded as soon as the results of calculations are available from Applied Research. Preliminary architectural drawings of the building to house the reactor have also been received and commented on.

Other Engineering Development Work

Fabrication of the core boring device for the Graphite Sub-Units continued during the month. Present schedules indicate that the device will be available for testing during May.

Equipment for process tube examination at 105-F Area was installed during the month. Installation of similar equipment in B and C Areas is currently under way.

Another series of rubber test samples were received during the month and will be inserted in outlet nozzles at H Pile during March.

EXPERIMENTAL PHYSICS

Slug Rupture Detection

The project proposal requesting authorization to replace the existing beta systems at all areas with the more sensitive and reliable gamma spectrometer units has received A and B Committee approval. This proposal, prepared by Design Section, estimates that the total project will be completed in two years with a total cost of $670,000. The initial installation will be expedited at H Pile and should be completed within one year.

The prototype gamma ray spectrometer slug rupture detector continued to operate satisfactorily at H Pile. Rotameters were installed on a portion of the sample lines, and flow regulation was facilitated as expected. A cooperative effort with Design Section personnel has been initiated to specify in detail the design and performance criteria for the projected installation. Operational data obtained from the prototype are interpreted to yield design refinements on a continuing basis where warranted.

A rapid "simulated rupture shutdown" was conducted at H Pile to permit a determination of the gamma intensities and spectra which are encountered as background in localizing the process tube containing a rupture. These measurements show that little short-lived gamma activity is encountered, the differential spectrum decreases exponentially with increasing energy, the spectra show evidence of Zn^{65} as a primary contaminant, and there was evidence that higher energy contaminants are present in the event of a rupture. The data substantiate previous conclusions that a high sensitivity integrated total activity monitor used in conjunction with a collimating system will provide the desired sensitivity of detection.

The development of appropriate slug rupture detection instrumentation in support of projected facilities or experiments is progressing as scheduled. The bulk of the components for the system to be employed in the fuel element irradiation facility at the Materials Testing Reactor are now on hand, and the system will be performance tested as soon as higher priority efforts permit. The requirements for slug rupture detection in the proposed Hanford Dual Purpose Reactor have been reviewed, and it is concluded that a gamma monitor system quite similar to that to be installed in existing piles will perform capably. The effluent samples will probably need to be passed through simple heat exchangers to minimize any deleterious effects associated with operating and maintaining these systems in a high temperature environment. The unknown factor at present is the gamma spectrum of the background radiations which will be present in a system recycling water through zirconium. This spectrum will be determined as the various projected "loops" employing zirconium components are brought into service; in any event, the nuclear data now available indicate that the gamma system should perform adequately under the projected conditions.

Measurement of the Neutron Diffusion Length in the KW Pile Graphite

All preparations and scheduling for the determination of the neutron diffusion length in the KW Pile graphite are complete. Personnel assignments have been made on the basis of three shift operation over the estimated 48 hour duration of test. Instrument fabrication and preventative maintenance have been completed, and the test is scheduled to be completed during the first week in March.

The purpose of the measurement is to detect gross graphite contamination, if it exists, prior to advancing construction further toward preparation for startup. A total of 464 independent diffusion lengths will be determined along plotted positions selected to give quite complete coverage of the power producing volume of the pile. A consideration of test pile reactivity data and graphite zoning leads to a theoretically expected overall diffusion length of 53 cm if no significant contamination exists.

Measurement of Lattice Constants

Increasing emphasis has been given the refinement of experimental techniques employed in the measurement of lattice constants since the utility and feasibility of employing gamma spectroscopy in this application has been demonstrated. A specially designed scintillating crystal permitting essentially 4π counting geometry has increased counting rates within the energy intervals of interest five-fold without appreciably affecting resolution, thus improving statistics as well as potential energy discrimination. This development has been employed to demonstrate that an assymetry in the 106 Kev plutonium X-ray peak is due to gamma ray scattering exterior to the crystal rather than the internal conversion of fission product gamma radiation in uranium as has been maintained by groups at other sites. This factor is quite important in experimental determinations of conversion ratio.

A series of experiments have been designed to determine the neutron distributions through J slugs, P-10 slugs, and thorium slugs in support of the physics aspects of special loadings to produce tritium and U-233. The measurements in thorium are expected to yield the fraction of the U-233 production which arises through resonance capture. In addition, metal temperature coefficient measurements in the test pile are planned for E metal (1.75 per cent U-235 in uranium) and thorium. These latter determinations will largely measure the change in resonance capture resulting from doppler broadening of the resonances and should be particularly instrumental in determining the importance of resonance capture in the pile safety aspects of loadings employing either material. A series of measurements are also planned in which the resonance integral of thorium will be determined and directly compared with that of U-238. It is hoped that the latter measurement will assist in firming the now uncertain estimates of conversion efficiency in enriched thorium loadings.

Instrument Development

The problem of providing more adequate monitoring of the neutron levels both prior to and during pile startup has received continued attention. It is believed that even though rigid operating procedures provide the major assurance that an undesirable power excursion will not be realized during the pile startup operation, it is, nevertheless, desirable to provide instrument coverage against many improbable sequences of human errors. The low and high level period trip systems designed for K Pile to give post critical protection at low and intermediate levels are being modified at present to make them adequate for use in a Hanford safety system; performance testing of these components will be initiated next month. Efforts to adapt sensitive thermal neutron fission chambers to monitoring the sub-critical neutron flux levels are continuing with encouraging results. It is believed that a fission chamber of Westinghouse design, which is reported to monitor thermal neutron flux levels in the range from 10 to 10^5 neutrons cm^{-2} in the presence of a 10^5 F/hr gamma field when used with the proper circuitry, can be made into a reliable production instrument.

The major portion of the circuitry required in a gray wedge energy analyzer for use in gamma spectroscopy has been completed and performance tested. The necessary circuit modification and development to yield an automatic energy scanning and direct recording scintillation spectrometer is complete, and the instrument is now in use. An experiment is now under way to determine the dependence of the amplification of a scintillation spectrometer on temperature; this work has primary application in the slug rupture detection problem.

Outlet Water Temperature Recording Facilities

The Flexowriter automatic outlet water temperature recording facilities at both B and H Piles continued to operate routinely. A service manual for the improved Flexowriter system at B Pile, which is a prototype of the systems being installed at the remaining areas by Reactor Section, has been

completed and issued as HW-30843. Steps are being taken to transfer the B and H Pile systems intact to the Manufacturing Department.

Development Test 105-564-A, "Temperature Monitor Prototype Test". was issued to authorize on-pile performance testing of a prototype of the K Pile temperature monitor which is an integral part of the K Pile safety system. All special components have been fabricated, and system testing will be initiated next month.

Test Pile - Routine Tests

Regular metal testing proceeded routinely. Twenty-four billet egg lots were tested with TDS values ranging from 13 to 17. Single slugs were selected from 312 J slug heats and tested to yield dih values ranging from 14.7 to 16.1; this spread is greater than that experienced in the DR-10 program. Seventy-four heats of P-10 slugs were tested with three heats rejected because of non-conformance to specification on lithium content.

Test Pile - Graphite Tests

The last of the graphite produced under contract G-5 with National Carbon Company was received and tested. The average quality of these heats continued to be poor, largely a result of low purity from material in the center of the furnace. The last of the graphite produced under contract G-23 (AGOT grade, unpurified) was also received and tested.

The graphite produced under contract G-12 with National Carbon continued to be of high quality. The density continues to routinely exceed 1.70 grams cm^{-3}; this is at least partially a result of sodium carbonate addition to the raw material to inhibit growth and cracking during processing. The sodium carbonate addition has no apparent adverse effect upon the elemental purity of the processed material.

The graphite which has been produced by Speer continues to be of uniformly high purity. The density continues to average about 1.64.

Test Pile - Special Tests

Samples of residue and dust collected during the graphite lay-up of KW Pile were routinely tested for evidence of high nuclear cross section contaminates which could significantly detract from pile reactivity if present in appreciable quantity. No evidence of contamination was found.

Attempts to employ the test pile to measure the reactivity effect in a 105 pile which would be experienced as water is lost from enriched loadings designed for tritium or U-233 production were unsuccessful. The complete reason for the lack of success is not understood, although it is recognized that single column experiments in an atypical lattice are usually of marginal validity. However, the absence of resonance capture in part of the loadings studied would lead to a theoretical production quite different from the experimental results. It is not now believed that the single column data can be properly interpreted,

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and measurements in multi-lattice cell assemblies will be required to determine this parameter. It is recommended that a series of measurments of this type be included in K Pile startup tests.

GRAPHITE STUDIES

TS-GHF Graphite for KE Pile

The first tube block drilling of sodium carbonate treated TS-GHF graphite and subsequent surfacing to 3.63 inches showed that the material had an extremely high cracking rate. This was contrary to the results predicted and the results of inspection of the material after it had been surfaced to about four iches. Previous experiments on non-sodium carbonate treated material had established that machining to four inches, and inspection of the surface was an excellent criterian of the condition of the interior. The anomalous properties of the new material were traced to about 2000 bars which had not rereceived thorough pitch impregnation in manufacture. Sectioning and mapping sodium carbonate treated graphite which was known to have had proper pitch impregnation revealed the internal structure to be excellent.

The 2000 bars of inferior material are being routed to non-critical pile positions. Properly manufactured carbonate treated material is being used for tube blocks.

Improved Methods of Pile Graphite Manufacture

Results have been obtained from the experimental heats authorized in the G-5 contract modification. The experiments were designed to test the effect of higher purification temperatures and higher purification gas flow on normal TS-GHF process stock and upon Texas coke material which had been given an AGOT treatment. The dih results showed conclusively that the temperature of graphitization rather than the flow rates tested is the predominant factor in graphite purification. The highest allocation index ever obtained on Clarksburg graphite was attained.

The results also showed that the Texas AGOT material could be purified as well as or better than GHF material. It is known that an AGOT process can eliminate the cracking problem. This, coupled with the results from these experiments, indicates that future pile graphite can be made by an AGOT process followed by an F purification. The conclusion is consistent with results previously obtained on Cleves coke material. Present indications are that the process would be no more costly than a GHF process.

Possible Method of Pile Operation for Higher Power Levels

Experimental data have been obtained which point to a new method of pile operation allowing higher average power levels and minimizing limits associated with graphite.

An experiment has been completed in which graphite was alternately exposed in a cool test hole at about 30 C for about 200 MD/CT and annealed in the laboratories to about 500 C for some six hours. With a continuing cycle of annealing and exposure, it has been found that the physical expansion and the thermal conductivity of the graphite saturates. The experiments have been performed to a total exposure of about 1000 MD/CT for thermal conductivity and 1200 MD/CT for physical expansion. The physical expansion saturates at about .35 per cent for KC graphite. This is to be contrasted with an expansion rate of about 1.0 per cent per 1000 MD/CT of which would have been obtained without the annealing cycle. The saturation of physical expansion occurred at about 700 MD/CT. The thermal conductivity also appears to saturate at about 700 MD/CT with a ratio between the initial conductivity and the final conductivity of about 21.

The implication for pile operation is that a pile could be operated at a high power level with a high helium concentration for a given time. After this damaging cycle, carbon dioxide could be introduced with a lower power level and the higher temperatures obtained would produce the necessary annealing. Preliminary calculations indicate that a repetition of such cycles should give a significantly higher average power level than is now possible.

Because of nuclear annealing, the temperature of annealing in the pile would not need be as high as annealing in the laboratory. From previously obtained experimental data, it is estimated that a temperature of something lower than 200 C in the pile would be equivalent to the 500 C anneal in the laboratory.

These results are not inconsistent with the phenomenological treatment of graphite damage annealing kinetics previously developed and presently being tested.

A Method of Removing Boron from Graphite in the Pile

Preliminary work is being completed on a chemical method for removal of boron from graphite in the pile. The work was initiated at the time of the rupture of the rod thimble at F, which presumably led to a leakage of boron compounds into the moderator. Although any boron in a pile may be compensated for by appropriate enriched uranium loads, this method is aimed at providing a means of removing this boron or boron which might be introduced into the moderator in more serious quantities in the future. The method being developed is based upon the reaction of methyl alcohol with oxides of boron or boric acid to produce methyl borate. Methyl borate and methyl alcohol boil at about 65 C. An azeotropic mixture of methyl alcohol and methyl borate which is 32 per cent methyl alcohol boils at about 55 C. The vaporized methyl borate could be trapped in a lime solution during recirculation of the pile atmosphere. Because a pile can be kept at about 70 C by recirculation of hot water, this method would seem to provide a means whereby boron in the form of oxides or boric acid could be removed from the moderator.

It cannot be assumed that liquid alcohol introduced into the pile would cover all volumes over which the boron is spread. Therefore, experiments are under way which will determine the effectiveness of the reaction of methyl alcohol vapor in removing the boron compounds

Among other factors, appraisal is also being made of:

1. Purity and availability of suitable quantities of methyl alcohol.
2. Safety and fire hazards associated with the use of methyl alcohol.
3. Feasibility of introducing a lime trap into the pile gas systems.
4. Expected residual quantities of methyl alcohol and methyl borate.
5. Consequences to pile operation of residual methyl borate and methyl alcohol.

Graphite Burnout - PT-105-532-E

This production test authorizes the routine monitoring of oxidizing conditions existing within a pile by measuring the weight loss of prepared samples exposed to pile conditions in special carriers. Samples were loaded at C Pile on January 26, 1954, under this production test. At the present time, similar samples are being exposed at D, F, and H Piles. Supplement A of this production test, which authorizes the increase from two to four process channels for such monitoring, has been approved and will be effected as soon as samples can be prepared.

Graphite Moderator Purity Near HSR Leak at the F Pile

The rupture of the No. 8 HSR at the F Pile in a leaky HSR thimble resulted in an initial loss of 250-300 ih of reactivity. Subsequent operation at low levels removed 150 gallons of water from the pile and a recovery of over half of the lost reactivity. Because the No. 8 rod was a "half rod", the tip of which was coated with boron anhydride-aluminum mixture, there was the possibility of contamination of the moderator with dissolved B_2O_3. The heater assembly of Production Test 105-514-E was discharged from channel 1075-F and powdered graphite samples were taken. Subsequent analysis of these samples showed no significant amount of boron. However, analysis of powdered samples removed from the interior of the thimble showed greater than 100 ppm of boron. This indicates that the rod channel is contaminated but the process channels under the rod are not. Plans are now being made to remove the "floor plates" in the No. 8 rod channel to confirm these indications.

Pile Distortion

Operation of D Pile on Production Test 105-531-E has indicated no adverse distortion effects from 470 C maximum graphite temperature and 40 per cent helium. Phase I of this production test will be completed by April 1. It is now anticipated that Phase II operation will be at maximum graphite temperatures possible under existing thimble limits and higher helium concentration.

WATER PLANT DEVELOPMENT

Flow Laboratory Studies

Operation of the two in-pile raw water tubes continued as scheduled. Slugs from one of the tubes were discharged for examination and weighing; the tube

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was recharged with metal to be exposed to 900 MWD/T. Two in-pile tubes operated satisfactorily at pH 7.3 and 2.0 ppm dichromate; slight film formation occurred in these tubes. One in-pile tube operated at pH 7.3 with 0.2 ppm dichromate; film formation was somewhat less in this tube. Correlation of accumulated in-pile and out-of-pile data at various dichromate concentrations has been performed in cooperation with Pile Coolant Studies Sub-Unit. It appears that a dichromate concentration of 0.1 ppm is fully as effective in preventing localized attack as 2.0 ppm. Correlation of data obtained from the in-pile floating pH test showed equal or lower aluminum corrosion rates in process water with no lime addition.

Drawings for the 1706-KE Water Studies Semi-Works are still being checked for field issue approval. Since the work stoppage on the recirculation phase of the laboratory, several of the original drawings are being revised to include originally requested provisions for the eventual installation of a recirculation facility.

Plant Tests

The high filter rate test at 183-D was begun after completion of the necessary plant modifications. Initial filter rates obtained were 5.5 gpm/sq ft, or 210 per cent of design rate. Difficulty with activated silica addition equipment caused a two day interruption of the test. At the end of the month, filter rates had been returned to test conditions, and a turbidity surge of 70 ppm in the raw water was handled effectively. This test is designed to simulate filter plant operation at the high filter rates anticipated after completion of the water plant expansion program.

Operation of the lime elimination test at 100-F continued. A production test supplement was issued which will permit addition of small amounts of lime for film control and the addition of sulfuric acid for pH control. It is anticipated that raw water pH control will effect appreciable savings in coagulant costs and will result in reduced slug and tube corrosion rates. The chlorine evaluation test at 100-DR continued. Discharge of the two remaining tubes for examination is scheduled early in March.

Recirculation Studies

The production test for high temperature operation of the 105-H in-pile recirculation loop has been approved. System modifications are nearly complete, and startup of the test is scheduled during March. The first phase of the test will use a 63 S aluminum tube with aluminum clad slugs; a maximum outlet water temperature of 150 C will be obtained. The second test phase calls for a zirconium tube and zirconium clad slugs; outlet water temperatures up to 200 C are anticipated. Eleven anodized slugs were exposed for eleven days in 170 C demineralized water in the isothermal out-of-pile loop. Corrosion rates were comparable to those experienced at 80 C in normal process water. Work continued on procurement of new out-of-pile high temperature loops and loop components. Failure to obtain AEC approval on the KE in-pile loops resulted in a work stoppage on this project.

Boiling Studies

Aluminum dummy slugs were exposed to a steam-water mixture under the following conditions: steam quality, 70 per cent; temperature, 180 C; velocity, 250 fps. Examination at one, two, and three week intervals showed very little localized attack and slight weight gains. The test is continuing. Further progress has been made toward an in-pile boiling test in the 105-H recirculation loop. A study of the necessary system modifications has been completed, and a set of operating conditions is being prepared in cooperation with the Heat Transfer Sub-Unit. The out-of-pile boiling loop in 100-F was modified to provide improved instrument response time.

PILE COOLANT STUDIES

Production Tests

A high panellit alarm on one of the tubes operating at 105 C under Production Test 105-519-E caused an emergency shutdown of C Pile. No rupture or suspected rupture could be detected among the discharged slugs. Probable cause of the trouble was a torn venturi O-ring seal. Two other corrosion data tubes were discharged under this high temperature test (see below), but none under Production Test 105-529-E and Production Test 105-531-E allowing 95 C at H and D Piles, respectively.

A production test authorizing exposure of normal production slugs to 950 MWD/T is currently being written with provision for corrosion monitoring.

Tube Examination

Nine pile process tubes were examined during February. Two of the tubes operating at high outlet temperatures under Production Test 105-519-E showed a general etching attack on the downstream sections. The 72 S cladding was almost completely removed from these sections which were exposed for eight months.

Tube 2752-H, an unclad 63 S aluminum tube was in excellent condition, no pitting having been found. Two tubes removed from D Pile were severely ledged and were pitted at slug junctions, some in upstream sections. External pits which narrowed to capillaries and then flared out under the surface into large cavities with a maximum observed penetration of 15 mils were found on two other D Pile tubes.

Process tubes for K Piles are being stamped during inspection so that the in-pile position of all sections will be plainly marked. Pile shutdown time for marking tubes during removal will be saved while the probability of confusing tube sections is greatly reduced. The ink that is being used passed pile irradiation and reactivity tests to which it was subjected. It will be recommended for use on tubes inserted in the present piles.

The Parker outlet fittings of tubes 3387-D and 3388-D, suspected of cavitation damage because of two months' operation at 93 C, were inspected. No localized attack was detected. The pigtails of these tubes will be slit open for inspection also.

Laboratory Corrosion Studies

The 50 tube mock-up tests and the erosion-corrosion tests with low dichromate concentration water have been completed. Under every condition tested, there was no significant difference between 0.1 and 2.0 ppm dichromate. Under pitting conditions, there was a marked difference between dichromate-free and dichromate-containing waters. These results, which apply to both tubes and slugs, are the basis for a production test of low dichromate water now being written. An annual savings of $700,000 is possible if 0.2 ppm dichromate is specified.

Simulated corrosion tests of aluminum tubes in wet graphite blocks are being carried out to compare previously reported results using dichromate-free water with process water. Considerable production time can be saved if preliminary results indicating protection by dichromate are born out. Pile drying after leaks could be accomplished by normal operation instead of hot water recirculating.

Data from the 61 day high temperature corrosion test in the Minitube apparatus showed a four-fold increase in corrosion rate going from 95 C to 115 C. Excessive scale formation in present process water at 135 C and 155 C makes this water unsuitable for such high temperature use. The apparatus has been converted to determine the effect of high velocity on aluminum corrosion.

A high pressure glass section is being installed in the 189-D Heat Transfer Apparatus to visually study boiling. High speed motion pictures of the boiling action will be taken.

TECHNICAL LIAISON

KE Loop

The proposal to modify CA-512-R to include the high pressure recirculating water test facility at KE Pile was withdrawn early in the month at the request of the AEC. As a result, work on the scoping and design of this facility was suspended. It is probable that the proposal will be resubmitted, but neither the date nor the method of resubmission has been decided. It is planned to incorporate in KE Pile construction those provisions which are necessary to permit completion of the loop installation at a later date with a minimum of difficulty.

Preliminary work was done on preparing a more general justification for this facility than that included in the original proposal. HW-30549 is being modified to provide more complete information on the desirability of undertaking water quality testing for high pressure, high temperature operating conditions.

K Pile Safety

Consideration was given to a proposal to reduce the effect of cooling water loss to the K Piles by omitting a fraction of the filler layer graphite blocks. Estimates were obtained of the effect on lay-up costs and completion schedule. Operating effects and safety philosophy aspects were also considered. A rough draft was prepared which summarizes the reasons that this proposal was not considered feasible.

Project Representative Activities

The CA-512-R project representatives held only one meeting during the month. Discussion concerned modifications to KE Pile necessary to make possible later installation of the KE Loop Facility as mentioned above. It was decided to go ahead with proposed process channel modifications as a non-scope item, since previously approved scope indicated that suitable process tubes should be provided for recirculation studies.

Items coming up for informal discussion during the month included the following:

a. Replacement of at least some of the iron-constantan thermocouples planned for graphite temperature monitoring with chromel-alumel was suggested. There are differences of opinion as to the superiority of chromel-alumel to iron-constantan for in-pile use. In view of the difficulty of accomplishing such a change at this late date, it is doubtful that any further action will be taken.

b. Informal approval was given to a twenty mil reduction in the O.D. of the VSR's to expedite fabrication of these components, since stock furnished the fabricator would not clean up to the full dimension.

The CG-558 project representatives approved approximately twenty scope drawings concerned with the water plant expansion program. Detailed discussion was held on the flow patterns and probable orifice and venturi zones for the old piles following 558 modifications. It was agreed to use a pattern similar to that proposed for H Pile after the current venturi installation is complete. This is based on about 25 Kg of fringe enrichment and 1817 effective flow tubes. Approval also was given to the replacement horizontal rod design now being tested by Mechanical Development.

HDPR

Further attention was given to various aspects of comparative economic analyses including cost of enrichment, inventory charges, and the effect of alternate isotope production. Another discussion meeting was held on HDPR lattice spacing, attended by representatives of Advance Technology, Applied Research, Design, and Pile Technology. The effect of lattice spacing and slug size on unit product costs was considered. Preliminary attention was given to the effect on optimum lattice design of large scale special isotope production.

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SPECIAL IRRADIATIONS

The in-pile experimental assembly designed to measure the creep rate of nickel (KAPL-105) was charged in F Pile January 31. The creep rate is exhibiting a pronounced decrease with exposure to pile radiations.

Germanium crystals bombarded with fission fragments (KAPL-118) give a power generation which is steadily increasing as a function of exposure since being charged into F Pile January 31.

Thirty-two thorium slugs of the design to be used in the Savannah River reactors were discharged from F Pile after an irradiation of two months. No gross anomalies in the slugs have been noted. Sixty slugs of this type still remain in B and F Piles.

P-10 slugs canned at Savannah River are being exposed at C Pile to determine activities which will be encountered in separation processes. Samples of aluminum used in the manufacture of these slugs are also being irradiated to determine the source of high activity that has been encountered in them in the past.

Preparations for charging zirconium and zircalloy process tubes in process channels are in progress. A tube of each type will be charged in the central and fringe zones respectively to obtain information on interaction of these materials with selected gas atmospheres under in-pile conditions.

The magazine facility in the B test hole at F Pile was replaced with a new facility.

The facility in the B test hole at B Pile was removed.

Extended assistance in support of the graphite and metallurgy research and development programs has been given. Isotope production continues.

INVENTIONS

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

R. B. Richards

R. B. Richards, Manager
Pile Technology Sub-Section

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SEPARATIONS TECHNOLOGY SUB-SECTION

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VISITORS AND TRIPS

J. P. Patnovic, C. C. Lockhart, O. D. Purdie, R. E. Chrystl visited here from duPont, Wilmington, Delaware, February 23 through 25, on P-10 liaison.

H. Parker visited here from A.E.C. Wilmington Delaware, February 23 through 25, on P-10 liaison.

R. H. Miller and C. A. Pippin visited here from Dow Chemical Company Denver, Colorado, February 10 through 12, on final product specifications.

N. Miller visited here from Los Alamos Scientific Laboratory, Los Alamos, New Mexico, February 4 and 5, on consultation on inspection work.

J. Delaplane visited here from Catalytic Construction, Oak Ridge, Tennessee, February 10 and 11, on process consultation.

A. A. Jonke visited here from Argonne National Laboratory, Lemont, Illinois, February 10 through 12, on separations processes fluidization development.

R. Feber and W. Alter visited here from Knolls Atomic Power Laboratory, Schenectady, New York, February 8 through 10, on process consultations.

J. Flagg and J. Marsden visited here from Knolls Atomic Power Laboratory, Schenectady, New York, February 9 and 10, to discuss potential assistance to Hanford needs generated by 3X Program.

M. H. Curtis and D. P. Granquist visited Oak Ridge National Laboratory, Oak Ridge, Tennessee, February 16 through 20, on thorex process laboratory and pilot plant data.

W. R. DeHollander visited Savannah River Plant, Aiken, South Carolina, February 15 and 16, on P-10 liaison; General Electric Laboratory, and Knolls Atomic Power Laboratory, Schenectady, New York, February 17 and 18, on P-10 liaison; and Argonne National Laboratory, Lemont, Illinois, February 19, for discussion of non-aqueous chemistry.

E. F. Kurtz visited the Chem Pump Corporation, Philadelphia, February 3, for consultation on agitator process; and Eastern Industries, Norwalk, Connecticut, February 1 and 2, for consultation on agitator procurement.

ORGANIZATION AND PERSONNEL

Personnel totals are as follow:

GENERAL ELECTRIC COMPANY

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	January	February
Administrative	2	2
Chemical Development	77	74
Plant Processes	52	49
P-10 Process Studies	6	9
Analytical Laboratories	35	34
Total	172	168

Chemical Development: One Engineer II was hired, one Administrative Analyst III was transferred in from Community Operations and Real Estate, one Steno-Typist was transferred in from Plant Protection, one Junior Engineer was transferred to P-10 Process Studies, one Technical Graduate-Rotational was transferred to Applied Research, one Technical Graduate-Rotational was transferred to Manufacturing-Reactor Operations, two Chemical Engineers and one Program Head were transferred to Fuel Technology.

Plant Processes: One Stenographer was hired, one Chemist was transferred in from Applied Research, one Stenographer was transferred to P-10 Process Studies, one Leader and three Chemical Engineers were transferred to Fuel Technology.

Analytical Laboratories: One Laboratory Assistant "B" was promoted to a Laboratory Assistant "A", one Laboratory Assistant "C" was transferred to Applied Research.

P-10 Process Studies: One Stenographer was transferred from Plant Processes and promoted to a Secretary "C", one Junior Engineer was transferred from Chemical Development, and one Engineer was transferred in from Pile Technology.

PUREX DEVELOPMENT

Process Studies

Enriched Slug Processing - Some consideration, for pile enrichment, is being given to using enriched slugs (say two to five per cent U^{235}) in place of "J" slugs (93.5 per cent U^{235}, 6.5 per cent U^{238}). To determine whether these enriched slugs could be processed in the existing 200 Area processing facilities, estimates of the critical mass size and critical cylinder diameters for various enrichment levels have been obtained from Theoretical Physics to permit order-of-magnitude evaluation of the processing difficulties, equipment piece capacities which would be encountered and the plant modifications which would be required. Tentative safe diameters for untamped (surrounded by air) cylinders containing enriched slugs are indicated in the table below:

U^{235} Per Cent In Uranium	Tentative Safe Diameter, Ins. (Untamped)	Purex HC Column Limiting Capacity, Tons Uranium Per Day (a)
1.0	22	8.4
1.5	17.5	-
2.0	16	4.5
3.0	14.5	-
4.9	14	3.4

(a) The Purex HC Column would prove limiting before the other large-diameter Purex Columns. The Purex HC Column was assumed to operate at a volume velocity of 1000 gal./(hr.)(sq.ft.) at HW No. 2 Flowsheet conditions for calculation of the above tonnage rates. Operating at these conditions the 34-inch diameter Purex Plant Column would be capable of processing 20 tons of uranium per day.

From this study it appears that fairly extensive modifications would be required in either the Redox or Purex Plants to permit processing of enriched slugs at high throughput rates. Although a detailed check has not been made of the equipment pieces which would require replacement for processing enriched slugs, it appears that dissolvers, uranium concentrators, uranium storage tanks and some solvent-extraction columns (in the case of the Purex Plant) would definitely be too large.

Processing Enriched Slugs by Blending with Natural Uranium - At the present time a number of experimental enriched slugs (1.75 per cent U^{235} in total uranium) are stored in the pile basins. A study has been made involving nuclear safety considerations to determine the number of these "Ike" slugs which may be blended with irradiated natural uranium slugs to permit processing these slugs in either the Redox or Purex Plant. Calculations by Theoretical Physics have indicated that critical mass problems would not be encountered if the amount of U^{235} in the form of these enriched slugs in the dissolver is kept below 1000 grams.

Thus it appears that the currently-stored "Ike" slugs could be processed in the Redox (or Purex) Plant provided the enriched slugs are added on a schedule which maintains the total weight of "Ike" slugs present in the dissolver (both virgin slugs and undissolved heel) below 125 lb. (i.e., not exceeding 15 eight-inch slugs or 30 four-inch slugs). Since these "Ike" slugs would be dissolved with a large amount of natural uranium in the existing dissolvers (approximately 125 lb. of "Ike" slugs with approximately 15,000 to 20,000 lb. of natural uranium slugs) the resulting homogeneous solution would not have a U^{235} to U^{238} ratio significantly greater than that of natural uranium. Consequently, no additional critical mass problems should be encountered in subsequent processing steps.

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Chemical Engineering Development

Three-Inch Pulse Column Studies with Nozzle Plates - The investigation of

water as the lubricant. In this test the load was 40 lb./sq.in. and the journal speed was 1800 rev./min. When the bearing and journal were inspected after 483 hours, no significant wear (less than 0.0002 inch) was observed. The surface finish of both the bearing and the journal had been improved slightly.

Instrument Development - Interface control in the 2A Column by air-purge dip tubes is complicated by a combination of two factors: (a) the 2A Column is the tallest pulse column in the Purex Plant, having a 40-foot over-all height, and (b) the interface is maintained at the bottom of the column. Thus the pressure fluctuations at the interface in the course of a pulse cycle, due primarily to the changing acceleration force on the column of liquid above the interface, is greater than for any other Purex Pulse Column. Work was continued towards the development of a satisfactory air-purge dip-tube-type interface controller for the 2A Column through elimination of pulse interference. Approaches involving the use of a restriction in the purge air lines immediately adjacent to the points of entry into the column disengaging section are showing some promise.

A capacitance-type instrument, using a capacitance probe at the interface, was investigated further as an alternative to air-purge dip tubes for 2A Column interface control. During several hours of countercurrent-flow operation of the column under 2A Column extraction section conditions at one-inch pulse amplitude and a frequency of 35 cyc./min. a modified Fielden Telstor instrument system satisfactorily followed interface fluctuations.

Materials Testing

Nitric Acid Fractionator Corrosion Studies - A pilot-plant nitric acid fractionator was operated under total reflux for 210 hours, in four runs, fractionating nitric acid at atmospheric pressure (with fresh 60 per cent HNO_3 charged to the fractionator at the beginning and end of the day shift). The reboiler tube (3/4-inch schedule 40, Type 347 stainless steel pipe, 6 feet long) was removed for weighing after each run. Coupons of stainless steel and other metals, placed on the bubble-cap trays, were removed only at the end of 210 operating hours.

Type 304L and type 309Cb stainless steel coupons corroded at average rates of 0.0006 and 0.0003 in./mo., respectively, on the bottom two trays, and at 0.0008 and 0.0005 in./mo., respectively, in the reboiler section. The corrosion rates of Duriron coupons on the trays were approximately ten-fold higher. Contrasted with the relatively low corrosion rates for the test coupons, the average rate of penetration on the steam-heated boiler tube was approximately 0.02 in./mo. The higher penetration is attributed to the higher skin temperature (167 C steam) for the steam-heated tube than for the corrosion coupons (approximately 120 C).

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Recoating of Phenoline 300 and Amercoat 74 - In order to determine the effectiveness of repairing Phenoline 300 and Amercoat 74 (formerly numbered 1574) coatings with either of the two coatings, a number of coupons were prepared as follows: Amercoat 74 on Amercoat 74, Phenoline 300 on Amercoat 74, Amercoat 74 on Phenoline 300, and Phenoline 300 on Phenoline 300. The adhesion of the second coating system to the first was good in all cases. There was no evidence of failure of the coatings after 27 days of static immersion in Shell Deodorized Spray Base plus 30 per cent TBP.

REDOX DEVELOPMENT

Process Chemistry

Waste Tank "Bumping" - Laboratory studies have been initiated in an attempt to develop fundamental information on the causes of observed pressure build-ups in the Redox underground waste tanks. It may be significant that severe "bumping" has been observed in the laboratory when simulated neutralized Redox wastes are heated under reflux for several weeks. These tests are continuing.

URANIUM RECOVERY DEVELOPMENT

Process Chemistry

Two-Cycle Mixer-Settler Runs - Preparatory to two-cycle runs with current T-Plant waste, a laboratory mixer-settler ("Mini") run was made simulating TBP - HW No. 6 Flowsheet conditions using three-year-old metal waste. In the two cycles the uranium was decontaminated to three and ten per cent of aged natural uranium beta and gamma activity, respectively.

RO Column: Feasibility of ROW Recycle - Laboratory batch contact indicated that ROW may be recycled at least 20 times without adversely affecting uranium and gross gamma distribution ratios or phase disengagment properties.

RO Column: Rate of Uranium and Fission-Product Transfer - The rates of uranium and gross gamma-emitter transfer were determined under simulated RO Column conditions, by means of a pulse-column-type vibrating agitator, as a function of sieve plate material (aqueous vs. organic-wet). Starting with TBP Plant RCW containing 0.14 g. uranium/l. and 40 microcuries of gross gamma activity/gal., the data indicate a 50 per cent increase in fission-product removal using organic-wet plates, and show that a 40-fold greater uranium removal may be expected, as measured at the end of 60 seconds contact time.

Simulated RO Column and 18-1 Tank Contacts - Combined RO Column and batch washing contacts (TBP Plant 18-1 Tank) were simulated in the laboratory to determine the effect of organic vs. aqueous-wet RO Column packing on over-all uranium and fission-product removal. The data indicate that over-all uranium and fission product arithmetic decontamination factors are increased by factors of about 5 and 1.6, respectively, with the use of an organic-wet packing in the RO Column. It should be noted that the use of an organic-phase-continuous RO Column would increase the uranium DF to a point which would permit the use of a NaOH wash (in 18-1 Tank) which has been proved, at higher initial activities, to be superior to Na_2CO_3 for fission-product removal.

RC Column: Effect of Sulfamic Acid - Based on previously reported data, the use of sulfamic acid in the RCX is contemplated as a means of reducing uranium concentrator corrosion and improving the reactivity of the UO_3 powder product. To determine whether any adverse effect would result from the use of sulfamic acid in the RCX, laboratory data were obtained on phase disengagement times, rate of uranium transfer, and uranium distribution in an RC system. The data indicate no adverse effects.

Reactivity of UO_3 - The study of the effect of additives on the reactivity of UO_3 was continued, with the results shown below. The results tend to confirm the assumption that the major improvement in reactivity is due to sulfate ion which presumably alters the crystal structure to give a greater surface area.

Additive	Weight Per Cent, U Basis	Reactivity*
None	—	0.93
$(NH_4)_2SO_4$	0.50	1.37
$(NH_2)_2CS$	0.50	1.43
S	0.25	1.37
NH_4NO_3	0.50	1.10

* Conversion ratio, based on the Mallinckrodt standard.

Continuous Calcination

Testing of a single-feed-point four-inch O.D. screw calciner with external powder recirculation was completed. In view of a relative lack of adaptability of the system with powder recirculation to varying operating conditions, notably to varying feed rates, the pilot-plant equipment is being reconverted for operation without powder recirculation, with multiple feed points.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

Process Studies

Thorex - Three preliminary study flowsheets have been developed by Process Studies for a possible Hanford Thorex Plant. These chemical flowsheets, which differ in many respects from the basic O.R.N.L. Thorex flowsheet, were used as a discussion basis during recent meetings with Oak Ridge personnel. Along with the study flowsheets, a number of Thorex process questions have developed which must be resolved by laboratory or pilot plant studies before firm design flowsheets may be specified.

HOT SEMIWORKS

Conversion to Purex

The design phase of the conversion effort as originally scoped is now 98 per cent complete, with a minor portion of the instrument design yet to be

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completed. The scope of the conversion is now being increased to include an underground waste line connecting the Hot Semiworks with the "C" Tank Farm and an experimental waste storage tank at the Semiworks. The detailed design of these additions will start in the near future. The experimental waste storage tank is being designed to study the self-concentration of highly radioactive process wastes, utilizing the wastes from the Hot Semiworks Purex studies as source material.

The construction phase of the Semiworks conversion is now about 14 per cent complete. Construction work in A Cell (the last cell to be decontaminated) started February 15, when it was concluded that decontamination efforts had reached the point of diminishing returns. A general working time of about one hour was obtained in the south end of the cell and about one-half hour in the north end.

URANIUM RECOVERY PROCESS TECHNOLOGY

Tank Farm Activities

Removal operations at three tank farms supplied 90 per cent of the feed processed through the solvent extraction columns. One farm (U) was down due to a Johnston sluice pump failure and lack of success in decontamination attempts to permit repair. Supernatant transfer employed during the first quarter of the report period, and water sluicing employed during the latter three quarters led to the removal of 5300 net gallons of stored waste per ton of uranium removed. Water sluicing increased the above volume by about 3800 gallons per ton of uranium. Ninety-four per cent of the removed uranium was aged a minimum of 3.1 years since pile discharge and six per cent about five years. Major production curtailments, other than U Farm, included a plugged transfer jet in 204-C and a low demand by the solvent extraction plant due to inability to process feed routinely with adequate fission product decontamination. The concentrated feed was fed uncentrifuged to the RA Columns. About 4200 gallons of neutralized concentrated waste containing 1.3 per cent of new feed uranium processed were returned to underground storage and about 21,200 gallons of low activity waste containing an additional 0.24 per cent of new feed uranium were routinely cribbed per ton of uranium processed.

Solvent Extraction Performance

Solvent extraction operations were carried out at rates from 0 to 137 per cent of nominal design rates at an over-all average of 89 per cent. RCU product shipments were made at 80 per cent of design rate with the processing-shipping variance being due to rework. Waste losses for the RA Columns were quite uniformly good and accounted for about one-third of the 1.3 per cent loss experienced while RC losses were non-uniform and accounted for the remaining two-thirds of the losses experienced. Gamma dF's ranged from 4.6 on supernatant-rich feeds to 4.0 on water slurry-rich feeds with

average RCU gammas of about 185 and 340 per cent of aged natural uranium, respectively. The lower dF's led to rework of RCU's. Plutonium, nitric acid, and metallic impurities in RCU averaged 6 ppb, 0.02 M, and ca. 60 ppm, respectively. No production curtailments were experienced due to equipment failure but time required for rework operations due to poor dF and for plant flushes limited production.

Solvent quality was sustained uniformly good using three weight per cent sodium carbonate as both RO scrub and as a continuous wash in ROO receivers. Gamma and uranium dF's were 0.5 and 2.0, respectively, giving RAX with about 20 to 30 microcuries of gamma activity and from 10^{-6} to 10^{-5} pounds of uranium per gallon. Solvent $E^{o/a}$ values were less than 0.01 in all cases and averaged about 0.003. High solvent losses of 79 and 15.5 gallons of diluent and TBP per ton of uranium processed, compared with long term averages of 24.6 and 7.6 gallons, respectively, are probably due to unsatisfactory decanting operations when jetting aqueous bottoms from the RAX tanks (18-6, 20-6) to ROW receivers (18-3, 20-3).

URANIUM CONVERSION PROCESS TECHNOLOGY

Uranium conversion plant operations, including stripping, concentration, and calcination of the TBP Plant and Redox Plant UNH product streams were carried out at 59 per cent of nominal design rate. Major production curtailments were due to lack of feed and the major process problem was the average 58 Mrad/hr. pot-radiation level during the report period. At the low processing rates experienced adequate personnel were available, by borrowing from other plants, to permit routine pot unloading. The UO_3 product exceeded plutonium specification once (first shipment, reflecting high temperature RAIS in 221-U reported last month) by two ppb and exceeded fission product specifications once by eight per cent. Total metallic impurities average 144 ppm. Production losses included 0.3 per cent of stripper feed uranium probably reflecting low rates with inefficient stripper cyclone operation, and high concentration (blending Redox UNH in RCU) feed. For each pot calcined about 4.8 pounds (0.95 per cent) of uranium was returned to the tank farms in 36 per cent HNO_3. About 1030 pounds of 100 per cent HNO_3 were recovered per ton of uranium calcined.

Sulfamic acid, used as an additive to 100 per cent UNH calcination pot feeds, appears to give an optimum reactivity improvement at about 0.1 weight per cent (uranium basis) with pot agitator stalling due to caking at values much above 0.1 weight per cent.

Fume vent system vacuum improvements have apparently extended the life of the furnace ventilation system filter bags from about 2.3 weeks per bag to over seven weeks per bag. An orlon bag is under test in the UO_3 unloading system. Auxiliary F-Cell equipment is essentially ready to run since the gas-fired pots have been accepted after burner inspection and test by a Selas Company representative.

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REDOX PROCESS TECHNOLOGY

Summary

Redox Plant production performance was substantially reduced during the month because of the failure and replacement of two D-12 Waste Concentrators and two H-2 Centrifuges (the second centrifuge not being replaced to date). Because of the limited periods of operation available for process testing, the only process test initiated was modification to the IAF Head-End Treatment procedure in an effort to reduce radio-ruthenium emission from the ventilation stack. Process performance during the month was normal with the use of a permanganate oxidation of IAF, three Uranium Cycles, and three Plutonium Cycles.

Process Performance

Decontamination performance and waste losses have been normal throughout the month. One product sampler batch (containing approximately 525 units of plutonium) was reworked through the Plutonium Cycles for additional decontamination. No uranium product or process waste batches required rework.

Feed Preparation

The dissolvers were charged during the month with uranium having an average pile exposure of 614 (598 to 631) MWD/T. No changes in dissolving procedure were made during the month.

All IAF batches were oxidized by a permanganate Head-End treatment procedure using chromic nitrate as the reductant. The "catalytic kill" technique was used to reduce residual permanganate following oxidation for all batches. Partial manganese dioxide scavenging for zirconium and niobium and IAF clarification was employed until IAF Batch HE-9. Subsequent IAF batches have been processed with complete dissolution of manganese dioxide and without the benefit of centrifugation because of a plow failure (jamming against bowl) in H-2 Centrifuge No. 3. The H-2 Centrifuge No. 2 was replaced on February 9, because of an indicated bearing failure. Process performance since elimination of the IAF centrifugation step on February 22, has been temporarily satisfactory; column instability and a decline in decontamination are expected.

In preparation for modifications to the Head-End treatment procedure, the H-4 Oxidizer packed tower was flushed for removal of plated ruthenium dioxide. Following several flushes, the H-4 Oxidizer procedure was modified (for IAF Batches HE-1, 4 through 8) to utilize a water reflux in the H-4 Oxidizer tower during volatilization. The purpose of this condensation and reflux was to improve ruthenium removal from the off-gases. No definite conclusions can be drawn at the present time regarding the effectiveness of this new technique for reducing ruthenium emission from the stack. However, it is evident the ruthenium decontamination in process was normal. Several additional tests are planned.

Process Chemistry

Head-End: Effect of Pu Recycle - Samples of seven different recycle Pu streams were received from the 231 (Isolation) Building, and have been tested for their effects on the permanganate head-end treatment process. These samples, derived from the processing of Redox-Plant plutonium product, included oxalate and peroxide recycle and filter boat station clean-outs. After simulated head-end treatment of "cold" uranium solution to which the Pu recycle streams were added, more than 99 per cent of the plutonium was in the hexavalent state in all samples. The stability of the MnO_4^- was unaffected by the recycle material (spiked into UNH solutions in the estimated recycle volume ratio) in all cases but one. The exception was a filter-boat station clean-out solution containing an excessive amount of Mn^{++}, which resulted in an unusually rapid reduction of $KMnO_4$ during the "sacrifice" (initial $KMnO_4$ addition) portion of the treatment. This can be remedied, however.

Stack Activity

An emission of 3.7 curies of ruthenium occurred during a period of process shut down when the H-4 Oxidizer tower cleanout was in progress. Also, on February 16, approximately 1.3 curies of ruthenium were emitted during a period of process shutdown. These two instances are believed to be indicative of J-1 (Ruthenium Scrubber Off-Gas) Filter break through or the release of extremely fine (less than 1 micron) particles of ruthenium dioxide from the system.

A replacement for a vent filter (J-1 or J-5) was packed with the following glass fiber bed formulation:

Layer No.	Type Fiber*	Bed Depth (Inches)	Packing Density (lbs./ft.^{3})
Clean-up	PF-105	1	1.2
Third	115K	12	6.0
Second	115K	6	3.0
Bottom	115K	12	1.5

* Nomenclature is that of the Owens-Corning Fiberglas Corporation.

Waste Processing

The D-12 Waste Concentrator Pot No. 4 coil failed completely on January 30. The first sign of leakage occurred on September 4, after approximately 3600 degree-days (mean temperature difference, °F, across coil times operating days), and the final failure represented approximately 9000 degree-days of service. For comparison purposes, the Pot No. 1 complete failure was represented by 14,500 degree-days of service. The plant-fabricated replacement (Pot No. 5) was installed on February 6, but the coil was apparently ruptured prior to installation. Installation of Pot No. 6 (Standard Steel Co.) was completed on February 15.

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Z-PLANT PROCESS TECHNOLOGY (ISOLATION, PURIFICATION AND FABRICATION)

Isolation Building (Task I)

Wire Cloth Filter Stick Performance

The amount of plutonium occurring in peroxide filtrate solutions which have passed through the stainless steel wire cloth filter stick indicates that plutonium peroxide is retained as completely by the wire cloth filter stick as by the sintered stainless steel filter sticks. The wire cloth, woven by Newark Wire Cloth Company (Grade No. 1095), from 2.5 mil diameter 316 stainless steel wire into a 100 x 950 twilled Dutch Weave, is installed between flanges, gasketed with Teflon, backed on both sides by coarse screen and has the shape of the sintered filter sticks but only half the area (wire cloth 22 sq. in. sintered stainless 45 sq. in.). The filter time is essentially the same using either the 22 sq. in. wire cloth filter or a 45 sq. in. sintered stainless steel filter.

Kel-F Filter Stick Performance

A filter stick having a Kel-F filter medium about 25 micron mean porosity and less filter area than the sintered stainless steel filters is being used successfully to thicken plutonium oxalate slurries. The filter time is about the same as for the sintered stainless steel filters. It has not been used, as yet, to filter plutonium peroxide slurries.

High Plutonium Recovery, N-1 Filter, Cell 4

A total of 961 grams of plutonium was leached from the N-1 filter, NR-1, P-1 system of cell four by a series of leaches which employed twelve 25 Kg 60 per cent nitric acid leaches. The presence of 448 grams of plutonium in 60 per cent nitric acid after leaching the N-1 filter block and filter-aid in cell 4 on February 3, 1954, indicated a need for further leaching. Subsequently, repeated leaches recovered 513 grams additional.

It is not known that all material recovered came from the N-1 filter, however, it is reasonable to assume that a large amount did. Based on this assumption it is concluded that at sometime(s) (when a run was on the filter but prior to start of filtration) a total mass greater than the calculated critical mass (calculated for worst possible conditions) was present in the N-1 filter tank and that criticality was not obtained because the mass did not exist in a geometry favorable for criticality.

A complete investigation of this incident has been made and corrective steps to prevent reoccurrance of this type incident have been, and/or are being taken.

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Plutonium Phosphate Solids in T-10-P Solutions

Plutonium phosphate solids were found in a sample (24 grams of plutonium) taken from the PR can of run number T-54-01-D-45. The presence of these solids is unexplainable based on the normal T-Plant Process Chemistry. Possible causes for the presence of phosphate are being investigated. It is interesting to note that this incident occurred between Cleancut No. 39 (January 13, 1954) and the major Cleancut No. 92 (February 3, 1954) discussed above. Such solids would be retained on the N-1 filter.

Dry Chemistry (Task II)

Based upon fluoride color, 17 per cent of all runs required rehydrofluorination. This compares to 17.6 and 23.1 per cent for December and January, respectively. The "500 C maximum" cycle without pre-heating the gases has been used in furnace 2 to process a total of 119 runs with only four requiring rehydrofluorination.

Process Gas Pre-heaters have been installed on all furnaces, these will pre-heat process gasses to ca. 600 C. The pre-heaters are made of Monel, are heated by 285 watt electric heaters and are lagged with four inches of magnesia. Results of pre-installation testing of the pre-heaters by the Process Control group showed that air flowing at 10 liters per minute and 20 pounds per square inch metering pressure can be heated to 500 C. This was accomplished with one-half inch lagging around the pre-heaters. The four inches of lagging should increase the exit gas temperature to between 575 and 600 C.

Reduction (Task III)

The average yield of plutonium from Task III reductions of plutonium fluoride powders was 97.5 per cent. The average plutonium yield reported for December and January was 97.6 and 97.1 per cent, respectively. Surfaces of the buttons were generally rougher than normal during mid-month because of relatively high recycle ratios and the reduction of smaller charges.

A program has been outlined by the Process Control Unit to determine the optimum calcium and iodine requirements for larger reductions under Production Test 235-10, "Evaluation of Larger Batch Reduction of Plutonium Tetrafluorides". During the initial phases of this production test the iodine ratio was standardized at 0.2 M I_2/M PuF_4 to simplify reagent requirement calculations for single and double batch reductions.

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Final Inspection and Quality Control

Two assemblies required handworking, one in the cavity, and the other on the polar surfaces, to meet specifications. One piece was rejected for a coating blister and one piece was rejected when the alpha count increased from 235 cfm to 700 cfm after polishing the cavity. All pieces passed the electrolytic check, autoradiography and radiography. One piece was dropped during inspection, but the coating did not break and it was salvaged by peening out the bulged area.

Mr. N. Miller of LASL visited HAPO, February 4 and 5, to consult on Magne-Gage operation and supporting theories. Mr. R. Miller and Mr. C. A. Pippin of Dow Chemical Co. visited HAPO on February 10 and 11, to review the new, tentative specifications for fabricated pieces. The new specifications offer relaxation in the number of impurity determinations (but not in quality control) and, in general, are more realistic. Comments were given Miller and Pippin orally and written comments are being prepared for transmittal to Dow management.

IN-LINE INSTRUMENTATION

Semi-continuous (up to six readings per hour) beta monitoring of ruthenium activity in the Redox stack-gas by deposition on a strip filter appears feasible. Development and installation of apparatus to accomplish this goal is proceeding under the direction of personnel of the Biophysics Section of the Radiological Sciences Department. A strip filter is installed and a Ru^{103}, Rh^{106} beta-monitoring device is in the final stages of development.

The instruments in the TBP Plant have continued to give satisfactory performance, with the data being comparable to that obtained from the laboratory. Some difficulty has been encountered with sampler jet plugging and rework operations has continued to cause excessive hash in the RAW polarograms. The polarograph sensing units continue to require more maintenance attention than any of the other in-line instruments, and in view of the increasing radiation intensities associated with the processing of progressively younger wastes, it has become expedient to replace the entire sensing unit assembly when the need arises rather than attempt to make repairs to individual components. The residual background of the RCU gamma monitor has continued to increase.

234-5 DEVELOPMENT

Off-Standard F-10-P Solution

A precipitate, tentatively identified as plutonium(IV) phosphate, was found in a sample of F-10-P solution from Run No. T-54-01-D-45. This observation

suggests that recent plutonium build-up on the N-1 filter in the 231 Building has been caused by the presence of phosphate in T-Plant product. In addition to the precipitate, the solution contained 3 g/l calcium, 0.83 g/l phosphate, and 0.13 g/l fluoride. When the run was processed by peroxide precipitation in the 231 Building, a 38 per cent loss to recycle resulted. Although laboratory attempts to confirm the cause of the high loss have failed (duplicate precipitations all gave normal losses), fluoride is again believed to be responsible.

Plutonium(IV) Oxalate Precipitation

Possible use of ethylene glycol as a coolant in the draft tube for the new precipitation vessels in Task I has aroused interest in the effect of glycol upon Task I and Recuplex operations. Small quantities apparently will not be detrimental to Task I, since a sample of Task I feed to which had been added 15 volume per cent glycol gave a completely satisfactory plutonium(IV) oxalate precipitate.

Calcium Plutonium(IV) Fluoride

Preliminary results indicate that precipitation of calcium plutonium(IV) fluoride gives poor separation of plutonium from stainless steel corrosion products (iron, chromium, and nickel).

Calcium Thorium Fluoride Precipitation

Calcium thorium fluoride, precipitated by reverse strike from 60 g/l thorium, 5 M nitric acid, was fine and slow-filtering. The sample was dried in nitrogen, giving an easily powdered material. A 5 gram reduction was unsuccessful.

Plutonium(IV) Fluoro-Oxalates

Granular, easily-filtered, pink plutonium(IV) fluoro-oxalates of undetermined composition have been precipitated from simulated Task I feed at room temperature. Provided adequate clean-up from metallic impurities can be achieved, these compounds offer hope of a room temperature, Task I process which can be carried out in equipment which is mostly glass and stainless steel.

Infra-Red Drying and Calcination of Plutonium(IV) Oxalates

Plutonium(IV) oxalate was successfully dried and calcined under an infra-red lamp, giving a powder which was either loose or was easily scraped from the pan, and which was later readily converted to PuF_4 by hydrofluorination.

Development of Continuous Equipment for Task II

The calcination reactor was completed and study of the powder flow characteristics was begun. After several minor changes, a bed flow rate of five inches per minute at eight degrees tilt was obtained with negligible dust formation.

Fluorothene Stability in Recuplex Solvent

Fluorothene raschig rings, stored in 15 per cent TBP-CCl_4 for nine months, showed little change in density. One set of rings underwent a ten per cent weight loss.

234-5 Technical Manual

The Plutonium Purification and Fabrication Technical Manual is estimated to have reached 81 per cent of completion.

Crucible Shop

Fabrication of CDS-1304 slip-cast thin-wall casting crucibles resulted in satisfactory dimensions. Fabrication of CDS-1104 crucibles for evaluation in Task IV was in progress at month's end. The uniformity, density, and pressure distribution of crucibles prepared by the compaction of MgO - ten per cent MgF_2 was improved by the addition of Carbowax 4000 to the mixture. Fabrication of magnesia tensile specimen molds by investment casting was in progress. Satisfactory plutonium castings have been made with these molds by 234-5 Metallurgy.

Task I Reactor

Circulation of a chilled fluid is the most satisfactory method tested for chilling the reactor contents. Cooling runs made using 5.2 C water flowing through the chamber at 3.7 gpm cooled 16 Kg of distilled water from 60 C to 6.4 C in 17 minutes. The agitator was run at 600 - 700 rpm for the cooling runs. On the otherhand, in attempts to use the draft tube chamber as a refrigeration evaporator it was found that (1) the evaporator design is inadequate for this use, and (2) the ca. one-half ton capacity refrigeration compressors, which were considered for use, have about 1/3 the cooling capacity required at peak load.

The results obtained from six heating runs show that the temperature of the eight liter starting solution can be raised from 25 C to 55 C in 20 $\pm$ 2 minutes by heating the draft tube by induction using 3.75 KW generator output and in about 12 minutes using 7 KW generator output. Shielding was placed in the work coil field to simulate the radiation shielding which will be installed outside the work coil. The distance from the outside of the work coil to the shielding was varied from 3/4 inch to 1-3/4 inches without noticeably affecting the solution heating rate. Although the amount of heat put into the shielding increased as the shielding was moved closer to the work coil, this will be insignificant in the Task I installation since 2-1/2 inch steel shielding will be used whereas 1/8 inch steel shielding was used in the testing.

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RECUPLEX CONSTRUCTION

Resumption of Recuplex construction in the 234-5 Building was scheduled for March 8, 1954, by members of Project, Separations, and Technical Sections after a review of the current vessel procurement status. The four-month shutdown of construction activities will delay start-up of the facility 1.5 to 2.5 months beyond the originally scheduled start-up date (September 1, 1954), depending upon whether on-site arrival of process equipment will permit a six- or a five-day work week.

P-10 PROCESS STUDIES

During February the P-10 extraction unit packaged tritium by reworking some air-contaminated product which had been returned by the customer. The reprocessing was accomplished successfully according to special operating procedures. A few extractions were conducted on slugs which had been used for pile flattening.

The preparation of technical basis and recommendations for the projected additional is in progress. A tentative schedule for issuance of required documents was issued - HW-30887, "Technical Basis and Specifications for Project CG-575". Establishment of final conditions is obstructed by absence of information on desired product characteristics.

ANALYTICAL LABORATORIES

The 300 Area Laboratories were moved from the 3706 Building to the 325 Building, in the new Technical Center. Time required for the move is reflected in the volume of work produced during the month.

General Chemical Laboratory - Analytical support has been requested to determine the composition of uranium-zirconium mixtures or compounds that have an explosive nature. Some problems involved include the small amount of substance available for analysis and the accuracy desired, e.g., 6 mg. of zirconium to be determined to ± 2 per cent. At present most samples can be analyzed to a lower limit of about 15 mg. and an accuracy of ± 5-10 per cent. Further method modification is being investigated; in addition, the Chemistry Unit has been requested to develop a new method which will satisfy the requirements.

Radiochemical Laboratory - Alpha counters are now being adjusted and maintained to conform with D. G. Miller's recommendations as presented in HW-29134, "Theory and Use of the Simpson Proportional Alpha Counter". Improved performance and reduced maintenance resulted immediately. ASP geometry limits of 50.00 ± 0.15 per cent as a criterion for proper instrument performance is now considered unrealistic and out of date. The gamma spectrometer was used to determint Ce/Zr and Cs/Zr ratios across a slug wafer. Slight variations, as might be expected were confirmed.

Spectrochemical Laboratory - With the move of the Spectrochemical Laboratory to the 325 Building, the Baird Associates Grating Spectrograph became available for use. For general analyses this instrument will be used in the ultra violet region, and the B & L Spectrograph in the visible region. By this arrangement the time of analysis can be cut 20 per cent and still retain the same sensitivities as in the past.

Mass Spectrometry and Water Quality Laboratory - P-10 Analytical support continued on a reduced schedule. The C-N Spectrometer was used to assist operations in locating leaks in the metal line. The new valve panel referred to in last month's report has been installed and is operating successfully. Statistical data on the precision of the C-N Spectrometer has been submitted to the Statistics Unit for evaluation.

Work volume statistics for the Analytical Laboratories reflect time employed in moving from 3706 to 325 Building and are as follows:

	January		February	
	Number of Samples	Number of Det'ns.	Number of Samples	Number of Det'ns.
Research and Development				
Applied Research	1065	1879	284	611
Pile Technology	152	469	29	400
Fuel Technology	6	9	39	286
Separations Technology	394	829	309	520
Process Assistance	139	1336	36	289
Others	119	529	96	503
Total	1875	5051	793	2609

Standards and Calibrations	January	February
Number of standards solutions prepared	19	4
Stock solutions dispensed	35	35
Number of calibrations performed	3	0
Number of calibrated glassware dispensed	3	2
Number of checked glassware dispensed	70	39
Total	130	80

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Separations Technology Sub-Sect[redacted] DECLASSIFIED HW-31006 Del

INVENTIONS

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. 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.

V. R. Cooper

V. R. Cooper, Manager
Separations Technology Sub-Section

March 9, 1954

VRC:mvt

March 8, 1954

APPLIED RESEARCH SUB-SECTION

MONTHLY REPORT - FEBRUARY, 1954

Fd-1

Applied Research Sub-Section

VISITORS AND BUSINESS TRIPS

W. Alter, R. Feber, J. F. Flagg and J. Marsden spent February 8-10 at Hanford discussing separations problems and KAPL Assistance to Hanford programs.

J. E. Faulkner spent February 1-2 at Knolls Atomic Power Laboratory, Schenectady, New York, discussing a major physics experiment. February 3-4 was spent at Argonne National Laboratory, Lemont, Illinois, discussing physics experiments.

E. E. Voiland spent February 1-3 at Battelle Memorial Institute, Columbus, Ohio, and February 4-5 at Westinghouse Atomic Power Division, Pittsburgh, Pennsylvania, discussing zirconium chemistry.

J. L. Daniel spent February 15-20 at the Applied Research Laboratories, Los Angeles, California, evaluating the Quantometer, an analytical instrument.

U. L. Upson spent February 27 at the Nuclear Research Lab., Chicago, Illinois, discussing counting techniques and February 28 attending the Pittsburgh Conference on Analytical Chemistry, Pittsburgh, Pennsylvania.

W. A. Horning spent February 9 at Oregon State College, Corvallis, presenting a paper before the Sigma Xi Group.

N. D. Groves attended the Corrosion Short Course at Washington State College, Pullman, February 1-5.

D. C. Kaulitz spent February 17 at the Radiation Laboratory, University of California, Berkeley, inspecting remote control equipment. February 16 was spent at the Leramac, Inc., San Francisco, California, appraising the construction of modular gloved boxes for HAPO.

ORGANIZATION AND PERSONNEL

Personnel totals as of February 28 were as follows:

	Exempt	Technical Graduates		Non-Exempt	Total
		Permanent	Rotational		
Physics Unit	26	1	1	6	34
Metallurgy Unit	44	0	5	24	73
Chemistry Unit	49	1	2	16	68
Administration	1	0	0	4	5
Total	120	2	8	50	180

Applied Research Sub-Section

PHYSICS

Lattice Physics

Buckling measurements have been made to determine the reactivity effect of larger cooling water annuli. These measurements were made first with the small diameter (0.925 inch) slug since the process tubes and process tube holes peculiar to the needs of this measurement were available. The results obtained so far are given in the table below.

Values of Buckling in Units of 10^{-6} cm^{-2}

Water Annulus Volume	6-3/16" Lattice		7-1/2" Lattice	
	Dry	Wet	Dry	Wet
1.03 cm^3/cm (B,D,F,H,DR)	115	98	95	66
2.01 cm^3/cm	122	89	103	51
4.56 cm^3/cm	103	-13	90	-49

These values have not yet been analyzed in terms of diffusion theory. It can be seen, however, that the reactivity change caused by water is by no means proportional to the volume of the annulus. For while this volume changes by a factor of 4.5, the buckling changes by factors of 6.8 and 4.8 in the 6-3/16" and 7-1/2" lattices, respectively.

For the first time since exponential experiments were begun at Hanford, a complete cell traverse has been made tracing the neutron flux from the axis of the slug to the edge of the cell. This has been made possible by the new source of neutrons which was recently obtained. The data have not yet been worked up. Detailed knowledge of the flux at all points in a lattice cell is expected to materially assist lattice theory.

Authorization to construct the Lattice Testing Reactor was obtained from the AEC this month.

A detailed description and quantitative appraisal of the methods of obtaining safe operation of the LTR was given to the Reactor Safeguard Committee at its recent meeting in Hanford. All questions raised by the Committee were satisfactorily dealt with so that its formal approval of the LTR is expected to present no difficulty.

Facilities for conducting 4' x 4' x 4' exponential experiments have been completed in the 326 Building and measurements are now under way.

Nuclear Physics

The Pu-240 content of product plutonium should depend on the flux (or pile power) level at which a given exposure is achieved. The reason for this is that the plutonium is not formed instantaneously in the pile but grows from Np-239 with a half-life of 2.3 days. Thus, when the Np-239 half-life becomes a significant fraction of the irradiation time, some of the Pu-239 will be formed only after it is out of the pile and will therefore not be exposed to possible transformation by neutrons to Pu-240. Irradiation times and fluxes have heretofore been such that it was possible to assume

the instantaneous formation of Pu-239 on neutron capture in U-238. However, present power levels, combined with a low exposure (200 MWD/T) will reveal the effects of the half-life of Np-239.

A theoretical examination of these effects has been carried out. The results depend on the cross section of Np-239 and, since this is totally unknown, must be stated for different possible values which it may have. If it lies in the region 0-100 barns, then a Pu-240 concentration in product plutonium, presently believed to correspond to 200 MWD/T exposure, will actually be achieved in 250 to 275 MWD/T exposure. If it lies in the region of about 1000 barns, then about 150 MWD/T exposure will be required.

These considerations have led to a planning of an experiment to measure the Np-239 cross section. This measurement is to be carried out by the Chemistry Unit. The work done so far is reported in HW-31016 by B. R. Leonard.

The experiment designed to measure the amount of selective burnout of Pu-240 from Pu-239 product has gone forward. Capsules which will contain the samples have been prepared. These are to be charged into the MTR during March.

Arrangements were completed for the isotopic analysis of the carbon samples of the carbon-12 cross section experiment. The analysis will be done by Mr. R. Hayden of the Argonne National Laboratory.

Plant Physics

Critical mass limits have been calculated for use in scoping separations plants for U-233 and enriched natural uranium. The results are based on data obtained from A. D. Callihan at ORNL. Column diameters for enriched uranium are given in the table below.

Assay (%)	Column Diameter (inches)
1.0	22.0
1.5	17.5
2.0	16.0
3.0	14.5
4.9	14.0

These columns are assumed to be unreflected by water.

CHEMISTRY

Separations Processes

A higher capacity Purex flowsheet is under study which involves the following changes: (1) increase in the organic-aqueous density difference at the top of the 1B scrub column by use of a lighter diluent, increased scrub acidity, or other means to avoid the limitation in capacity at that point; (2) use of a higher percentage of TBP in the diluent; and (3) operation at higher temperatures to improve kinetics, viscosity, and disengaging time. It appears that 35% TBP is the maximum permissible content at higher temperature operation and that increased scrub acidity may be practical.

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A series of experiments were carried out to examine disengagement and entrainment by mixing aqueous and organic phases under controlled conditions and determining -- through tracer techniques -- the entrainment of the dispersed phase after various periods of time. Amsco diluent-aqueous systems containing U-HNO_3-Ca*, after mixing, were found to undergo a two to four-fold decrease of entrainment during the period 10 seconds to 100 seconds and to undergo a further decrease of two-fold during the period 100 seconds to 1000 seconds. The behavior was similar regardless of which phase was continuous during the mixing. A similar pattern was obtained with a carbon tetrachloride-aqueous system except that the entrainment in all cases was about three-fold lower.

A pulse column to operate at elevated temperatures has been constructed and employed to examine behavior when employing an organic phase of carbon tetrachloride containing 40% TBP. Dispersion and coalescence behavior were satisfactory, and extraction behavior appeared to be good, although analyses have not yet been obtained.

A Mini unit was set up for operations at elevated temperatures (50-60 C) and has given satisfactory performance in trial runs. It will be employed to examine modified Purex high capacity flowsheets.

In view of the current interest in the Thorex Process at Hanford, a modest program was initiated to examine difficult aspects of the process and to gain familiarity with it. One reported difficulty of the process is the tendency to form a three-phase system, the third phase reportedly consisting of a polymer of TBP and thorium. Brief test tube studies revealed no formation of the third phase when employing carbon tetrachloride as the diluent. The conventional procedure for dissolving thorium slugs employs a nitric acid-hydrofluoric acid solvent. Phosphate and sulfate produced no catalytic effect on dissolvings in nitric acid solution. Following the lead of the standard etching procedure, samples of thorium metal were dissolved by electrolysis in a 10% nitric acid solution containing silver nitrate; the dissolution proceeded smoothly and rapidly. Electrolysis in nitric acid solution proceeded rapidly but formed a fine black sludge.

Previously reported chromatographic studies defined the presence of two ruthenium states in dissolver solution, these states presumably being tetravalent ruthenium and a nitroso-nitrite complex. Similar studies carried out with ICU solution revealed the presence of only the tetravalent ruthenium.

Another aspect of the "ruthenium problem" concerns the distillation of ruthenium with nitric acid during recovery of the latter in Purex type operations. Examination of the literature on this subject indicates that such distillations have occurred only under one set of conditions: a high concentration of acid in the solution, a high concentration of salt in the solution, and a high temperature of the wall of the containing vessel. These observations coupled with the known chemistry of the element led to a very plausible explanation of the difficulty. It is proposed this occurs by means of the following sequence: formation of a cake of dry salt containing ruthenium on the wall of the vessel, conversion of tetravalent ruthenium to ruthenate which is known to occur in the dried state at temperatures above 150 C, and disproportionation of the ruthenate to tetravalent ruthenium and ruthenium tetroxide, which is known to occur upon wetting with strong acid. Since the latter is volatile, it will logically follow the distilled nitric acid.

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A previous report described work aimed at the explanation and possible elimination of the explosion hazard that may be associated with nitric acid dissolution of zirconium-clad slugs. A standard etching treatment was described which led to a formation of a sensitive surface on uranium-zirconium alloys. The addition of phosphate to the etch does not prevent sensitization, whereas the presence of 0.1 M fluosilicate is completely effective. It was noted that a quenched alloy containing 10% zirconium was extremely soluble in nitric acid and yielded a residue of only 1%, whereas an annealed alloy containing 1.5% zirconium yielded an insoluble residue of 2.24%. Attempts to explode the sensitized material in vacuum or in argon (150 mm) were unsuccessful. Explosions with a bright flash occurred in atmospheres of oxygen, nitrogen, or carbon dioxide, each at 150 mm pressure. A slow reaction occurs in an atmosphere of water vapor. Analysis of the sensitized material indicates the approximate formula UZr_3. The gain in weight upon explosion indicates the addition of only half of the stoichiometric amount of oxygen appropriate to the above formula. Electron micrographs of the nonsensitized and the reacted surfaces indicate a very fine particle size, whereas those for the sensitized surface show a much coarser grain structure.

Uranium Oxide Process

It was recently observed in the Separations Technology laboratories that the presence of sulfamic acid during ignition of UNH had a marked effect in increasing the reactivity of the resulting UO_3. Some subsequent production tests, however, yielded a product of abnormally low reactivity; infrared examination showed the material to be incompletely ignited, as indicated by the presence of UNH. As a consequence, a test ignition was carried out at 250 C on a laboratory hot plate. At the "cake" stage of the ignition, the material was shown by infrared analysis to consist of the basic nitrate. After longer heating, normal UO_3 resulted. Samples of normal UO_3 (reactivity = 100), sulfamic treated UO_3 (reactivity = 140), and pebbley UO_3 product in the Separations Technology continuous calciner (reactivity = 70) have been examined by means of infrared absorption and electron microscopy. In all three cases the ultimate particle size is in the order of 0.01 microns, and the infrared patterns are identical. Thus, at the present time no variations in physical or chemical properties have been found which can be correlated with variations in reactivity.

Analysis of Fuel Slugs

A potential use of enriched fuel slugs in greater number at Hanford emphasizes the need for non-destructive analytical methods to serve for identification purposes and accountability measurements. To these ends a series of aluminum slugs, containing uranium in the range 3 - 8%, were ordered and have been received from Oak Ridge. Measurements of dimensions, weight, and density agree well. The four slugs of each specific composition likewise agree among themselves. Also, the agreement between density and the uranium content as reported by Oak Ridge is excellent and forms a straight line relationship, thus verifying the postulate that density measurements can adequately serve for the non-destructive determination of uranium content. If the slug dimensions are determined within normal tolerance and the weight is obtained to ± 0.01 gram, the calculated density allows determination of total uranium to within ± 1% relative. One or more of the standard slugs of each concentration will be destructively analyzed locally to verify the analysis.

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Another and even more promising non-destructive analysis employs gamma photometric techniques in which gamma rays from an external source are allowed to pass through the sample and the attenuation of the radiation is correlated with the uranium content. The large difference in mass number between aluminum and uranium make this system ideal for this application. The slugs referred to above were tested according to this technique by allowing the radiation to pass transversely through the slug. The observations indicate that total uranium may thus be determined with a relative precision of 0.05%.

A third aspect of the problem involves determination of the uranium isotopic ratio by measuring the weak gamma emission from both U-235 and U-238. The method remains to be tested with enriched slugs of known composition. Present indications are that the technique can determine U-235 in normal uranium slugs with a precision of ± 1% relative; the behavior with enriched slugs is unknown.

In-Line Analyses

The rinse cycle introduced in the various Uranium Recovery Process monitors has operated in a highly successful manner as indicated by the occurrence of only one plugged jet on the RAF sampler, as compared with previous experience involving several such incidents per day, each of which required a manual flushing operation. Similarly, the helium sparge treatment introduced with the RAW polarographic monitor to break the organic emulsion in the sampler operated in a satisfactory manner. The sparge introduces the additional benefit of freeing the solution from oxygen, although laboratory tests showed that both oxygen and ferric iron introduce only negligible errors at the normal uranium content. An RCU gamma monitor constructed by Manufacturing for installation on the Uranium Recovery B line was checked, calibrated, and delivered for installation.

A major program is that involving installation of a variety of in-line monitors in the Hot Semi-Works prior to start-up of Purex pilot runs. To this end requisitions have been placed for component parts of the various instruments; designs have been completed for a gamma probe, a multiple recording system, and a sampling system; construction has been completed on a new double beam photometer that provides internal correction for variable source intensity; experiments are being carried out in an attempt to develop an alpha-sensitive scintillation probe suitable for determining plutonium in waste streams; and various materials of construction are being tested in process solutions to find one that does not tend to adsorb gamma emitters and therefore is suitable for use with a gamma monitoring instrument.

Analytical Methods

The light scattering photometer referred to in the preceding report of this series continues to show itself to be a most useful tool in the evaluation of turbidity in pile water and various pile water treatments. The instrument is many times more sensitive than previously employed visual techniques for determining turbidity and thus allows correlation heretofore impossible. Routine analyses of pile water from all areas provided results of sufficient reliability to allow establishment of a filter backwash limit that anticipates filter break-through. A production filter test in the 100-D Area involves use of fewer filters and consequently higher flow through the remaining ones. Turbidity examination of this water has allowed a precise evaluation of

the procedure. The light scattering photometer being employed is a laboratory instrument and is too tempermental and fragile for production use; as a consequence, a more rugged instrument suitable for routine application is being designed with the ultimate intent of placing such a unit in each of the 100 Areas.

The program for analyzing sections of irradiated slugs to determine distribution of components has been reactivated with analyses of samples from a slug irradiated at 200 MWD/T. Three wafers were cut across the slug, one close to the end cap, one at one-quarter the length, and one at the center. Ten punchings were then obtained across the diameter of each wafer. Analyses supplied data showing the variation in the plutonium and gamma emitter concentration along the axis of the slug; at the center the concentration of both components is approximately 15% less than at a point near the center of the end face. Similarly, the test provided data showing variations across the diameter of the slug at each of the sampling sections. Of most interest is the indication of exceptionally high contents at the outer surface of the slug. Cesium, cerium, and zirconium analyses were made on each sample by means of gamma spectrometry. A comparison of the various ratios of these fission products shows some non-uniformity which may be suggestive of fission product migration.

The Hanford-design x-ray photometer has been constructed at the General Engineering Laboratory and was received on plant site within the past two weeks. Indications based on the final inspection and local tests are that the instrument meets all the requirements for which it was designed. Inspection of the Quantometer, a direct reading emission spectrograph, at the Applied Research Laboratories in Glendale, Calif., allowed analyses of various materials of interest to Hanford. The data obtained are being studied and evaluated in an attempt to learn the applicability of such an instrument for use in the 234-5 laboratory.

The automatic extractability test recently developed and placed in service in the 222-S laboratory is proving to be accurate and reliable for evaluating the properties of Uranium Recovery Process feeds. The instrument automatically provides a laboratory scale extraction test using plant RAF and RAX solutions and is providing data which promise to replace the empirical K 1/2 (NO_3) factor for evaluating the effects of phosphate, sulfate, and nitrate content of the feed. A dielectric constant technique for determining TBP has been installed in the 222-S laboratory. Since the procedure is not applicable for low level contents in aqueous solution, an agreement was made to provide such analyses in the 300 Area, thus releasing the 222-S laboratory infrared spectrometer for return to the Chemistry Unit.

Malfunction of the ROO column led to formation of an emulsion that subsequently broke, leaving a cruddy material at the interface. Examination of this material showed it to contain infrared absorption bands, thus indicating an inorganic composition. A modified flame photometer procedure for determining cadmium in cadmium-lead poison slugs was placed in service in the 300 laboratory; it provides a 20-minute determination and a precision of ± 1.6% relative.

Decontamination and Waste Disposal

Waste disposal activities may be summarized as follows: 900,000 gallons of "retention" level waste from the Works Laboratory Area were processed to ground; 50 gallons of aqueous and organic low level organic waste were discarded via the 300 Area Pond; the

connection to the crib system of two sinks in the 325 Building decontamination room was completed, allowing the disposal of 40 gallons of aqueous waste directly rather than by trucking separately to 222-S for discard; seven tank loads (35,000 gallons) of "crib" level waste from the Works Laboratory Area were transported to 200 West Area for disposal in the 200 Area Cribs.

A glassware decontamination service for occupants of Building 325 was initiated during the month.

During this period the efforts of the Decontamination and Waste Disposal personnel were directed largely to aiding in the decontamination of the material for the move from 3706 Building, and to disposing of radioactive materials resulting from the move. To this end, all Chemistry Unit laboratories were "checked out" by the group to make sure that hazardous materials had been removed and that the laboratories were left in satisfactory condition.

Three gloved boxes requiring discard were prepared for burial and one gloved box too large to move economically and safely is in the process of being prepared so that it may be left in 3706 Building. Other building service and laundry functions were accomplished in a routine manner. One trip was made to 200 West Area to discard a box of high level waste from the cubicle room.

METALLURGY

Mechanical and Physical Properties of Uranium

The decanning of the preformed tensile, thermal conductivity, x-ray, etc., specimens which were irradiated to an average exposure of 310 MWD/T for PT-105-3N is now in progress in the Radiometallurgy Laboratory. To date, one thermal conductivity specimen, four tensile specimens, four x-ray wafers, and three thermal expansion samples have been decanned and visually examined. The canning method used to protect the preformed uranium samples during irradiation consisted of surrounding the preformed sample with a very tight-fitting aluminum insert which was sealed into a standard Hanford can. The surface of half of the preformed samples consisted of a clean, freshly pickled surface and the remainder were coated with a suspension of colloidal graphite. On opening the specimens it was noted that some bonding occurred in those samples which were not treated with graphite. This observation is being studied in more detail to determine more specifically the extent and depth of the diffusion. The specimens examined to date all exhibit some surface bumps. Visual examination of the first samples opened indicate that temperature may have an effect on bumping since the 9/16-inch diameter sections of the tensile specimens (where the most heat is generated) are not nearly as bumped as the 1/4-inch sections. Four x-ray wafers included in this test which had different fabrication histories also exhibited bumps. The beta-rolled and alpha-extruded samples had minor surface irregularities while the samples of gamma extruded and beta heat-treated metal show pronounced bumping. The remaining samples are being decanned and mechanical property data from the irradiated material will be obtained during March.

To supplement the data obtained from this study, samples have been machined to form the test assemblies for exposure of preformed uranium samples at three more exposure levels. The machining of the uranium samples from Billet 5385 is now essentially complete. The

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ranium samples are being inspected, sorted, and the pre-irradiation properties determined so the assemblies may be completed for the pile charges. The pre-irradiation data will include the crystallography, metallography, thermal expansion, electrical conductivity, density, hardness, and elastic constants. The destructive mechanical property tests on the non-irradiated samples will be made at the same time as the destructive tests on the irradiated uranium.

A comparison of the properties and chemical composition of the metal ordered for the above study (Billet 5835)(1) with the properties of a shipment of Pickled-Derby uranium (IQS-4 Study)(2)(3) which is contemplated for future use at Hanford has been completed. Pickled derby uranium has appeared attractive because of a prospective lower chemical impurities content, especially in respect to carbon and magnesium, and a reduction of seams and striations in the slugs manufactured from this uranium. The quality of the IQS-4 uranium was not found to be significantly different than the quality of the uranium in Billet 5835. Contents of hydrogen and carbon were comparable, Billet 5835 was lower in nitrogen and magnesium content, and considering an analytical precision of a factor of two, there was no essential difference in respect to other metallic elements. Uranium from Billet 5835 demonstrated a lesser tendency towards retained preferred orientation than the IQS-4 material when both were given identical beta heat treatments and alpha anneals. The densities of the IQS-4 slugs were higher than those of Billet 5835 material, however the density of the uranium billet samples compared favorably with the average of the many samples determined and reported by Geiling, et.al.(2). In respect to tensile properties, uranium from Billet 5835 was slightly stronger, a little less plastic, and the surface of the samples as they were being elongated indicated a finer, more random grain structure in the 5835 material.

Sixty flat tensile specimens and forty electrical resistivity specimens have been machined for a special irradiation, to be conducted at low (35 C) temperatures, in order to determine the effect of low temperature irradiation on the mechanical properties of uranium metal. Heat treatment of the specimens has been accomplished by heating them in a continuous vacuum into the beta phase followed by air cooling. Atmosphere was not introduced into the tube until the samples were near room temperature. This treatment preserved the surface finish obtained by cold-rolling. The specimens for this test will be placed in a 2S aluminum tube which will be collapsed and pressed on the sample. Attempts to close the flattened ends of this assembly by welding were not entirely satisfactory so a method of closure by cold-rolling and pressing was tried. The aluminum tube was sandblasted before pressing to provide a clean metal surface. After pressing the tube on the samples, each end was rolled for approximately 50 percent reduction in thickness. About 1/4-inch of this rolled section was bent 180° and pressed flat again. The assembly was exposed in the autoclave for 44 hours and successfully passed this test. The method has the advantage of not heating the sample as in welding and would appear to provide more consistently good closures. A rough draft of the production test covering these irradiations is being written.

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(1) R. E. Yount, to C. E. Bussert, Rolling of Special D-Metal Ingots, NLO-30781, July 31, 1953, Secret.
(2) K. R. Geiling, A. M. Askoy, E. M. Kaulbach, to R. L. Kirk (Director, Production Division, NYOO), Metal Quality Program -- IQS-4 Test, October 23, 1953, Confidential.
(3) T. G. Lake, (National Lead Co.), to C. E. Bussert, Additional Data on IQS-4, NLO-36840, October 10, 1953, Secret.

Applied Research Sub-Section

Mechanism of Irradiation Damage to Uranium

Preparation and testing of specimens for a production test designed to elucidate the radiation damage to the crystal structures of uranium is nearing completion and charging of these samples into the poison column facility at 105-B is expected during the week of March 15.

Uranium Alloy Studies

Material for a proposed production test to determine the behavior of metastable uranium alloys under irradiation is being evaluated. A U-14% Mo alloy specimen has been gamma quenched (800 C - 1 1/4 hours - H_2O quenched) to produce a metastable gamma structure and alpha annealed (400 C) for a period of sixteen days. The effect of the 400 C anneal upon the gamma structure over this period has been followed by x-ray diffraction patterns and by hardness measurements, using the Rockwell "A" scale as well as the Rockwell "C" and "D" scales. There seems to be an overaging effect occurring between eight and sixteen days. All three of the scales show a rise in hardness up to approximately eight days.

Four arc-melted uranium-zirconium alloy ingots, containing 1, 2, 3, and 4 weight percent zirconium, were received from BMI in February for use in further study of the mechanism by which small amounts of alloying elements increase stability of uranium to radiation damage. Specimens have been worked and heat treated preparatory to pile exposure. The uranium-chromium alloy specimens previously irradiated as part of the same study are awaiting decanning and inspection by the Radiometallurgy Sub-Unit.

Metallurgical Techniques

Vacuum cathodic etching apparatus has been assembled for use on irradiated uranium. Test runs on non-irradiated uranium are contemplated for the month of March; etching of irradiated uranium of various pile histories has been requested and will be conducted when facilities and scheduling permit. In the course of designing and modifying the experimental cathodic etching unit used in past studies, it was desirable to utilize zirconium as a specimen mount. Such a mount is currently being sealed directly to 705 glass tubing and will be cooled with dry ice freezing mixtures in a vacuum chamber.

An etched aluminum specimen and one of several Faxfilm replicas of this aluminum specimen were subjected to the radiation emanating from a wafer of irradiated uranium. The uranium covered with a thin sheet of plastic to control possible spread of contamination was placed directly on the aluminum and Faxfilm specimens. The exposure period was five hours at a level of 475 R/hr at ten inches. Comparison of the irradiated specimens and the control replica specimens is currently being conducted by electron microscopical techniques in order to ascertain the extent to which Faxfilm is damaged during the replication of irradiated uranium.

A microbeam, preselecting, x-ray camera with goniometer movements on the sample mount has been designed. This unit will provide maximum utility and versatility in problems associated with the identification of minute phases, inclusions, and orientations; in addition, it will provide a convenient means for orienting fracture specimens or irregularly shaped specimens for viewing on a metallograph.

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Diffusion Studies

A literature survey of methods and techniques applicable to the quantitative study of metal diffusion processes and the cataloging of such information pertinent to future higher power reactor components is being continued. The requirements imposed on the equipment to be used and the experiments to be conducted have been presented to design personnel who are now working on an "in-pile" diffusion facility. Since the success of any diffusion experiment rests primarily on satisfactory preparation of the specific diffusion couple employed, particular attention is being placed on methods of forming the couples. Percussive welding appears to fulfill many of the requirements for preparing satisfactory couples.

MTR Capsule Irradiations

The NaK filling apparatus is now assembled and is undergoing leak testing. Minor modifications have been and are being made as troubles develop and the need for refinement becomes obvious. NaK samples will be removed from the NaK tank the first week in March and practice capsule filling runs undertaken.

Fuel Element Studies

Plans are being made to irradiate zirconium jacketed cored slugs in the H-loop following installation of a zirconium process tube in this facility. These slugs will probably be scheduled for inclusion in the second loading of the zirconium tube. The higher water temperatures available in this loop will permit testing of fuel elements at temperatures somewhat above those presently available in the piles.

Preparations are also being made to test cored slugs in the fuel element testing loop in the Materials Testing Reactor at Arco. The high flux available in the MTR permits testing at high specific powers and hence at high maximum uranium temperatures.

Four enriched cored slugs were charged in the hot spot in C Pile during an unscheduled outage on February 11, 1954, for irradiation as per PT-105-531-SL. These lead-dip canned slugs are four inches in length with an axial 3/8-inch diameter core sealed at both ends with a 9/16-inch long threaded uranium plug.

Different methods of fabricating uranium shot to be used in the uranium-magnesium slug have been investigated. The most feasible method from the standpoint of production cost and production capacity, appears to be the shot-tower method. It is desired to form shot about 0.125-inch diameter and smaller to obtain a high bulk density -- an apparent 60 to 70% of that of solid uranium. The largest item in the construction of a shot tower is the furnace required to melt the uranium. A graphite spiral heating element type furnace has been decided on and is now being designed along with the rest of the shot tower. The furnace will have a very rapid heating rate and a maximum temperature of about 2000 C at 6.1 KW using 40 volts. It is felt that temperatures in the range of 1400 C will be required. Helium will be used as atmosphere and the particles will fall into a bath of silicone oil. Uranium punchings about 3/32-inch diameter have been made and will be used as a stand-in for shot. Their apparent density is about 8.5 grams per ml or 45 percent of the density of solid uranium. Fuel elements will be made using these punchings to test thermal conductivity, reactivity, etc. Uranium turnings are also being used as a substitute

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for shot. Different sizes have been machined and attempts were made to form a compact by pressing at 20,000 psi, but the turnings were too large and brittle to compact satisfactorily. Smaller turnings are now being made. A die and punch of the correct size is also being fabricated in the shop. A vacuum furnace to be used for melting the magnesium in and around the uranium has been designed and is being fabricated in the shop. This will facilitate the fabrication of shot type elements.

Construction of the MTR slug testing facility is continuing. The arrival of equipment is generally somewhat slower than the original estimate. The six uranium rods from two ingots, ordered by Fuel Technology personnel for use in testing facility experiments, have arrived and a tentative sampling and evaluation plan has been prepared.

The stress-strain conditions have been calculated and documented in HW-30059 for the following solid and cored fuel elements: (1) solid 1.36-inch d, (2) solid 1.66-inch d, (3) cored 1.36-inch o.d., 0.354-inch i.d., and (4) cored 2.45-inch o.d., 1.8-inch i.d. For purposes of comparison, the same temperature limits were assumed for the four cases, viz., 600 C for the maximum uranium temperature and 212 C for the coolant temperature. Thus, the cored slugs would have higher specific powers than the solid slugs for a given o.d. Conclusions reached from these calculations include (a) coring a slug reduces the stress intensities throughout the slug, (b) the larger cored slug has the lowest stress intensities of the four cases considered, (c) there is negligible size effect for solid slugs, and (d) the elastic solution gives a maximum stress three times as high as the plastic solution for the smaller solid slug and is, therefore not applicable.

Can Closures

A series of tests are under way to evaluate the "point" closure achieved by forming a cap on a slug by upsetting of a heavy can wall section initially extending above the slug surface. The problem of obtaining the necessary heavy, 0.200-inch, wall section above the slug has been attacked as follows: A 3-1/4 inch long can having a 0.200-inch thick can wall was drawn onto a 4-inch annodically roughened slug. A 0.100-inch reduction in can wall thickness was accomplished in the drawing operation. The excess can wall extending above the slug was then machined to length, and the 0.050-inch excess can wall was machined from the slug. The slug was then inserted into a die and the closure made by upsetting. The finished canned slug obtained from the above operations is near standard dimensions and represents a prototype fuel element both with respect to mechanically bonding of the jacket to the slug and the can closure.

Fuel Elements for Isotope Production

A feasibility survey has been made of the application of thoria as a target slug material for U-233 production. Factors considered included physical and mechanical properties, stability, corrosion resistance and fabricability. In general, thoria's properties appear favorable with radiation stability, high core temperatures and chemical dissolution rates being major uncertainties.

A survey has also been initiated to investigate alternate lithium alloys for tritium production and to develop substitutes for J alloy other than slightly enriched uranium which have sufficient density to minimize gamma heating of the graphite.

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Mechanical Properties of Zirconium (PT-105-509-SI)

A total of seventy-two partially cold worked zirconium metal samples were charged in F Pile on February 2, 1954. This special irradiation is being conducted to determine the effect of 150, 500, and 1200 MWD/T exposure on the properties of zirconium metal having 0, 10, 20,30, 40, and 50 percent cold work. Thirty-six preformed tensile specimens and thirty-six metallographic and hardness specimens are being irradiated for this study. Metallographic examination of irradiated and unirradiated samples will permit a comparison of grain size and grain structure. The first group of samples has been scheduled for discharge on February 28, 1954.

Reaction of Zirconium with Pile Gas

A prototype sample container and heater in which to expose structural materials in-pile to various gases at temperatures ranging up to 600 C has been tested in the laboratory. A temperature difference of approximately 500 C between the cooling water and the center of the sample container was obtained using 125 watts of resistance heating generated in the core. This power is equivalent to that calculated for gamma heating of the assembly using 0.25 watt per gram of stainless steel. If necessary to increase heat retention, the ceramic fiber insulation used, Fiberfrax, can be packed to the recommended lower density than that used in this test.

Design of instrumentation, piping and electrical circuiting has been completed for the ex-pile gas reaction apparatus. Construction is scheduled for March, 1954.

An in-pile test of zirconium and Zircaloy-2 process tubes run dry with controlled gas composition inside is planned by Pile Technology. A cooperative effort is being arranged whereby Metallurgy Unit of Applied Research will evaluate the damage sustained by the process tubes by measuring the changes in the metallurgical properties of preformed test specimens which will be removed from the tube after various lengths of time in-pile. The conditions of exposure will be chosen with the intention of slightly accelerating damage, i.e., they will be at least as bad as the worst conditions anticipated in future piles.

High Temperature Uranium-Water Reaction

Design of the pressurized water loop for investigating the reaction of reactor fuels with water at high temperatures has been completed and construction design drawings are now being prepared. Bids have been requested on the air-operated valves and on the pumps required (one low velocity 5 gpm and one high velocity 150 gpm pump). Tentative arrangements have been made to locate this testing facility in Room 6, Bldg. 3706.

Radiometallurgical Examinations

The examination of the slugs which broke during or after discharge on January 5, 1954, at 105-H was continued by making a detailed macro-examination of another of the broken slugs in the Radiometallurgy Laboratory. The uranium appeared to have no voids, laps, seams, or impurity defects that could contribute to the failures so it is concluded that under these same discharging conditions and at high exposures more of this type of failure can be expected. A report has been issued(1).

(1) D. P. O'Keefe, Broken Slugs from January 5, 1954, Discharge at 100-H, HW-30910, February 19, 1954, (Secret).

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A macro-examination was conducted on the thorium slug which ruptured on January 21, 1954 in tube 3884-H(2). A side failure was observed near the base of the slug. The corrosion buildup between the jacket and the slug, resulting from water penetration of the jacket, was the direct cause of the failure. Little significance can be attached to this failure, however. The slug had been machined to an elliptical shape through one-half its length, resulting in a sharp shoulder at the center of the slug about 0.1-inch high. The shoulder tapered off to no offset in 220° of slug circumference. The base of the slug varied from the specified diameter by approximately 0.2 inch.

Metallographic examination of the irradiated 63-S aluminum coupons has been difficult because of etching problems which do not give the necessary grain delineation to determine if any metallographic change has occurred because of irradiation. Tensile tests have shown the average ultimate strengths to increase 14 percent after irradiation.

The density changes in zirconium which may occur as a result of irradiation could not be measured because of the adherent oxide. The samples were tumbled in garnet without any of the oxide being removed. Samples with various degrees of cold work were hardness tested and it was found that the sample with the greatest amount of work became the softest as a result of irradiation. Hardness values decreased for all samples from 7 to 12 points Rockwell G scale. The examination is continuing.

Radiometallurgical Equipment

The cut-off box was not operable during this month for cutting samples from irradiated materials because of the lack of maintenance forces and lead brick shielding. This condition has been improved and it is hoped that operation will be attained in March. The metallographic cell was strip-coated and the polishing and etching equipment completed. Samples of aluminum and steel were successfully polished, etched and examined within the cell utilizing the remote controls. Photographs of all cell equipment were taken prior to handling radioactive materials.

Plutonium Metal Production

Study of the method for preparation of plutonium tetrafluoride by the reaction between plutonium oxide and ammonium bifluoride has been brought to conclusion. A formal report is being prepared. Recent experiments not previously reported have shown that the plutonium(IV) ammonium fluoride can be decomposed at 300 C if followed by dehydration in an inert atmosphere at 500 C in order to prevent excessive bomb pressures during subsequent reduction. A slight amount of reduction to plutonium(III) fluoride has been observed following decomposition and dehydration of the double salt in an all-metal system. Bomb reduction of the partially reduced fluoride produced, however, a regulus of excellent shape, and normal yield.

Studies of electrolytic methods of plutonium production have been halted until facilities are available in the new 325 Building laboratories.

(2) G. E. McCullough, Technical Activities Report - Fuel Technology Sub-Section, January 1954, HW-30594, February 8, 1954, (Secret), p. 7 and 31.

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Metallurgy of Plutonium

Four plutonium alloys were prepared with gallium contents of 0, 0.5%, 0.6% and 1.0%. The four alloys were cast into tensile specimens of a new tapered design which requires considerably less metal than previous specimens. A four-fold decrease in yield strength and modulus of elasticity was observed on increasing the alloy content from 0.0 to 0.50%. Other tensile data are not yet complete.

Metallographic examination of pure plutonium specimens which were machined and annealed revealed no changes in microstructure upon annealing. This verifies the results obtained with cold-rolled specimens. It is not possible to detect work hardening of pure plutonium by metallographic examination. The microhardness of a cold-rolled specimen that was not annealed was 334 DPHN. The alpha-annealed and delta-annealed machined specimens had hardnesses of 240 and 213 DPHN respectively, using a 200 gram load.

Stress Rupture

The stress-rupture tests on bomb material were resumed the first part of the month. These tests had been interrupted due to breakdown of the stress-rupture machine. The tests were continued with the sample of 309-SCb stainless steel that was being tested when the breakdown occurred. This sample has now run a total of 254 cycles and has not failed. The total elongation to date is 3.7%. Although the results are not conclusive as yet, 309 SCb looks very promising as a material of construction for reduction bomb cans.

Plutonium Coating Studies

Further studies have shown the solubility of nickel in molten calcium-magnesium eutectic to exceed 18 weight percent. This is considered adequate for diffusion coating studies and further solubility investigation will not be made. Among the materials examined for use as a container for molten calcium-magnesium-nickel solutions the following appeared unsatisfactory due to excessive diffusion of the melt: slip cast magnesium oxide fired at 1750 C and at 2200 C, slip cast mixture of magnesium-oxide-10 percent magnesium fluoride fired at 1400 C, 1500 C, and at 1750 C. A mixture of ten percent magnesium fluoride in magnesium oxide, ball milled together, slip cast, and fired at 1750 C exhibited slight diffusion of the melt but appeared highly susceptible to thermal shock. Two materials which appear suitable on first examination are ten percent each magnesium fluoride and carbowax C_{4000} in magnesium oxide, ball milled together, slip cast, and fired at 1750 C, and slip cast magnesium oxide fired at 1750 C, impregnated with sodium silicate and magnesium sulfate, in order, then refired at 1250 C.

Separations Plant Corrosion Problems

In an effort to evaluate several different materials and at the same time determine which of several methods of fabrication can be most effectively used to fabricate heat transfer equipment for the Separations Plants, a cooperative program with Separations Technology personnel has been established. A small vessel (F-4 Pot) equipped with both long tube type and bayonet type heat exchangers made of four types of stainless steel - namely 304L, 309 SCb, 347, and Carpenter 20 - continuously evaporates phase I Redox D-12 waste concentrate. The F-4 pot heat exchangers have been examined twice.

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The first examination was made following one week's operation at approximately 30 psig steam pressure to estimate the optimum time of operation. The second examination was made the early part of February after the unit had operated for one month at approximately 30 psig steam pressure. At that time, all of the tubes in the heat exchangers appeared to be relatively unattacked with the exception of the Carpenter 20 stainless steel tubes which had become very rough and appeared to be suffering from general corrosion on the entire tube surface. Inasmuch as plant operating steam pressures are considerably above 30 psig and laboratory studies indicate that the corrosion rate may be a function of the tube surface temperature, modifications were made on the F-4 unit which enabled the heat exchangers to operate at approximately 80 psig steam pressure. At the present time, the unit is operating at 80 psig (162 C) and has not failed after three and one-half weeks of service. Present plans are to run the unit until failure occurs before making another examination.

Pursuant to determining optimum operating conditions and comparative operating data between nitric acid fractionation at atmospheric pressures and reduced pressures, Separations Technology personnel have constructed and are operating a prototype nitric acid fractionator. Metallurgy Unit is cooperating in this program in order to determine the most suitable material for fabrication and if possible determine optimum fabrication techniques. To date specimens of type 304L stainless steel have been exposed in each of the fractionation trays while the fractionator was operating at atmospheric pressure. In addition, specimens of type 309 SCb stainless steel and commercially pure cast titanium were exposed on the 37, 45, and 60 percent trays. Calculations of the corrosion rates on these specimens have not been made. A duplicate set of specimens is now being exposed in the fractionator operating at approximately half atmospheric pressure.

Some corrosion rates have been calculated for the spring steel wire exposed for 4-1/2 months in simulated neutralized Purex Process waste solution. The tests consisted of exposing tensile specimens, stressed specimens and as-received specimens in the waste solution at 230 F and in the vapor over the solution at 212 F. The wire exposed in the vapor was more severely attacked than that exposed in the liquid, there being numerous pits on the surface of the vapor-exposed specimens, while the surface of liquid-exposed specimens was relatively unimpaired. In the case of the tensile specimens, the deeper pits generally occurred on the sections of wire outside of the gage length, and measured approximately 10 mils in depth. Neither the vapor-exposed nor liquid-exposed wire specimens exhibited any change in tensile properties as a result of the 4-1/2 month exposure to the boiling waste solution. The uniform corrosion rate calculated from weight loss was less than 5×10^{-5} inches per month under both conditions of exposure. No preferential attack was noted in the stressed portions of the specimens exposed in the stressed condition. The data obtained in this 4-1/2 month test corroborates the data obtained in the earlier 3-week exposure test as regards rate of uniform attack and absence of stress corrosion cracking, but uncovers the poor pitting resistance of the wire which was not evident in the shorter test.

The specimens from the recently completed 10-month test of SAE-1010 steel in simulated neutralized Purex waste solution were examined, photographed, and cleaned, and measurements of weight losses and pit depths were made. All of the specimens in this test were exposed in the solution at 220 F, and the same solution was used during the entire course of the test. The extent of corrosion, measured both in terms of weight loss and pit depth, was no greater than that observed after 3-months' exposure, in an earlier test, indicating that the corrosion product layer protects the metal from attack after the initial metal-solution reactions take place. The uniform corrosion rates generally were less than 10^{-5} ipm. about .04"/yr

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Failures of Rear Face Stainless Steel Pigtails, C Pile

Analysis of a water leach of a new, unused pigtail, cut open to expose the entire cloth binding and inner surface of the neoprene cover, showed the presence of 0.002 gram/liter Cl^- in a total volume of ~2 liters. This leach was accomplished at 85 C for a period of 48 hours. Analysis of a water leach of a small quantity of the cloth tape only from a failed pigtail showed the presence of a total of 0.034 gram of Cl^- ion in a total volume of 100 ml. This leach was accomplished at room temperature for a period of 100 hours.

It is believed that sufficient Cl^- is present to account for a severe stress corrosion cracking condition. It is not clear what the source of chlorine is but it is quite possible that degradation of the neoprene under the influence of radiation is occurring. This mechanism would account for the relatively large amount of Cl^- leached from a small failed sample (less than 10 percent of the total tape wrapping) and the small amount leached from an entire new assembly.

INVENTIONS

All Applied Research Sub-Section personnel engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during February, 1954, except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

Inventor(s)	Title
W. B. Tolley & R. C. Smith	The Preparation of Plutonium for Ammonium Fluoride and its Decomposition to Plutonium Tetrafluoride for Reduction to Metal (HW-30753)
P. B. Branin & W. H. Reas	Wet Fluoride Studies: Calcium Plutonium(IV) Fluoride (HW-30039)
W. A. Horning, D. D. Lanning, D. J. Donahue, & J. O. Erkman	A Control Rod for Nuclear Reactors
W. A. Horning, D. D. Lanning & D. J. Donahue	A "Last Ditch" Safety for Low-Power Enriched Uranium Reactors.

Signed: J. W. Albaugh
Manager - Applied Research
ENGINEERING DEPARTMENT

FWA:kb

MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

G. Hassman, Selas Corp. of America, Philadelphia, Pa., visited here February 19 - 25 for consultation on Selas Furnaces installed in the 224-U Building.

D.M. McIntosh, V.T. Malcom and W. Mabb, Chapman Valve Co., Springfield, Mass., visited here February 23 - 26 for engineering design conferences.

A.F. Sperry, Panellit, Inc., Chicago, Illinois, visited here February 23 - 26 for consultation on performance of installed instrumentation equipment.

F.P. Robinson, General Electric Service Engineer, Pasco, Washington, visited here February 24 for inspection of damaged canning machine equipment.

R.L. Tower, Tower Equipment Co., Seattle, Washington, visited here February 25 for consultation on performance of installed instrumentation equipment.

E.L. Frost, Instrument Laboratory, Inc., Seattle, Washington, visited here February 25 for inspection of equipment on rod position indicators (Project CA-512-R).

W.R. Thorson visited the Continental Electric Equipment Company, Cincinnati, Ohio, January 24 - February 1 to approve vendor's drawings on Auxiliary Battery Supply System.

E.J. Barrett visited the Ohio Crankshaft Co., Cleveland, Ohio, January 30 - February 4, to discuss engineering requirements of Frost Test Machine and the Nela Park Office of the General Electric Co., Cleveland, Ohio, February 2, to discuss problems involving the handling fixture of the Frost Test Machine.

B.E. Woodward visited the Industrial Instrument Supply, Spokane, Washington, February 5 to inspect reactor thermocouple panel.

C.E. Bonham visited the Ilco Tube Bending Works, Los Angeles, California, February 4 - 6 to expedite changes in connector assemblies for CA-512-R.

V.D. Nixon, J.H. Snyder, A.J. McCrocklin and G.L. Love visited the Pacific Gas and Electric Company, Pittsburgh, California, February 16 - 18 to inspect power generation system.

W.L. Pearl visited the Combustion Engineering Inc., New York City, and Sheppard T. Powell, February 16 - 18 to discuss water treatment of recirculation system.

L.T. Pedersen visited the Ingersoll-rand Comapny, New York City February 24 - 25 to clarify drawings and specifications for 115-K gas blowers.

Design Section

[redacted]

ANIZATION AND PERSONNEL

Personnel Statistics:

	January 31			February 28		
	Exempt	Non Exempt	Total	Exempt	Non Exempt	Total
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	60	11	71	61	12	73
Design Planning Unit	18	12	30	18	12	30
Design Engineering Sub-Section	85	11	96	86	11	97
Drafting Unit	8	90	98	8	90	98
Total Section Personnel	173	125	298	175	126	301
Technical Graduates (Rotational)	-	9	9	-	6	6
TOTAL	173	134	307	175	132	307

Accessions - 4
Separations - 4

GENERAL

Design Section engineering effort for February was distributed approximately as follows:

	Man Months Expended	% of Total
3X Program	14.0	8.4
1952 Expansion Program	50.6	30.3
Research and Development	57.6	34.5
Other Projects and Design Orders	23.0	13.7
Reactor Plant Modification	21.9	13.1
	167.1*	100.0

* Equivalent man months expended includes 7.0 months of overtime.

This reflects a gradual decrease in Expansion Program activity and a corresponding increase in other projects and design orders, notably the 3X Program and the Reactor Plant Modification for Increased Production.

Design Section drafting manpower for February was distributed as follows:

	Man Months Expended	% of Total
Design Section	89.8	94.1
Project Section	1.2	1.3
Technical Section	2.5	2.6
Other	1.9	2.0
	95.4	100.0

The drafting production for the month was 233 new drawings, 16 charts and graphs, and 271 revisions. The drafting room average was 6.2 man days per drawing.

[redacted]

osition Analyses were prepared by all exempt personnel. Position Descriptions are now being prepared.

A preliminary construction budget for FY-1956 and review of the budget for FY-1955 was issued to the Financial Department for use in preparing the consolidated budget. Construction budget data sheets are being prepared and are approximately 50% complete.

DESIGN DEVELOPMENT

Statistics:

The total number of engineering man months expended on research and development during February was distributed as follows:

	Man Months Expended	% of Total
RDS-D-10 Reactor Design Development	22.8	39.6
RDS-D-11 Water Plant Design Development	5.6	9.7
RDS-D-12 Separations Design Development	11.5	20.0
RDS-D-13 Mechanical Design Development	9.6	16.7
RDS-D-14 Utilities and Services Design Development	2.2	3.8
RDS-D-15 Engineering Standards and Materials Development	5.9	10.2
	57.6*	100.0

* Equivalent man months expended reflects 1.6 months of overtime.

RDS-D-10 and D-11 - Reactor Plant Development "DPR Program"

The scope of the economic studies which permit the selection of the basic reactor plant parameters was expanded to evaluate the feasibility of a more versatile reactor plant design. In addition to the dual-purpose function, consideration will be given to the feasibility of single purpose power operation, and the adaptability of the plant for the efficient production of isotopes other than plutonium (principally tritium and U^{233}). These economic studies are being conducted for alternate types of reactor designs at several operating levels to determine the advantages of large diameter slugs, advantages of externally-cooled hollow slugs, and advantages of in-pile boiling with both aluminum and zirconium tube assemblies.

Studies were made to define the flexibility of the power generation system for a variety of conceivable operating conditions. These conditions cover future conversion to in-pile boiling, various water flows and temperatures, and further reactor power level increases.

Discussions of water quality specifications and associated equipment were held with Mr. Sheppard T. Powell, consultant. These discussions pertained to alternative methods of obtaining the desired water quality for the primary coolant system and boiler feed water. Further studies are to be undertaken by Mr. Powell in parallel with those in progress at HAPO.

A cost estimate was prepared for the construction of a 20 - 25 foot dike around the proposed reactor area (between 100-K and 100-D Areas) to form a basis for comparing the cost of diking around this area and the cost of locating at a site above the

flood level of a Grand Coulee disaster. Construction cost was estimated to be approximately 1.5 million dollars and time of construction to be eight months. The most economic site for location above flood level is across the river. This plant would cost approximately nine million dollars more as compared to the proposed site without diking. This figure includes the cost of bridges and other extra facilities.

RDS-D-11 - Water Plant Design Development

A report for "Screening Test No. 1 for Selecting Coatings to be Tested for Steel Retention Basins" was issued during the month. This report summarizes the results of the samples tested. Of the 22 coating systems tested, eight were selected to be tested under actual operating conditions, in the 107-H Retention Basin.

RDS-D-12 - Separations Design Development

Scoping of a reduced-pressure (100 mm of mercury) nitric acid fractionator for the Purex Plant is proceeding with design based on a contact-maintenance principle and with the equipment located outside of the canyon and above ground level. The atmospheric pressure fractionator in the canyon would concentrate its nitric acid feed from 10 to 30 per cent and reduce the volume of solution to be handled in the vacuum fractionator accordingly. A check of the radioactivity of the solutions would be made before leaving the canyon and if too high, the solutions could be temporarily handled within the canyon or sent to waste. The concentrated sixty er cent acid can be dropped from the fractionator to storage tanks in the acid ault through a barometric leg.

Vacuum fractionating equipment is being scoped for the UO_3 Plant. Until this equipment can be obtained, flowsheet changes in the UO_3 Plant have been proposed which will permit operations to continue and to manufacture forty per cent nitric acid for use at the THP Plant. Back-up scrubbing and filtration equipment was scoped for the Redox Plant oxidizer off-gas system following several instances of the escape of radioactive ruthenium.

In the 234-5 Building, a scope drawing of a new hydrofluorination furnace retort was completed to permit purchasing of spare horizontal retorts. A preliminary flow diagram and an arrangement drawing have been completed for a vertical hydrofluorination furnace, utilizing the existing rectangular filter boats from the wet chemistry purification step.

RDS-D-13 - Mechanical Design Development

Development work on the prototype canning machine was continued and hot testing was started. The furnace was tested with hot metal and operation was generally satisfactory except for a failure of an induction regulator on the furnace control element. Full operational testing will be started after the furnace control has been repaired. A thorough instrument analysis of the control systems is being made to obtain better operating characteristics and to determine standards whereby a later check on drift or mal-function may be made. The water quench unit for the assembled fuel element and a gas heating system to apply heat to the tools when out of the bath were installed during the month.

Preliminary fuel element assembly cost estimates were completed for the triple-dip (manual), manual lead-dip, canning machine (lead dip), hot press and vacuum canning methods. Compared to triple-dip, lead-dip costs 88% as much, canning machine 83%, hot press 85%, and vacuum canning approximately 90%. If zirconium were used in place of the present aluminum cap and can in the lead-dip canning method, the preparation costs would increase 290%. The estimated cost of an 8" zirconium cap and can is $6.50, whereas the present aluminum cap and can cost is $.46.

A report, HW-30791, was prepared which outlines proposed continuous in-line alpha and beta monitoring for separations and other processes. Detail drawings are approximately 60% complete for a prototype alpha monitoring instrument. Investigation is being made of the possible development and fabrication of a similar instrument for beta monitoring in the 100 Areas for water being returned to the river.

RDS-D-14 - Utilities and Services Design Development

Studies were started to determine the desirability of and develop the criteria for installation of cathodic protection on the large tanks of 100-K and 100-C retention basins. The conditions existant at these locations subject the tanks to an estimated corrosion rate for bare steel that will shorten the life to less than the design life. The corrosion study program for underground lines and structures is completely outlined and provision of test facilities and the starting of tests are scheduled for July 1. Economy in testing will be obtained by exposing, instrumenting, and observing existing lines that are representative of a class.

The data on the Columbia River have been compiled into a document HW-30347, "A Summary of Columbia River Hydrographic Information Pertinent to HAPO, 1894 to 1954."

RDS-D-15 - Engineering Standards and Materials Development

Cost to date for development of engineering standards for the current fiscal year is $28,514.

The following revisions to standards were completed and issued:

HW-4924-S	Standard Specification for Welding Stainless Steel, Rev. 1
DI-1-W	Page 1, Instructions to Design Engineers for Use of Standard Welding Specifications
DI-4-W	Pages 1, 2, 3, Instructions to Design Engineers for Use of HW-4924-S.

Work on standards and studies during the month is as follows:

a. The revisions being made to the specification for qualifying welders is 85% completed.

b. Work was continued on the industrial noise reduction study with the search for technical literature.

ESIGN PROJECTS

Statistics:

Design engineering effort by the Section on projects for the month of February was expended in the following categories:

		Man Months Expended	% of Total
CA-512-R	100-K Reactor	31.6	28.9
CA-512-W	100-K Water Plant	1.7	1.6
CA-513	Purex Separations Facility	9.0	8.2
CA-514	300 Area Expansion	4.2	3.8
CG-551	Expansion of Building 234-5 Facilities	4.1	3.7
CG-558	Reactor Plant Modification	21.9	20.0
CG-562	TBP Plant Modifications	2.7	2.5
CG-567	Alum-Activated Silica Water Treatment Facilities	2.2	2.0
CG-575	3X Program - Extraction	3.0	2.7
Other 3X		10.0	9.1
Major Projects - Other than Expansion Program		15.4	14.1
Minor Projects and Design Orders		3.7	3.4
		109.5*	100.0

* Equivalent man months expended reflects 5.4 man months of overtime.

CA-512-R - 100-K Reactor Facilities

Design for 100-K Reactor Facilities is substantially complete, as reported last month, and monthly progress will no longer be reported. Remaining effort for the Section will include scope review, design revisions, bid review, checking vendor's drawings, design field liaison, and preparation of as-built construction drawings. The project proposal which was submitted to the Commission in January for authorization of revisions to the 1706-KE Water Studies Semi-Works to provide reactor cooling water recirculation study facilities was requested, by letter dated February 18, 1954, to be returned to General Electric without action.

CA-513 - Purex Separations Facility

Design of the Hot Semiworks Conversion is 94% complete, an advance of 4% during the month. This does not include the self-concentrator tank which is an addition to the original project scope. Of a total of 145 drawings, 107 have been approved and 26 have been issued for comment. All Technical Section drawings out for comment have been checked by Design.

Several revisions to the Purex scope were acted upon during the month. These included provision of a clean-out system for the C-type columns and provisions of inaccessible piping for future design changes to increase hold-up time of the uranium rich 2E column aqueous effluent for organic disengagement. The design will be changed to permit future installation of ammonia scrubbers in each dissolver cell. Design will be initiated on a vacuum operated, nitric acid fractionator.

CA-514 - 300 Area Expansion

Detail design of the 300 Area Expansion Program was advanced 2% during the month to 81% complete. The small advance resulted from the emphasis on the 300 Area 3X Program. Revised drawing and design progress schedules were issued indicating that design will be completed about May 15, 1954. Counter to original planning, it was decided that General Electric will design the slug recovery process equipment based on criteria prepared by the Design Section. Bid evaluation on the metal drying units and monorail systems was completed. Study was continued on the question of fire protection in the uranium storage areas of the 313 Building. Design of the electrical distribution and fire alarm system was completed during the month.

CG-535 - Redox Capacity Increase - Phase II

Final design for Redox Capacity Increase, Phase II, was advanced 2% during the month to 92% complete. Five drawings for a 200 gallon re-cycle tank and associated piping were issued for approval. Approximately 20 drawings remain. Review of purchase requisitions, specifications, bids and drawings submitted by the architect-engineer continued through the month.

CA-539 - Redox 241-SX Tank Farm

Over-all design for the 241-SX Tank Farm is approximately 95% complete, an increase of 7% during the month. Detail design drawings were approved and issued to the field for the variable manifold system arrangement and details, structural drawings for the condenser house, plans and profile for cooling water to pond, condensate to crib, and raw water supply. The remaining detailed design work to be completed is the condenser arrangement and piping drawings, and the 106 tank condensate pump installation.

CG-549 - Activate Task I, Building 234-5

Design work on the Activation of Task I, Building 234-5, was advanced 17% during the month to 85% complete. Twenty-six drawings were approved during the month making a total of 75 drawings completed out of the 124 required.

CG-551 - Expansion of Building 234-5 Facilities

Design work on Expansion of Building 234-5 Facilities is approximately 85% complete, an increase of 9% during the month. Purchase requisitions and specifications issued for procurement of critical materials and engineered equipment now total $72,300. Of the 263 drawings required, 200 have been approved to date, an increase of 34 drawings during the month.

CG-558 - Reactor Plant Modification for Increased Production

Over-all design on Reactor Plant Modifications for Increased Production advanced to 9.4% complete. Detail design is 5% complete, an increase of 2% during the month.

Thirteen additional scope drawings were design approved during the month, with the majority of the drawings showing the modifications required in the 100-D and 100-DR plants. The orifice pattern and Panellit gage settings for all reactors was established and design approved. Project Proposal, Revision 2, was completed, approved, and forwarded to the A&B Committee. This requested authorization of funds for completion of design and for procurement of engineered materials.

preliminary estimate of the cost of conducting the effluent from 105-C through a canal to Gable Mountain and diverting the effluent of 105-B to 107-C in comparison to the cost of the conventional system was completed. However, the Radiological Sciences Department questioned the feasibility of the plan and started a series of test borings in the locality to determine the permeability of the earth and provide data which will permit the definition of a firm scope for cost estimating purposes.

A rough draft of a document outlining the reasons for using wound rotor motors in 100-K Area and synchronous motors for the Reactor Plant Modification was prepared. Some of the major considerations in the decision were speed control, voltage regulation, power factor, efficiency, cost, system stability, and switchgear requirements.

A rough draft of the drawing schedule is being prepared which shows all drawings which will be required for the complete job in all areas. In the 100-F and 100-H areas only drawings for partial modification within budget limits were scheduled. Detail design was started on the 190-B Building. An extensive study is being made to determine the most feasible method of design and construction of the 190-DR Building. The difficulty exists because the building is to be located between two existing pipe tunnels and has a floor elevation approximately 45 feet below the level of the tunnels.

CG-562 - Waste Metal Recovery Plant Modification

Design of the modifications to the Solvent recovery system of the Waste Metal Recovery Plant is 85% complete, an advance of 60% during the month.

CG-567 - Alum-Activated Silica Water Treatment Facilities, Phase I

Design of the Alum-Activated Silica Water Treatment Facilities was advanced 8% during the month to 98% complete. Only drawing transmittals and minor corrections still remain. During the month the mixing arrangement at 183-C was revised and modified and the work at 100-D and 100-F was completed.

CG-573 - Hanford 3X Program - 300 Area

Over-all design of the Hanford 3X Program - 300 Area is approximately 66% complete, an increase of 41% during the month. Design scope changes have been made several times and, except for the bond test equipment, is gradually becoming firm. Detail design is proceeding on hot press canning facilities, floor support modification, ventilation and acid storage equipment relocation, and initial cleaning station modification.

CG-574 - Hanford 3X Program - P-10 Irradiation

A project proposal requesting $600,000 for design, procurement, and field work was completed, approved, and forwarded to the HOO, AEC.

CG-575 - Hanford 3X Program - P-10 Extraction

Authorization for design of the Hanford 3X Program, P-10 Extraction facilities was received during the month and scope design is 5% complete. The scope of the work includes improvements to the 108-B Building (existing extraction plant), provisions for isotopic purification of product from the 108-B Building, and additional extraction and isotopic enrichment facilities for increased production and to allow shutdown of the 108-B Building.

.O. 100473 - Hot Ball Detector, Ball 3X System

Design of a "hot" ball separator for the Ball 3X System was advanced 2% during the month to 82% complete. The prototype separator was completed and field tests are scheduled for early next month.

D.O. 100549 - Redox Back-Cycle (CG-182-D-II)

Detail design of the Redox Back-Cycle was continued with the completion and issuance of three drawings and is 60% complete.

D.O. 100630 - Fuel Element Pilot Plant

Drawings on structural steel fabrication, steel siding, steel deck, sash and cranes were reviewed and returned to the architect-engineer.

D.O. 100724 - Modifications to the 314 Building for Fuel Development (CG-563)

Design for modifications to the 314 Building was advanced 30% during the month to 60% complete.

D.O. 100742 - Electro-Magnetic Counter System

Design of a pulse counting instrument for determining pulsation rate of several columns in the Hot Semiworks is 20% complete, an advance of 15% during the month.

D.O. 100746 - Warehouse Modification Design

One drawing showing architectural, electrical and mechanical alterations to the south end of warehouse 13 and one specification were approved, completing the work required.

D.O. 100750 - Project Proposal - Modifications 100-C Reactor Plant

Preparation of a project proposal for 100-C Reactor Plant alterations is 80% complete.

D.O. 100753 - Building for Physical Constants Test Reactor

Preliminary design was continued on a building for a physical constants test reactor.

D.O. 100754 - Modification of the 189-D Process Tube Mock-Up

Design continued on the modification of 189-D Process Tube Mock-Up for high temperature-pressure studies and is approximately 25% complete. The work consists of designing process tube and supports, motor-generator foundation, piping layout and equipment arrangement as well as procurement.

D.O. 100755 - Hot Semiworks Purex Self-Concentrating Waste Storage Prototype

Design work was started on a self-concentrator tank and associated piping and accesories for the Hot Semiworks. Approximately 12 drawings will be required.

.O. 100757 "As-Built" Area Maps

Drafting is continuing on the revision of Hanford project maps to bring them up to date. Six electrical drawings are ready for checking and work is proceeding on twelve civil drawings for the 100-B Area.

D.O. 100765 - Cell Air Cleaners - Redox Production Plant

Design work continued on a new Redox cell ventillation unit and is approximately 40% complete.

D.O. 100769 - H-2 Drawing of Evaporator, 224-U Building

Design was started on the conversion of vendor evaporator drawings to General Electric drawings and the preparation of a specification. This work is 75% complete.

D.O. 100770 - (CG-569-1) Replacement of Catch Tanks 311-ER and 302-BR

Design was started on four drawings for replacement of catch tanks for the 221-B and T Plants and the work is 90% complete.

D.O. 100773 - Auxiliary Ventillation Counting Room, 329 Building

Work was started on a supplemental cooling system in the counting room of the Biophysics Laboratory and is 40% complete.

D.O. 100774 - Portable Mirror for Diversion Box Repair

Design was started on two drawings for a portable mirror to be used on diversion box repair jobs and is 75% complete.

D.O. 100776 - Redox Recycle Tank

Design was started on three drawings for a 200 gallon recycle tank and appurtenances for the Redox Plant. The work is 95% complete.

D.O. 100778 - Physical Constants Testing Reactor - Graphite Component Design

Work was started on the detail design of graphite components for the Prototype Constants Test Reactor.

DESIGN SECTION WORK COMPLETED OR IN THE CLOSING STAGES DURING FEBRUARY

*D.O. 100362 - Underground Waste Line Between "S" and "U" Area - 200-W
D.O. 100529 - Ball Third System - Ball Recovery System
*D.O. 100601 - "As-Built" Drawings (200-W)
*D.O. 100652 - Auxiliary Ventilation System - Redox Cells
*D.O. 100698 - Conversion of Crane BPF 2250-A Drawings to General Electric Dwgs.
*D.O. 100699 - " " " BPF-2895 " " " " "
*D.O. 100714 - Conversion of Vendor's Drawings to General Electric Drawings
*D.O. 100740 - Modification of the 115-C Gas System (CG-431-B)

*Design work completed during February.

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

Inventor	Subject
G.H. Strong	Hermetically sealed motor pump with magnetically coupled flywheel.

P H Beaton

Manager, Design
ENGINEERING DEPARTMENT

DESIGN SECT I WORK STATUS

PROCESS ENGINEERING SUB-SECTION
ENGINEERING MAN MONTHS

Description	** Backlog Start of Mo.	Orders Rec. During Month	Time Spent During Month	% of Total Effort	Backlog End of Month	Mar.	Apr.	May	June	July	Aug.	* Sked. FY 55 Only	Ant.Ft. FY 55 Only	Total FY 55 Only
CA-512	144.7		12.7	17.9	132	12	11	11	11	11	10	87		87
CA-513	17.9		2.9	4.1	15	2	2	2	2	2	1	7		7
CG-551	8.8		1.8	2.5	7.0	2	2	1	1	½	½	1		1
CG-558	42.2		6.2	8.8	36	4	4	3	3	3	3	22		22
3X	45.2		1.2	1.7	44	5	5	5	5	5	5	24		24
RDS Program	223.5		44.5	62.7	179	44	44	45	46	47	49		600	600
Other Major Proj., Minor Proj. & D.O's.	10.7		1.7	2.3	9	2	2	3	2	3	3		36	36
	Anticipated Future						1	2	3	2½	3½			
TOTALS	493		71.0	100.0	422	71	71	72	73	74	75	141	774	915

DESIGN ENGINEERING SUB-SECTION
ENGINEERING MAN MONTHS

CA-512	115.4	14.4	19.1	101	13	12	12	11	9	9	53		53
CA-513	27.6	5.6	7.4	22	3	4	4	5	3	2	6		6
CA-514	19.4	3.4	4.5	16	3	3	3	3	2	1	4		4
CG-551	7.1	2.1	2.8	5	2	1	1	1	-	-	-	0	0
CG-558	322.7	13.7	18.1	309	14	15	16	18	21	23	246		246
3X	175.9	9.9	13.1	166	12	17	18	17	15	15	102		102
RDS Program	48.9	7.9	10.5	41	9	10	11	11	12	12	-	210	210
Other Major Projects	61.9	14.9	19.7	47	17	11	6	4	4	2	9		9
Minor Proj. & D.O's.	19.6	3.6	4.8	16	4	4	4	4	5	5		60	60
Anticipated Future					2	3	5	6	9	12		281	281
TOTALS	798.5	75.5	100.0	723	79	80	80	80	80	81	420	551	971

Present Total Backlog is distributed over the five engineering branches in terms of man months as follows:

	Authorized Projects FY 54 & 55	Anticipated Future FY 54 & 55	Totals
Arch. & Civil	122	102	224
Mechanical	200	170	370
Electrical	188	141	329
Instrument	141	105	246
Standards	72	49	121
TOTALS	723	567	1290

* Includes July and August, 1954

** Adjusted Backlog

Design Section

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HW-31006 - Rev

HW-31006 -Dec

MONTHLY NARRATIVE REPORT - FEBRUARY 1954

PROJECT SECTION

I. SUMMARY

A. ORGANIZATION AND PERSONNEL

The search was continued for qualified vendor inspectors, and a net gain of three was made.

Following is a summary of personnel changes in Project Section during the month:

	February 1, 1954	February 28, 1954	Net Change
Employees on Payroll	452*	458	+ 6
Tech. Grad. - Rotational	14	16	+ 2

The end-of-month status involved these changes:

	Project Section Personnel	Tech Grad - Rotational
Payroll Additions	9	
Payroll Removals	4	
Transfers into Section	2	2
Transfers from Section	1	
Transfers within Section	2	

B. SCOPE OF ACTIVITIES

At the end of the month, construction completion status of major projects was as follows, with scheduled completion being shown in parentheses: CG-496, Recuplex (86%) 33%; CA-512, 100-K Area Facilities - Water Plants, KW (76%) 68.2%, KE (49%) 44.6%, General Facilities 62.4%, Reactors and Buildings, KW (71%) 61.7%, KE (36%) 38.3%; CA-513, Purex Facility, Part "A", overall (46%) 21.4%, Part "B" (100%) 100%, Part "D" (25%) 17%; CA-514, 300 Area Expansion, overall (63%) 30%; CG-535, Redox Capacity Increase, Phase II, (28%) 11%; CA-539, Redox 241-SX Tank Farm (79%) 62%; CA-546, Fuel Element Pilot Plant, (4%) 2%; CG-573, Hanford 3X Program - 300 Area, 41%.

C. CRAFT LABOR

Three jurisdictional disputes at Hanford interfered with construction during the month. Two half-day work stoppages at KW Water Plant were caused by millwrights and pipefitters. Another stoppage in 165-KW involved millwrights, fitters, and electricians. A direct result was interruption of graphite packing at KW on February 23-24. At least three off-site labor disputes in vendors' plants have delayed delivery of essential equipment.

*Net result of transfers which were effective on February 1, 1954.

A special two-man panel in San Francisco conducted a hearing on the pending millwright dispute. Isolation pay was not discussed although the employers' brief contained a detailed presentation. In Spokane, agreement was reached between the Associated General Contractors and the carpenters and millwrights. The subject of wages may be re-opened on January 1, 1955 for adjustment according to change in the Consumer Price Index for fiscal year 1954. Negotiations have been resumed with the local Building Trades Council on the subject of isolation pay. Reference to the Chinn Panel is being considered.

The J. A. Jones Construction Company is attempting to secure a no-strike pledge from the Building Trades Council to include all Minor Construction work by service contractors.

D. SAFETY & SECURITY

There were nine regular meetings and discussions of safety, security, and health topics which were attended by about 340 personnel. Three regular Monday morning "tool box" meetings were conducted in the field, and seven mass safety meetings were held for General Electric and service contractor personnel. Six Special Hazards meetings were held in construction areas, and Special Hazards disclosure and orientation were given to 58 contractor employees.

E. HIGHLIGHTS

Minor Projects Sub-Section worked on 41 project items and three informal requests, representing an estimated total of $20,710,400. The Sub-Section completed assigned work on three projects, Fifth Boiler Addition, 284-W Building, Part "B" of 200 Area Expansion, and Personnel Meters Gatehouse Facility Improvement; and on ER-2744, New Dry Waste Crib - 222-S Building. Work was begun on Project CG-575, Hanford 3X Program Extraction Facility, and on ER-2748, 221-T Building Roof Repair. Three project proposals were approved by the A&B Committee. Six authorizations were granted by the AEC. A preliminary inspection has been held for lump sum work on the 108-F Biology Laboratory. After five months of delay on Recuplex Installation, deliveries of vessels and equipment began so that construction is to be resumed in March 1954. The prototype hot ball separator for the Ball Third Safety System was prepared for testing in March. For P-10 Facilities, Minor Construction has been authorized to assemble, from available parts, five additional supply casks. Important projects now in progress include Recuplex Installation, 300 Area Expansion Program, Fuel Element Pilot Plant, Reactivation of P-10 Facilities, and Hanford 3X Program - 300 Area.

Project Auxiliaries Sub-Section

Inspection was completed on 28 orders, and 182 new orders which will require inspection were received. At the end of the month there were 1086 orders for items which required inspection. Reproduction output was 536,000 square feet for the twenty working days of the period. Estimating completed 28 estimates, including those for ten project proposals. Field Surveys completed two orders for AEC, as follows: checked ditch grades on the waste ditch for Redox Area, obtained settlement checks on the George Washington Way Yakima River Bridge.

Reactor Projects Sub-Section

All preliminary arrangements were satisfactorily completed, and packing of K.W. graphite began on the morning of February 16. The packing was substantially accomplished by the end of the month. (Actual completion was at 11:02 a.m., March 1, 1954.) Other installations accompanied the packing of graphite. Two subcontractors began installation of the Storage Basin monorail system and steel rolling doors in the 105-K Buildings. Installation of crates in 105-KE was stopped until additional information can be obtained from mock-up of graphite which is now being fabricated. The #4 pump at 181-KW was put into service February 25 to fill the 183.4-KW clear well. Two sedimentation basins and two filters were put into service at reduced flow rates for filling the clear well. Installation of primary and secondary process water pumps has been delayed by jurisdictional disputes and by discovery of more cracked castings. The secondary pump #5 was returned to the vendor because of un-repairable cracks in the casting. In spite of continued labor problems, some progress was made toward installation of the first secondary process pump drive assembly in 190-KW, switchgear and boilers in 165-KW, and the turbine generator units in 165-KW. Construction work in KE Water Plant buildings is proceeding closely behind the schedule for corresponding K.W. buildings. Boiler erection and switchgear installation have been started in 165-KE.

Separations Projects Sub-Section

The construction schedule for Purex was revised by Blaw-Knox and approved by AEC as of February 1, 1954. The design of Purex Facility, Part "A", was 96% complete as compared to 98% scheduled completion. Concrete placement in 202-A structures consisted of about 9500 yards, including completion of the east end wall, the south building wall, and the south process wall. The first roof slab was placed February 19, and three more slabs were added during the month. Setting of kickplates was begun in the Hot Pipe Trench wall. The 272-E Mock-up Building was about 52% complete as compared to 100% scheduled completion. During the month the 10-ton crane was put into service, and the 40-ton crane was set on the overhead rails. The sprinkler system was accepted on February 23. Foundation for the 291-A Stack was completed, and forming for the stack was begun. Construction of the 13.8 KV Transmission Line progressed to 84.3% complete compared with 90% scheduled completion. Construction of 284-E Power Plant was almost on schedule at 7.4% complete. At the 241-A Tank Farm, construction of three tank bases was begun. The 8" raw water line was complete except for testing and backfill. At the 241-SX Tank Farm, all concrete tank walls were completed, and five concrete domes were placed. Painting of tank liners was completed in four tanks. The catch tank assembly was essentially complete.

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

February 28, 1954

J. W. McMahon, Manager - Projects

II. STATISTICAL AND GENERAL

A. SIGNIFICANT ASSIGNMENTS

1. Initial Reporting

CG-575 - Hanford 3X Program - Extraction Facilities

Scoping was 5% complete. The Project Section has been authorized $8,500 for its part in the initial scoping and preliminary design phases.

ER-274S - 221 T Building Roof Repair

Scoping was 5% complete. A work order was issued for preparation of necessary scoping and a project proposal. The target schedule for submittal of the project proposal to the A&B Committee is April 26, 1954.

2. Final Reporting

CG-477 - Building 284-W - Fifth Boiler Addition

With the exceptions and corrections completed, the project was closed out.

CA-513-B - Uranium Oxide Conversion Facility

The punch list items which were being accomplished on Work Order CC-6265 have been completed.

CA-529 - Personnel Meter Gatehouse Facility Improvements

All field work has been completed, and information for the Completion Notice is being assembled.

ERA-751 - Facilities for Special Pile Measurement

With the project proposal about 2% complete, the work was cancelled at request of the Technical Section.

ER-2744 - New Dry Waste Crib, 222-S Building

With the project proposal about 2% complete, the project was cancelled at request of the Manufacturing Department. An alternate method for handling contaminated waste for the 222-S Building has proved satisfactory.

3. Current Projects

CA-192 - Remodeling Building 108-F for Biology Laboratory

Completion status remained at design 100%, construction 99%. For the lump sum contract work, a preliminary inspection has been held. Minor exceptions are being cleared. Shipment of the X-ray unit has been scheduled for early March 1954, and the unit is to be installed by Plant Forces.

CA-431-A - New Reactor - 100-C Plant (Waterworks)

Completion status remained at design 100%, construction 99.9%. Repair of baffles in the 107-C Tank was about 40% complete. A letter describing proposed improvements in venting facilities for the cushion chamber at Building 105-B has been prepared for approval by the A & B Committee.

CA-431-B - New Reactor - 100-C Plant (Reactor)

Completion status remained at design 100%, construction 99.9%. The Design Section continued work on its assigned portions, and it has accepted responsibility from the Architect-Engineer. Requisitions have been essentially completed for horizontal rod tips and pigtails, and the purchase order for the gate seal has been placed.

CA-431-C - Metal Examination Facility - 105-C

Design had been completed previously; construction progressed 6% to a total of 16%. Revision No. 6 of the project proposal was rejected by the A & B Committee. Two separate proposals which request additional funds and a change of scope are being prepared. Shop work by Plant Forces was increased.

CG-438 - Ball Third Safety System

Completion status remained at design 100%, construction 98%. Design for installation of the ball washer in 105-F Area was awaiting arrival of vendor shop drawings. The prototype hot ball separator was prepared for testing in "H" Area during the outage of March 8, 1954. Several hot balls are being irradiated in the "H" Reactor for use during the testing. Since portions of the existing hose feeders are being used in fabrication of the new ones, the assembling and testing of new hose feeders in 105-F has been planned for SWP conditions.

On February 9, 1954, 13,700 pounds of boron balls were shipped to the plater. The total shipment of 30,000 pounds is to be completed by March 8, 1954.

CG-496 - Recuplex Installation, 234-5 Building

Design had been completed previously; construction progressed 2% to a total of 33%. Two of the six column footings have been placed, and other work on columns was continued. Fabrications of the vent filter and silica storage tank are almost complete. The portion of work in Building 234-5 which has been assigned to Minor Construction must await delivery of vessels. Construction has been tentatively scheduled for the middle of March 1954. General Electric engineers have obtained more favorable delivery dates following conference trips on vessels, valves, agitators, and special pumps.

CA-512 - 100-K Area Facilities

100-KW and 100-KE Water Plants

Overall design of water plants remained at 99.8% complete. Construction progress was as follows: KW progressed 16.2% to a total of 68.2%; KE progressed 5.6% to a total of 44.6%; General Facilities progressed 5.4% to a total of 62.4%.

The cumulative total of concrete placed to date was: KW water area 79,191 cubic yards; KE water area 73,555 cubic yards; General Facilities 12,022 cubic yards.

At the 181-KW River Pump House pump number 4 has been installed and placed in service. This pump is being used to fill the 183.4-KW clear well in preparation for testing the process water pumps. Two sedimentation basins and two filters in 183-KW filter plant have been put in service at reduced flow rates to supply water for filling 183.4-KW clear well.

Installation of equipment was continued in the 190-KW Process Pump House, although work was hindered by labor disputes and the discoveries of cracked parts in the pumps. Jurisdictional disputes prevented adequate inspection of the faulty casts; however, the manufacturer has been advised of these unsatisfactory parts. The number 5 secondary process pump has been returned to the vendor. Meanwhile, the drive unit and assembly are being installed and aligned.

In the 165-KW building, the switch gear has been installed, and work is proceeding on related installations. The heating surface of the first boiler has been placed, and placing of the refractory material was essentially completed. Work was continued on the other two boiler units.

Improved weather conditions have allowed good progress on the 1700 Buildings, railroads, retention tanks, 230-KV Transmission Line, and the 151-KW-KE sub-station.

Construction work on 100-KE Water Plant buildings has followed closely behind construction on corresponding buildings in 100-KW. Erection of boilers and installation of switchgear have been started in building 165-KE.

105-KW and 105-KE Buildings

Design was 99.7% complete. Construction progress was as follows: KW progressed 8.5% to a total of 61.7%; KE progressed 16% to a total of 38.3%.

Cumulative totals of concrete placed to date were: 105-KW, 23,949 cubic yards; 105-KE, 23,593 cubic yards. The corresponding totals of steel placed were: 2,698 tons for 105-KW; and 2,643 tons for 105-KE. There have been 1,312 tons of cast iron blocks placed in 105-KW.

In the 105-110-115-KW Buildings, work was continued on placing concrete slabs, backfilling, and completing installation of siding on the 115 Building. The subcontractor for installation of Storage Basin monorail system began work on the underwater gate frames.

[redacted]

HW-31006 - Del

In preparation for packing graphite for 105-KW Reactor, installation work was continued on gun barrels, flanges, cast iron rings, and inlet and outlet face reflector shields. Actual packing on 105-KW graphite began at 7:03 a.m. February 16, and was completed at 11:02 a.m. March 1. This packing included a work stoppage and complete shutdown during which the unfinished pile was covered with a nylon sheet. Installation of process tubes was begun on February 22, and continued throughout the month. The diffusion test was scheduled for March 1, 1954.

Two additional eight-foot sections of the downcomer have been finish-machined. Fabrication has started on the entrance L and the expansion joint. Satisfactory progress was made on installation of electrical and instrumentation work.

In 105-KE Building, the third tier right, left side crates have been packed and grouted. Installation of crates was stopped to await further information from the mock-up of graphite for 105-KE. The graphite which was being prepared for 105-KE exhibited unusual characteristics, and it was believed that further installation of crates would be potentially detrimental to the quality of the pile without having the mock-up information. It was apparent that information could be obtained from mock-up of about 50 layers, and this was scheduled for completion during early March 1954. Work on the heavy aggregate preparation was also temporarily suspended.

Instrumentation and electrical work was continued. All work on the service and control system was following closely behind similar work in 105-KW.

CA-513-A - Purex Facility

Overall design for Purex progressed 2.4% to a total of 96.8%. Construction progressed 3.7% to a total of 21.4%, as compared to scheduled completion of 46%.

Following is a summary of design details as of the end of February 1954:

ITEM	REQUIRED	RECEIVED	APPROVED
Drawings	2,480	2,384	2,220
Specifications	44	44	42
Requisitions (From Vitro	510	501	477
Exceptance Test Procedures (From Vitro)	67	62	0*

The placement of concrete was continued in 202-A Building walls, cells, and roof slabs. About 9,500 yards were added to the 202-A Building and related structures. The south building wall and the east end of the building were structurally completed. The north building wall was 66% complete, and the west end was 65% complete. The first roof slab was placed February 19, and three more slabs were completed during the month. Five cells division walls were placed, and the concrete floors were finished in cells A, B, and C. Setting of kickplates began in the Hot Pipe Trench wall. About 80% of the concrete has been placed in the 203-A UNH storage.

In the 272-E Mock-up Building, the 10-ton crane was put into operation. The 40-ton crane has been set up on the overhead crane rail. A sprinkler system has been tested and accepted. The heating and ventilating system was completed except for balancing.

* 31 are being reviewed, and 31 have been returned for correction.

[redacted]

For 241-A Tank Farm, the excavation of the storage tank area was completed February 2. Construction of three tank bases has begun. The 8 inch raw water line was completed except for wrapping joints, testing and backfilling. Other excavations were begun for the 30 inch water line, the steam condensate line, and the waste crib.

The ventilation for 291-A Stack was completed, and forming for the stock was begun. Construction of the 13.8 KV Transmission Line was 84.3% complete as compaired to scheduled completion of 90%.

CA-513-D - (ERA-747) - Hot Semiworks Conversion

Design progressed 16% to a total of 98%; construction progressed 7% to a total of 17%. Instrumental design was substantially complete, and electrical design was 95% complete.

Temporary equipment has been set up for the passivation of stainless steel pipe and equipment conformance. Tank 74 was fabricated, and work was progressing on Tanks 73 and 76. Stripping of "A" Cell was completed. Erection of pipe was begun in "B", "C" Cells. Painting in "B" Cell was completed.

CG-514 - 300 Area Expansion Program - Production Facilities

Detailed design progressed 6% to a total of 88%; overall construction progressed 4% to a total of 30%. Procurement of engineered equipment was continued. Total actual and estimated cost of equipment on order, undergoing bid review, and out for bid was about $976,000.

Minor Construction completed the construction of two temporary storage bins in 303-F. About 70% of the concrete wall has been placed. The lathes have been temporarily moved to White Bluffs.

For Phase II, the lump sum contractor's construction and manpower schedule has been approved. The steel erectors have installed the autoclave pit and furnace pit steel to the extent of field bolting. Minor Construction has completed the outside water line and has started removing the existing floor slabs and partitions in 303-F. The main floor slabs and trenches were completed. Other progress consisted of overhead piping, electrical work, and placement of concrete.

A contract for the badge house has been awarded for $12,280.

CG-535 - Redox Capacity Increase, Phase II

Design progressed 13% to a total of 75% complete, as compared to scheduled completion of 94%. Construction progressed 2.5% to a total of 11%. A Project Authorization has been issued. It increased project funds to $2,980,000 plus $135,000 for transfer of capital property. This revision provides for inclusion of the silica gel facilities. Construction being performed by Minor Construction has been retarded because of contamination.

CA-539 - Additional Waste Storage for Redox

Design progressed 6% to a total of 94%; construction progressed 6% to a total of 62%. The construction contractor was 68% complete as compared to 78% scheduled completion.

Placement of concrete has been completed on all tank walls and on the domes of five tanks. Painting of the interior of tank liners was completed on four tanks. The catch tank assembly was essentially complete and ready for backfilling, and the storage tank area was being backfilled.

CG-550 - Reactivation of P-10 Facilities

Design had been completed previously; construction progressed 6% to a total of 95%. Minor Construction has been authorized to assemble, from available parts, five additional supply tanks. The "J" casks are now complete except for machining of the tops and bottoms; however, they are scheduled to be completed in the construction contractor's main shops about the middle of March.

CG-573 - Hanford 3X Program - 300 Area

Design progressed 52% to a total of 60%; construction progressed 37% to a total of 41%. The Metal Preparation Section has requested that the working height for furnaces on hot press canning be reduced from 42 inches to 34 inches. This change requires that the presses be placed in a 15-inch trench.

In the 313 Building, construction of the additional bay for ventilation and hydraulic equipment was started during the week of February 15. Laying of the concrete block wall and fabrication of the structural steel have been started by Minor Construction.

In the 303-J Building, the process and sanitary sewer lines have been tested and backfilled. Architectural work on the east and west addition was 80% complete. The concrete floor has been placed in the east addition. Service installations have been started.

B. OTHER ASSIGNMENTS

CG-187-D-II - Redox Production Plant

Design remained at 40% complete, as compared to scheduled completion of 100%. Construction progressed 1% to a total of 10% complete.

CA-187-D-III - Redox Waste Water Disposal Basin

Design had been completed previously. Construction work to be performed by the lump sum contractor progressed 34% to completion. Minor Construction work is scheduled for reopening in March.

CA-434 - New Bio-Assay Laboratory

Design had been completed previously; Phase I construction progressed 3% to a total of 95%. Phase II construction progressed 18% to a total of 68%. Installation of laboratory furniture was continued as rapidly as possible without service fittings which were omitted from the shipment. Inside plumbing and electrical work was continued. The sprinkler system plumbing was almost complete. Following request of the architect-engineer, part of the responsibility for Title III service was shifted to the Field Engineering for AEC. The architect-engineers will still approve all shop drawings

and provide design liaison; the AEC Field Engineer will work closely with the architect-engineer in expediting and resolving field design problems.

CA-441 - Solvent Building

Design progressed 10% to a total of 45%. The AEC has approved the proposed site change to a location north and east of the 325 Building.

CA-455 - Replace Two Elevated Water Tanks in 200-E Area

Completion status remained at design 100%, construction 99%. The contractor was completing clean-up work preparatory to completion of the project during March 1954.

CA-489 - Neutron Monitoring Calibration Facilities

Completion status remained at design 100%; construction 98%. The accelerator was being prepared for shipment at Cambridge, Massachusetts. The shipment was delayed until early March 1954. Only installation of the accelerator and balancing the ventilation system remained.

CG-511 - Completion of Minor Construction Fabricating Shops

The design and construction completion status was revised downward to design 91%; construction 81%. This change was made to include additional scope of work. The remaining construction funds have been released to the field, and Minor Construction resumed work. Shakes are being applied to the new furnace lean-to.

CA-516 - Gable Butte Railroad

Design had been completed previously. The bid assembly has been prepared for the AEC contract group, and the bids have been advertised. The bid opening date has been tentatively set at March 17, 1954.

CA-532 - (ER-2737) Fiscal Year 1954 Water Tank Replacements

Design had been completed previously. Bid assemblies were sent out by the AEC on February 12, 1954. The bid opening was tentatively scheduled for March 17, 1954.

CA-533 - (ERE-479) Hanford Works Official Telephone Exchange

Completion status remained at design 30%; construction 0%. Drawing No. SK-7-681 of the building plot plan has been approved and transmitted to the AEC. The architect-engineer has been selected by the AEC.

CG-538 - (ER-2734) - Install Underground Waste Line Between "S" Area and "U" Area 200-W

Design had been completed previously; construction progressed 1% to a total of 97%. Drawings of the condenser installation shield wall and the revised drawings of the condenser assembly were transmitted to the field. A letter of explanation and instruction was sent to Minor Construction concerning changes and additions to the scope. These changes resulted from the reassignment by Manufacturing Department of tanks number 105-109-U from Redox to "T" Plant reserve. Minor Construction has installed clean-outs

107 and 108 tank overflow. Work was continued on installation of the condensate lines to the crib and pipe to the condensers.

CA-543 - (ER-2733) - Replace Sanitary Tile Field 200 West Administration Area

Preliminary design was complete. The project proposal is still awaiting approval by the Washington AEC.

CA-544 - (ERA-661) - Central Distribution Headquarters

Design completion status remained at 30%. The Electrical Distribution Unit has planned to re-submit the proposal with some reduction in scope and total project cost.

CA-546 - (ER-3099) - Fuel Element Pilot Plant

Design completion status was 57% complete; construction began and progressed to 2% complete. About 80% of the contractor's structural and equipment drawings have been submitted for review and approval. The architect-engineer is proceeding with details of structural steel.

The construction contractor has placed all column footings and columns and about half of curtain walls and footings.

CG-549 - (ER-2731) - Activate Task I, RMA Line - Building 234-5

Design progressed 15% to a total of 85%; construction remained at 6% complete. Tests are being continued to determine necessity for design revisions. The on-site fabrication by Plant Forces of a tapered agitator shaft & seal bearings was about 70% complete. Removal of control panels and equipment was continued.

CG-551 - Expansion of Building 234-5 Facilities

Design progressed 6% to a total of 81%; construction progressed 2% to a total of 9%. Mechanical design drawings are almost complete, and design efforts are now concentrated on electrical drawings. Fifteen new drawings and 13 revised drawings were approved and transmitted to the field. Some additional work was performed on estimating cost of removing or modifying present equipment. This was in preparation for issuance of a work order.

CA-555 - (ERA-735) - Graphite Hot Shop and Storage Building

Preliminary design was complete. The project proposal was scheduled for discussion at a meeting between AEC and General Electric Management, presumably at an early date.

CG-556 - (ERA-1201) - X-Level Controlling and Recording Equipment

Design progressed 4% to completion; construction progressed 2% to a total of 15%. Work was delayed because of conflict with an extended outage scheduledin 100-B Area.

CG-558 - Reactor Plant Modification for Increased Production

Evaluation is being made regarding the best method of adding to the 190-DR Pump House. This proposed addition was estimated to be more costly because the present building is

located in a hole, and also because two process pipe tunnels are in the vicinity of the proposed addition.

CG-559 - (ER-1200) - Heat Transfer Laboratory

Design had been completed previously; construction progressed 6% to a total of 8%. Installation of the 225 psi steam system progressed satisfactorily. Shop work by Minor Construction was begun on process piping and architect modification.

CG-562 - Waste Metal Recovery Plant Modifications

Completion status remained at design 100%, construction 0%. Design of jumpers for revision of the solvent treatment facilities was nearly complete.

CG-563 - (ERA-3100) - Modifications to 314 Building and Installation of Electroplating Pilot Plant

Design completion status remained at 50%; construction progressed to 7% complete. Floor repairs and decontamination of the building are being performed by Minor Construction.

CG-564 - (ER-1209) - Installation of Additional Ball 3-X Equipment 105-C Building

Completion status remained at design 100%, construction 92% Further work awaits deliver of valve parts and balls. On February 18, 1954, an unsuccessful attempt was made to remove the pieces of KAPL unit from Hole number 21; therefore, the testing of the hopper was delayed.

CG-566 - (ERA-1205) - Building for Prototype Physical Constants Test Reactor

Scoping had been completed previously. The starting of design work awaits receipt of a Work Authority from AEC.

CG-567 - (ERA-1208) - Alum-Activated Silica Facilities - 100-B, D, F, and H.

Construction progressed 9% to a total of 50%. Work in the 100-B Area was started by Minor Construction on February 11, 1954, and progress was satisfactory. Modifications to the 183-C facility by Plant Forces was scheduled to begin in March 1954.

CG-569 - Replacement of Catch Tanks 311-ER and 302-ER - 200-E and W

Design was 78% complete, following the start on February 8, 1954. Processing of advance orders of engineered materials was started February 15, 1954.

CG-572 - (ERA-725) - Particle Problem Animal Exposure Equipment

Preliminary design was 50% complete. The project proposal was reviewed by the AEC Review Board on February 11, 1954; however, approval was withheld until additional information was provided by the AEC Operations Branch.

CG-576 - General Improvements to Laboratory Area - 300 Area

Scoping progressed 10% to a total of 70%. Informal notice was received that Project CG-576

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had been approved by the AEC, including only the immediate work requirements in the 326 Building. Revision number 1 to the project proposal is being routed for signatures. The total estimated cost of the project was revised from $233,000 to $245,000 to allow for S&T conditions affecting the work in 325, 326, and 327 Buildings.

IR-116 - (AEC-P-138) - Combined Civil Defense and Plant Disaster Control Center

Design had been completed previously; construction progressed 10% to a total of 80%. The main accomplishment was installation of radio transmitter, receiver, and antenna supports. It is estimated that all radio equipment will be installed during the first week of March, after which the exterior paint can be completed.

IR-159 - (ER-2742) - Improved Ventilation Facilities, 201-C

Completion status remained at design 100%, construction 60%. Work is scheduled to be resumed early in March 1954.

IR-162 - Fire Protection Buildings, 272 E and W

Preliminary design was complete. The legal entanglement which resulted from the attempted withdrawal from the low bid has been referred to the Comptroller General in Washington, D.C. The possibility of rejecting all bids was considered however, there were no sufficient grounds for this action. A final decision cannot be expected for three to six months.

IR-172 (ERA-748) - Laboratory Supply Space, 3706 Building

Preliminary design was completed. The informal request was withdrawn pending further consideration of the fire protection aspects of the proposed location of the 325 building.

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The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month.

ERA-727 - 313 Building Roof Repair or Replacement

Preparation of the project proposal remained at 50% complete. Completion of the project proposal was scheduled for March 1954, and performance of the work was scheduled for the last calendar quarter of 1954.

ERA-742 - Remodeling First Aid Buildings 100-B, D, and F

With preliminary design completed, the Manufacturing Department has requested that this request be held open pending development of additional information.

ER-2747 - Hot Semiworks Self-Concentrator

Preparation of project proposal was 90% complete, and design was 5% complete. The request for advance authorization of funds has been approved, to the extent of $25,000 for detailed design and procurement. Detailed design started during the last week of February.

The project proposal has been revised to make it a revision to project CA-513-D, Hot Semiworks Conversion, and is being routed for approvals.

WORK ORDERS:

CC-5461-64, Install Thermal Insulation in 2101-E Building

All work was completed within the building. Work was completed on [illegible] units and related piping, and work was started on an additional two units. All outside piping was scheduled for completion during March 1954.

CC-6140, Baffle Modifications to 107-C Retention Basin, 100-C Area

Work was practically stopping during the month because of inclement weather and flooding of the tank by operating personnel.

C. RELATED FUNCTIONS

Although three inspectors were added during the month, the vendor inspectors still were pressed to keep pace with the increased work load. Special attention was given the process water pumps for K Area because several were found to have cracked castings. One pump was returned to the vendor, and the others are being studied to determine possible methods of repair. Production problems still exist on pigtails, vertical safety rods, horizontal rods, and nozzles for the reactors.

The corrosion testing program increased by 130 samples to a total of about 820, of which 633 were processed by Lambert and Lent Laboratories. Fabrication of towers for the Redox Expansion Program has begun. Recuplex vessels are scheduled for shipment in early March 1954.

Following is a resume' of Inspection and Materials activities during the month:

ITEM	NUMBER
Total orders on land requiring inspection	1086
Cumulative number of orders assigned to inspectors	994
Number of orders assigned to inspectors this month	187
New orders received by Inspection during the month	182
Orders completed	28
Total requisitions transmitted for Expansion Program	73
Total orders of engineered equipment placed for Expansion Program	162

At the end of February, there had been grand totals of 2499 Expansion Program requisitions for engineered equipment transmitted, and 2401 Expansion Program orders placed.

Reproduction output was 536,000 square feet during the 20 regular working days, including 192 hours overtime. The largest single order processed during February was 16,448 prints for Purex.

Estimating Unit completed 28 estimates during the month. The completed estimates comprised the following: project proposals - 10, comparative - 2, fair cost - 1, high spot - 4, scope - 7, and miscellaneous - 4.

Field Surveys completed two AEC orders, the check of grades on the new waste ditch for Redox Area, and settlement checks on the George Washington Way, Yakima River Bridge.

D. CRAFT LABOR

Percentages of voluntary terminations from construction contractors fluctuated during the month. Kaiser engineers and associates increased about 1% to a total of 3.6%. Blaw Knox and associates dropped 1.7% to a total of 6%. J. A. Jones Construction Company increased almost 2% to a total of 3.1%.

Three jurisdictional disputes at Hanford interfered directly with construction of the 100-K Area. Two half-day work stoppages at KW Water Plant were caused by millwright and pipe fitter disputes over installation of process water pumps. This dispute prevented adequate inspection of pumps which were found to have cracked casings. Another stoppage in 165 KW involved millwright, pipe fitters, and electricians. The immediate cause of dispute was installation of a turbine generator, and a direct result was interuption of graphite packing in KW on February 23, 24.

At least three off-site labor disputes in vendors' plants have delayed delivery of essential equipment. The projects most effected were Recuplex, 108-F Biology Laboratory and the Expansion Program projects.

A two-man panel in San Francisco conducted a hearing on the carpenter - millwright dispute centered on the 2101 Building. Isolation pay was not discussed, although the employers brief contained a detailed presentation of their views. It is now believed that the Ching Panel will resume negotiations on the question of isolation pay.

Isolation pay remains as a point of discussion in the Master Agreement Negotiations. No indication of decisive action has been given. Reference to the Ching Panel is being considered.

In Spokane, agreement was reached between the Associated General Contractors and the carpenters and millwrights. The agreement provided for wage increases effective January 1, and June 16, 1954. The subject of wage may be re-opened on January 1, 1955 for adjustment according to changes in the Consumers Price Index between June 1953 and June 1954.

The service contractor, J. A. Jones Construction Company, is attempting to secure a no-strike pledge from the local Building Trades Council to include all Minor Construction work. Preliminary discussions have been favorable.

The work stoppage on February 23 and 24 was the first occasion in the history of Hanford on which a labor problem interrupted actual graphite packing operations during construction of a reactor. This was a most undesirable situation due to the increased possibility of contamination to the pile, and extra-precautionary measures were required including the covering of the partially-finished reactor with a nylon blanket during the two shifts of lost time.

REPORT OF VISITORS

To Hanford

Eustace Vynne, Cascade Distributors, Seattle, Washington, visited R. J. Benckenstein on February 2 to demonstrate Cadwell Ramset equipment.

S. M. Stoller, Vitro Corporation, New York, New York, visited W. B. Webster February 9 through February 12 for general discussion of Purex design.

J. C. Tourek, Vitro Corporation, New York, New York, visited W. B. Webster February 16 through 18, 1954 for general disccusion of Purex design.

L. P. Sharts, B. J. Kulakowski and L. J. Pionowski, Udylite Corporation, Detroit, Michigan, visited R. J. O'Neil and R. J. Cavanaugh February 19, 1954 to discuss engineering details on Udylite Corporation equipment.

A. F. Sperry, Panellit, Incorporated, Chicago, Illinois, visited W. B. Webster February 23 and 24, 1954 to discuss Purex instrumentation.

Official Trips to Other Installations

C. F. Quackenbush visited Bingham Pump Company, Portland, Oregon, January 31, to February 3, 1954 to inspect primary pump assemblies for 190-K Buildings.

W. W. Walker visited Wyatt Sheet Metal, Dallas, Texas and Fritz-Glitsch, Dallas, Texas from February 1 to February 5, 1954 to coordinate inspection procedures.

C. P. Lawson visited Tube Turns Incorporated, Louisville, Kentucky, from February 4 to February 6, 1954 to coordinate inspection procedures.

C. A. Lyneis visited Standard Steel Corporation, Los Angeles, California, from February 1 through February 3, 1954 for consultation and expediting of Recuplex vessel fabrication.

H. Radow visited Eastern Equipment Company, Norwalk, Connecticut, on February 2, 1954 for conference on orders for agitator and pump.

R. J. Cavanaugh and G. L. Swezea visited Ohio Crankshaft Company, Cleveland, Ohio, on February 1 and 3, 1954 to negotiate design for 300 Area Expansion Program.

R. J. Cavanaugh visited National Acme Company, Cleveland, Ohio, on February 2 and 4, 1954 to check design on facing machine for 300 Area Expansion Program.

G. L. Swezea visited General Electric Company, Cleveland, Ohio, on February 2, 1954 to discuss handling of frost test.

H. P. Shaw and D. F. Watson visited the Rucker Company, Oakland, California, on February 4 and 5, 1954 to purchase pressing equipment for Hanford 3X Program - 300 Area.

R. M. Griffith visited Bouillon and Griffith, Seattle, Washington, on February 10 and 11, 1954 to correct vendor's drawings.

A. J. Broderson visited Square D Company, Seattle, Washington, on February 24, 1954 to approve vendor drawings.

D. A. Hoover visited Gate City Steel Company, Boise, Idaho, on February 25, 1954 to approve vendor drawings.

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H. H. Hubble visited A. O. Smith Company, Milwaukee, Wisconsin, Graham Manufacturing Company, Buffalo, New York, and Carpenter Steel Company, New York, New York, from February 26 through March 7, 1954 for engineering consultation.

R. C. Hollingshead visited C. L. Gougler Company, Kent, Ohio, and Stearns-Rogers Company, Denver, Colorado, on February 25 and 26, 1954 to provide engineering assistance to inspection and to witness generator tests.

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GENERAL ELECTRIC COMPANY

RICHLAND, WASHINGTON . . . . . HANFORD ATOMIC PRODUCTS OPERATION

HW-31006 De

March 4, 1954

MONTHLY REPORT

FUEL TECHNOLOGY SUB-SECTION

FEBRUARY, 1954

VISITORS AND BUSINESS TRIPS

Name	Date	Address	Purpose
E. E. Hayes	2-1,3-54	du Pont Co. Wilmington, Del.	Fabrication discussions
H. H. Uhlig	2-3,5-54	M.I.T. Cambridge, Mass.	Corrosion discussions
H. A. Pray	2-5,6-54	Battelle Memorial Inst., Columbus, O.	Corrosion discussions

Name	Date	Place Visited	Purpose
L. J. Lucas	2-1,5-54	A.E.C., Augusta, Ga.	Inspection of equipment and shop operations
		K.A.P.L.	Same as above
P. J. Pankaskie	2-1,4-54	K.A.P.L.	Fabrication discussions
		M.I.T.	Same as above
		Bridgeport Brass Co., Bridgeport, Conn.	Same as above
		Chase Brass, Waterbury, Conn.	Same as above
T. G. Marshall	Same as P. J. Pankaskie		
R. A. Thiede	2-1,6-54	Washington State College, Pullman, Wash.	Corrosion conference
C. Groot	2-3,7-54	Same as above	Same as above
G. S. Allison	2-7,9-54	Electric Steel Foundry, Seattle, Wash.	Equipment discussions
J. W. Riches	2-13,22-54	Iowa State College	Metallurgy of uranium
		Battelle Memorial Institute	Same as above
		K.A.P.L.	Same as above

GENERAL ELECTRIC COMPANY

Fuel Technology Sub-Section

HW-31006 Del

VISITORS AND BUSINESS TRIPS

Name	Date	Place Visited	Purpose
R. W. Benoliel	2-15,28-54	du Pont Co., Augusta, Ga. & Aiken, S. C.	Fuel element discussions
		ALCOA, N. Y., N. Y.	Same as above
		Mallinckrodt Chemical Works, St. Louis, Mo.	Same as above
W. T. Kattner	2-20,28-54	Mallinckrodt Chemical Works	Uranium quality discussion
		National Lead Co., Cincinnati, Ohio	Same as above
		Battelle Memorial Institute	Same as above
		Argonne National Lab., Chicago, Ill.	Same as above
		N.Y.O.O., N.Y.C.	Same as above
		Bridgeport Brass	Same as above
E. A. Eschbach	2-21,28-54	Mallinckrodt Chemical Works	Uranium quality discussion
R. S. Peterson	2-25,27-54	Vickers, Inc., Seattle, Wash.	Equipment inspection

URANIUM QUALITY

Slug Core Characteristics

A more comprehensive program has been initiated to determine the effect, in the absence of irradiation, of surface defects, microscopic structure, chemical composition, orientation, and mechanical properties, on the resistance of a uranium core to fatigue failure under cyclic straining induced by a thermal gradient (wood splitter). Initial results should be forthcoming in the near future.

The MTR facility permits the evaluation, in the presence of irradiation, of the above properties of uranium cores to withstand a high central core temperature and long exposure. As a basis for future developments of uranium fuel cores, typical FMPC rolled salt bath heat treated water quenched rods are being considered for initial tests in this facility. Complete metallurgical evaluation of this material will be made prior to irradiation.

Examination of broken pieces of eight-inch slugs discovered in the January discharge at 105-H indicates that the failures occurred during or after discharge and may have been caused by sub-normal quality uranium.

The high incidence of split ruptures at 105-C has led to consideration of segregating production material so that only striation-free uranium fuel cores would be charged in C Pile.

Preliminary information obtained at HAPO on the increase in hydrogen content from salt bath heat treatment of uranium and its effect on the mechanical properties was confirmed by the results of extensive investigation conducted at Los Alamos. Experimental data indicate that the hydrogen content of good quality uranium is not appreciably affected by normal storage conditions, or by a fifty per cent nitric acid pickle. Other evidence indicates that hydrogen in amounts of 0.4 to 1.2 ppm is present in as-rolled rod.

Rolling Processes

Alpha rolled untransformed uranium exhibits a finer grain size and greater strength and ductility than normal production material and should provide increased resistance to split type failures. The first control tube of four-inch slugs of this material irradiated under PT-8-M was discharged at 162 MWD/T and showed no gross distortion or warp of the pieces.

Eleven ruptures occurred in February in PT-19-M material which is an evaluation of FMPC rolled material but also contains material rolled at Simonds. Nine of these ruptures occurred at higher than normal goal exposures of 600 MWD/T. Of these eleven failures, five have been classified as splits and one as a side blowout. The other five have not, as yet, been classified. Failures have occurred in material rolled at both sites and there appears to be no appreciable difference between the rupture rates of Simonds and Fernald rolled material at exposures up to the normal goal of 600 MWD/T. The "X" pattern macrostructure, observed in photomacrographs of FMPC rolled uranium billets, could be indicative of zones or planes of weakness. A program has been initiated to determine the relationship, if any, between this "X" pattern and split type failures.

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Fuel Technology Sub-Section [redacted] HW-31006 Def

Heat Treatment

Irradiated alpha canned slugs from Simonds rolled rods salt bath beta heat treated at Lackawanna (PT-6-M) have been selected for metallurgical comparison with unirradiated material processed at the same time. Analysis of pre- and post-irradiation dimensions of PT-6-M slugs has been attempted, but the data do not appear accurate enough to make valid conclusions. There are indications of decreases in the length of the slugs in the central portion of the tubes.

Examination of eight-inch alpha canned slugs from a control tube of material rolled at Simonds, salt bath beta heat treated at Fernald (PT-7-M), discharged at 820 MWD/T shows moderate to severe warpage of nine pieces. It has been reported that some of the warpage is severe enough to give indications of excessive localized heating due to non-uniform cooling. The indications of the localized excessive heating could be related to the cause of the warping or it could have resulted from initial warping during irradiation. In either case, the localized heating would cause an increase in the amount of warp of a slug.

URANIUM DEVELOPMENT

Among other remedies, the importance of improving the mechanical properties of the uranium fuel core to resist fatigue failure is indicated by the high incidence of uranium split type failures during the past few months. Increasing the strength and ductility of the uranium by removing stress concentrators such as inclusions, and rolling defects and by alloy addition should provide resistance to failure at high specific powers and exposures. Two tests have recently been developed to provide basic information on the resistance of uranium to fatigue failure when subjected to cyclic strain induced by a thermal gradient in the slug. The so-called "wood splitter" developed by the Uranium Quality Sub-Unit and the bursting test have been shown to distinguish between uranium of varying quality and alloy content and will be utilized to compare uranium and uranium alloys fabricated by different techniques.

Uranium Alloys

The uranium-chromium alloy slug failed by splitting after an exposure of 832 MWD/T. The uranium core contained 0.4 atomic per cent chromium added to a high purity base uranium containing not more than 50 ppm per carbon and trace amounts of other impurities. The failure was unusual in Hanford experience since no stringer type inclusions were present to give direction to the fracture which followed a typical pattern of the failure of metals under equal biaxial tension. As failure patterns of this type are also associated with pure metal, they may be approached when the stringer type inclusions and planes of weakness are removed from present production uranium.

Fabrication of Uranium

Rods alpha extruded by Revere Brass and Copper Company under MIT supervision and beta heat treated at FMPC are being machined into eight-inch slugs for irradiation testing. A small billet of uranium cast directly into a zirconium can was extruded

by MIT. The uranium cladding interface was more uniform than has been previously obtained by other techniques. A successful alpha extrusion of a small diameter uranium-silicon alloy rod was accomplished by MIT.

A total of 4,000 uranium powder metal compact slugs have been received from Sylvania Electric Products Company. These slugs exhibit fine grain size, randomly oriented structure but are extremely brittle in tension. It is proposed to irradiate these slugs at low specific power up to a maximum exposure of 600 MWD/T to avoid the possibility of split type ruptures at higher exposures or high specific power levels existing in C Pile.

Uranium rolled from a chloride salt bath preheat medium has been shown to exhibit greater ductility than rods rolled from a carbonate salt bath similar to that used at Fernald. Similar results were obtained in comparing the ductility of rods beta heat treated in the two salt baths. None of the techniques employed to date have produced uranium with a ductility approaching that of uranium roll clad with zirconium.

COMPONENTS

Can Forming

The feasibility of fabrication of 2S, 63S, and 2S Al-Si clad cans by the "uniskan" process has been successfully demonstrated. Excellent surface finishes were obtained where reductions in wall thickness of the order of 95 per cent were involved.

Investigations into the use of hot forming techniques to form zircalloy 2 have been extremely encouraging. Small cups have been successfully formed and equipment is being designed to permit full investigation of these metals. Efforts to cold form zircalloy 2 cups were unsuccessful as the material cracked on the radii.

Zirconium

Two hundred zirconium cups are scheduled for shipment from Bridgeport Brass Company by March 1.

Three zircalloy and three zirconium process tube blanks are ready for finish cold-reducing to "H" tube dimensions by Superior Tube in early March.

Aluminum Alloys

The production test for the in-pile evaluation of 63S-72-S clad process tubes is being processed for approval. Interior and exterior appearances of these tubes were comparable to those of standard 2S-72-S clad tubes. One 63S-72S clad tube has been successfully installed in the H pile high temperature loop.

Two successful melts of high purity aluminum alloys, 0.2 per cent and 0.5 per cent magnesium have been made using 314 Building melt plant facilities. Corrosion coupons of the 0.2 per cent silicon alloy and of the 0.5 per cent magnesium high purity aluminum alloy from Vacuum Metals Corporation are being sent to the flow cup laboratory.

GENERAL ELECTRIC COMPANY

Fuel Technology Sub-Section

Following close visual inspection, 100 slugs were canned using caps and cans of 0.5 per cent magnesium high purity aluminum alloy fabricated by the Aluminum Company of America from stock made by National Research Corporation. The canned material will be subjected to the standard fabrication and inspection procedures following which it will be used for penetration and corrosion studies.

CANNING PROCESS

Failure of Thorium Slug

The rupture thorium slug from tube 3884-H was examined in the Radio-Metallurgy facility. The unbonded ("B" process) slug apparently failed from entrance of water through the can near the base end. The local distortion of the jacket and the appearance of the corrosive attack on the core were typical of the "side" failures observed in uranium slugs except that the thorium piece was more severely disrupted. Examination of the slug core following removal of the jacket showed that the core had been improperly machined and that the base half was not fully cylindrical. It is estimated that a gap ranging from 1/10 - 1/5 of an inch existed between the deficient portion of the core and the can when assembled. Failure may have ensued through thermogalvanic corrosion of the jacket due to the extreme insulating effect of the gap. The examination did not indicate in any way that the unbonded jacketing process now in use, the "C" process, would not continue to be satisfactory for thorium canning until an optimum (bonded process) could be reduced to practice.

Fillerwelding

The porosity in the fusion zone of Fillerwelded "C" process slugs (unbonded) was reduced by a further improvement in technique. The four Fillerweld units received by Manufacturing this month are being revised to take advantage of this technique improvement.

Die Stripping of Cans

A KAPL-developed die for mechanically stripping the jackets from Al-Si canned uranium slugs is being evaluated for possible use in replacing chemical removal of slug jackets in the present 300 Area process for Al-Si dipped uranium slugs, for post-irradiation examination of slug cores, and for stripping the jackets from hot-pressed (bonded) target slugs prior to product extraction. Recovery of "C" process rejects, presently mechanically stripped by hand, could also be facilitated.

Induction Preheating of Can-Sleeve Assemblies

Analysis of data from a test of induction preheated can-sleeve assemblies for Al-Si dip canning of four-inch slugs indicates that minor increases in the amount of can wall retained can be accomplished concurrently with easy and complete insertion of the slugs into the cans. Further tests using eight-inch components will be made in the future if an estimate indicates a possible economic gain through improvement of the canning yield.

construction is expected to start about June 15. Specifications and bids for plating equipment, swaging equipment, vapor blast cleaning equipment, machine tools, and salt bath heat treating equipment were reviewed during the month.

Building clean-up and repair of the floor and roof is proceeding on the 314 Building - Project CG-563. The removal of the 200 KW induction heating unit from 304 Building and installation of this equipment in 314 Building is being considered to determine if it should be undertaken as a part of this project.

FUEL EXAMINATION

Fuel Examination

Eleven additional warped slugs were found in the alpha-canned salt-bath beta heat-treated material at exposures above 800 MWD/T. Examination of lesser exposed material is continuing to determine whether there is a correlation between warp and specific exposure of this material.

At an exposure of 832 MWD/T one of the low carbon uranium chromium alloy slugs failed. The fine grain structure of the original material was quite evident from the exposed surface of the rupture.

Examination Facilities

The revised proposal for project C-431-C will be separated into two parts, one for completion of the original scope and one for the additional scope.

TESTING

Al-Si Penetration

Results from the remainder of the 60 slugs which had been checked by the MIZ-1 equipment for Al-Si penetration show that considerably more work must be done to reduce the response of the equipment to motion of the probe, small surface irregularities, and out-of-roundness of the slugs before the MIZ-1 instrument can be considered as a production tool. Some work directed toward this objective has been done in which signals so phased as to respond primarily to probe motion were fed back into the channel phased to respond to penetration. Results were encouraging. It still appears, however, that if it is required at present to detect 20 mil penetrations, some three-fourths of the rejects will be spurious. This does not, of course, mean that production use of the instrument might not still be advantageous and economic.

Laboratory studies of coil configurations for MIZ-1 are essentially complete and have resulted in a re-design of the MIZ-1 probe. The result will be much lighter and smaller than the existing model and it is expected that its performance in terms of resolution, stability, and reduction of spurious response should be much better.

Unbond Test

The ultrasonic pulse-echo unbond test was used to inspect the "J" slugs canned by both hot-press and single-dip process which were manufactured for the current P-10 production test. The test was found to be very sensitive, reliably picked up small voids about 3/16" in diameter and occasionally detected even smaller ones. This sensitivity resulted in a rather large number of rejects on both the single-dip and hot-press canned slugs. Among hot-pressed slugs were somewhat fewer rejects than single dip.

Some of the rejects undoubtedly resulted from the ability of the equipment to detect voids, impurity segregation, and other defects in the uranium - aluminum alloy cores. This particular problem would not be encountered on uranium cores because of the extremely high attenuation of the uranium at the frequency used in the test.

COATINGS AND CORROSION

Autoclave Testing

Slugs having a 0.003-inch hole through the can wall to the uranium have been exposed to steam and to water at 180 C for over 40 hours without failure. Evidently neither the steam nor the water autoclave will cause failure of imperfect slugs in this period of time unless holes larger than 0.003-inch are present.

Corrosion Studies

Equipment for polarization studies has been improved to permit higher flows, increased agitation and longer operation. With this equipment, it is possible to duplicate certain conditions observed in pile operation; over a period of three days, mounds of corrosion product were formed on the samples.

High Temperature In-Pile Exposure

Some slugs were prepared for exposure in the H loop at temperatures up to 150 C. These were prepared either by autoclaving in special solutions or by anodizing. It is expected that these will be exposed for about one month; the results will be compared to those from laboratory tests.

Protective Films

Some slugs anodized by the Alumilite method were exposed to deionized water at 170 C. After 11 days exposure, the film was still intact. Flow cup tests indicate that the oxalic acid film is the most resistant to hot pile water. After 19 days exposure at 90 C, the film was still present.

GENERAL ELECTRIC COMPANY

Fuel Technology Sub-Section

[redacted]

A film deposited by dipping in a special solution, Iridite No. 14 was tested to determine its value as a lubricant for hot pressing. This may result in the elimination of the need for a graphite lubricant and thus simplify the cleaning procedure.

Electroplating Studies

A method for regneration of the Thompson nickel plating bath was developed; titration studies to determine the best method of pH control were completed.

A more efficient method for etching uranium either in preparation for plating or for other canning procedures was developed; this procedure used a salt of either copper or nickel in a dilute nitric acid solution. When nickel nitrate is used, a very thin film of nickel is deposited; this may serve as a base for electroplating.

The present facilities for plating full-size fuel elements has been enlarged. After relocation in Building 3706, the equipment will be satisfactory for plating six slugs at once.

[redacted]

INVENTIONS

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

INVENTOR	TITLE
E. F. Gates	BONDING OF ZIRCONIUM AND GLASS TUBING

A glass to zirconium metal seal was made for what is believed to be the first time and looks very promising. It has been on test for several weeks and apparently does not leak.

INVENTORS	TITLE
E. A. Eschbach R. K. Koler W. J. Bailey	SEALING CERAMIC THERMAL BARRIER IN AN ALUMINUM END-CAP

Possible invention is involved in method devised for completely sealing ceramic thermal barrier material in the form of thin discs in aluminum end caps. Ceramic discs are made an integral part of slug end caps by pressure or solid phase welding a sandwich assembly consisting of a 1-3/8-inch aluminum disc, 1-1/8-inch ceramic disc, and an aluminum end cap in a heated die. (For further description see HW-29843)

G. E. McCullough
Manager - Fuel Technology
ENGINEERING DEPARTMENT

GE McCullough:acj

MEDICAL DEPARTMENT

FEBRUARY 1954

General

Personnel Changes

The roll decreased from 254 to 251.

Visits

Dr. Sachs attended an executive board meeting of the Washington State Public Health Association in Seattle and an executive board meeting of the Western Branch of the American Public Health Association in Berkeley, California.

Employee Relations

Employee attendance at 16 meetings was 139.

Industrial Medicine

Medical examinations decreased from 881 to 684 due to physician shortage. While one physician was added during the month, another is leaving due to failure to pass the State Basic Science Examination required for licensure.
Dispensary treatments decreased from 4317 to 4136.
Procedures were set up for tabulating absences by frequency of absence rather than total time lost, as it is felt that this gives a better index of correctable absenteeism.
New forms to notify employees of conditions found on examination by the physician have been drawn up with the aid of our legal counsel. This will stress the personal doctor patient relationship and will strengthen the Company's legal position.
One major and two sub-major injuries of General Electric employees were treated.
Contractor employees sustained one sub-major injury.
The health topic was "Allergy."
Sickness absenteeism was 2.17% as compared with 1.94% for January while the rate for total absenteeism was 2.91% as compared with 2.60% for January. In the face of a high incidence of Influenza A' the above absentee rates are considered good.

Kadlec Hospital

The annual combined dinner meeting of the hospital board and staff featured talks by the General Manager of General Electric and A.E.C.
The consultation study by Public Administration Services was started during the month.
The average daily adult census increased from 77.9 to 89.9 as compared to 98.4 a year ago. No explanation is available for the lower census this year as compared to last year.
The occupancy percentage of the mixed service was 88.9. Nursing hours per patient day were 3.32 on mixed services.

Public Health

The incidence of communicable disease was high with 513 cases of measles reported during the month. Sickness rates among school children were high with absentee rates reaching 25% in some schools. This was largely due to upper respiratory infections, largely Influenza.

MEDICAL DEPARTMENT

FEBRUARY 1954

General (Continued)

Costs-January

	Dec.	Jan.	Jan. Budget
Industrial Medicine (Oper.)	$42,881	$41,262	$42,248
Public Health (Oper.)	10,541	10,424	10,564
Kadlec Hospital (Net)	32,969	20,062	19,242
Hospital Expense Credits	1,081	1,430	2,500
Sub-total-Medical Dept. (Oper.)	87,472	73,178	74,554
Construction Medical (Industrial and Public Health)	1,513	1,080	1,660
Total-Operations & Construction	$88,985	$74,258	76,214

The net cost of operating the Medical Department before charges were assessed to other departments was $74,258, about $15,000 less than for December and some $2,000 below the budget. The improvement was largely due to a reduction in Kadlec Hospital net costs of nearly $13,000, made up of reduction is Hospital gross costs of $6,000 and an increase in revenue of $7,000. After seven months of operation, there is a net budget underrun of $12,000, or about 2%. However, Kadlec Hospital is $7,000 over the budget due to unexplained low census.

MEDICAL DEPARTMENT

FEBRUARY 1954

Industrial Medical Section

The total number of examinations decreased from 815 to 684. Dispensary visits also decreased from 4,317 to 4,136. There were decreases in all areas except 300 and 100-B Areas where there was an increase in the number of visits. General Electric employees sustained one major injury and two sub-majors and contractor employees sustained no majors and one sub-major injury. Industrial nurses on the active roll remained at 24.

One information meeting was held for Industrial Physicians during the month. Dr. C. C. Martin joined the Industrial Medical staff on February 16th, coming from a medical residency at Hines General Hospital in Chicago. One vacancy still exists on the Industrial Medical staff.

Special absence tabulating procedure was revised during the month so that reports will in the future be based on frequency of absence rather than on total days lost. Previous reports had been made on male employees aggregating 14 days and female employees aggregating 20 days during the calendar year. Subsequent reports will be made when the frecuency of absence aggregates three for men or four for women during any quarter or three-month period. The change was made because it has been found that frequency of absence is a more sensitive index to absenteeism problems than is total days lost for the individual case.

Employee notification procedure following medical examination was revised on recommendations made by our legal counsel. The new procedure will more clearly explain the objective of medical examination of employees and supervisors and report the medical findings on a more personal doctor-employee patient relationship to the employee.

The Health Activities Committee meeting was held on February 18th and the health topic on "Allergies" was presented. Material on this subject was prepared for distribution and discussion throughout the plant. The absenteeism tabulation procedure has been revised to conform with company-wide policy and all absence over one-tenth hour will be recorded. The change has not yet seemed to have materially affected the rate. The sickness absenteeism was 2.17% as compared with 1.94% for January.

Net costs for January amounted to $33,895, a decrease of $1,502, or 4%, from the December level. A generally lower level of expenditure in nearly all categories of expense accounted for the decrease.

Costs-Operations

	Jan.	Dec.	Increase (Decrease)
Salaries	$31,104	$31,672	$ (568)
Continuity of Service	3,110	3,167	(57)
Laundry	227	241	(14)
Utilities, Transportation, Maintenance	3,807	4,507	(700)
Supplies and Other	4,093	4,497	(404)
Total Gross Costs	$42,341	$44,084	$(1,743)
Less: Revenue	1,079	1,203	(124)
Expense Credits	7,367	7,484	(117)
Net Cost of Operation	$33,895	$35,397	$(1,502)

Industrial Medical Section (Continued)

Costs-Operations (Continued)

At the end of seven months' operation, net costs total $245,606 as compared with a budget of $264,877. This is a net underrun of $19,271, or 7%.

Costs-Construction

No costs were incurred in connection with this program after December 31, 1953. Fiscal year to date costs, made up almost entirely of salaries and related continuity of service expense amounted to $2,775.

	Jan.	Dec.	Increase (Decrease)
Salaries	$ -0-	$ 211	$(211)
Continuity of Service	-0-	21	(21)
Supplies and Other	-0-	0	0
Total Gross Costs	$ -0-	$ 232	$(232)

MEDICAL DEPARTMENT

FEBRUARY 1954

Industrial Medical Section (Continued)	January	February	Year to Date
Physical Examinations			
Operations			
Pre-employment	49	65	114
Rehire	21	26	47
Annual	461	300	761
Interim	16	5	21
A.E.C.	25	33	58
Re-examination and recheck	189	205	394
Termination	54	50	104
Sub-total	815	684	1499
Contractors			
Annual	19	12	31
Pre-employment	26	58	84
Recheck	8	33	41
Termination and Transfer	13	15	28
Sub-total	66	118	184
Total Physical Examinations	881	802	1683
Laboratory Examinations			
Clinical Laboratory			
Government	117	156	273
Pre-employment, Termination, Transfer	938	1227	2165
Annual	2474	1631	4105
Recheck (Area)	105	63	168
First Aid	9	10	19
Clinic	407	291	698
Hospital	4690	4471	9161
Total	8740	7849	16589
X-Ray			
Government	17	16	33
Pre-employment, Termination, Transfer	123	183	306
Annual	538	328	866
First Aid	94	80	174
Clinic	202	200	402
Hospital	299	312	611
Public Health	16	13	29
Total	1289	1132	2421
Electrocardiographs			
Industrial	110	67	177
Clinic	1	1	2
Hospital	47	40	87
Total	158	108	266

MEDICAL DEPARTMENT

FEBRUARY 1954

Industrial Medical Section (Continued)	January	February	Year to Date
First Aid Treatments			
Operations			
New Occupational Cases	336	291	627
Occupational Case Retreatments	1100	1092	2192
Non-occupational Treatments	2733	2564	5297
Sub-total	4169	3947	8116
Construction			
New Occupational Cases	36	38	74
Occupational Case Retreatments	66	79	145
Non-occupational Treatments	10	37	47
Sub-total	112	154	266
Facility Operators	36	35	71
Total First Aid Treatments	4317	4136	8453
Major Injuries			
General Electric	2	1	3
Contractors	0	0	0
Total	2	1	3
Sub-Major Injuries			
General Electric	1	2	3
Contractors	0	1	1
Total	1	3	4
Absenteeism Investigation			
Calls Made	10	5	15
Employee Personal Illness	9	4	13
No. absent due to illness in family	0	0	0
No. not at home when call was made	1	1	2

MEDICAL DEPARTMENT

FEBRUARY 1954

Hospital Section

The average daily adult census increased from 77.9 to 89.9 as compared to 98.4 a year ago. This represents an occupancy percentage of 82.5, broken down as follows: Mixed Service (Medical, Surgical and Pediatrics) 88.9; Obstetrical Service 55.7. The minimum and maximum daily census ranged as follows:

	Minimum	Maximum
Mixed Service	53	97
Obstetrical Service	4	18
Total Adult	61	115

The average daily newborn census increased from 10.6 to 11.7, as compared to 10.1 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.32
Obstetrical	5.26
Newborn	3.08

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of January was 2.18. When newborn infants are included, the ratio is 1.93.

The net expense for the operation of Kadlec Hospital for January was $20,062 as compared to $32,969 for December. Summary is as follows:

Kadlec Hospital net expense $20,062
This is a decrease of about $13,000. Gross costs reduced approximately $5,900 while revenue increased almost $6,700 and expense credits increased about $350. Revenue is lower than budgeted due to lower patient census than was expected.

The following is a summary of employee relations meetings held in the Medical Department during February:

	Meetings	Attendance
Hospital	12	107
Industrial Medicine	2	11
Public Health	1	16
General	1	5
Total	16	139

MEDICAL DEPARTMENT

FEBRUARY 1954

Hospital Section (Continued)	January	February	Year to Date
Kadlec Hospital			
Average Daily Adult Census	77.9	89.9	83.6
Medical	25.4	28.3	26.8
Surgical	30.3	34.7	32.4
Pediatrics	12.3	15.2	13.7
Mixed	77.3	78.2	72.9
Obstetrical	9.9	11.7	10.7
Average Daily Newborn Census	10.6	11.7	11.1
Maximum Daily Census:			
Mixed Services	85	97	97
Obstetrical	14	18	18
Total Adult Census	94	115	115
Minimum Daily Census:			
Mixed Services	44	53	44
Obstetrical Service	5	4	4
Total Adult Census	55	61	55
Admissions: Adults	558	524	1082
Discharges: Adults	535	530	1065
Medical	146	156	302
Surgical	226	206	432
Pediatrics	90	88	178
Mixed	462	450	912
Obstetrical	73	80	153
Newborn	69	71	140
Patient Days: Adult	2416	2518	4934
Medical	788	792	1580
Surgical	942	972	1914
Pediatrics	380	426	806
Mixed	2110	2190	4300
Obstetrical	306	328	634
Newborn	329	328	657
Average Length of Stay: Adults	4.5	4.8	4.6
Medical	5.4	5.1	5.2
Surgical	4.1	4.7	4.4
Pediatrics	4.2	4.8	4.5
Mixed	4.6	4.9	4.7
Obstetrical	4.2	4.1	4.1
Newborn	4.8	4.6	4.7
Occupancy Percentage: Adults	71.5	82.5	76.7
Medical	68.6	76.5	72.4
Surgical	94.7	108.4	101.3
Pediatrics	64.7	80.0	72.1
Mixed	77.3	88.9	82.8
Obstetrical	47.1	55.7	51.0
Newborn	40.8	45.0	42.7
(Occupancy Percentage based on 109 adult beds and 26 bassinets.)			

MEDICAL DEPARTMENT

FEBRUARY 1954

Hospital Section (Continued)	January	February	Year to Date
Kadlec Hospital (Continued)			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.81	3.32	
Obstetrics	6.46	5.26	
Newborn	3.39	3.08	
Avg. No. Employees per Patient (excluding newborn)	2.18		
Operations: Major	77	83	160
Minor	102	84	186
E.E.N.T.	67	49	116
Dental	3	2	5
Births: Live	67	68	135
Still	0	2	2
Deaths	6	5	11
Hospital Net Death Rate	.66%	.33%	.50%
Net Autopsy Rate	50.0	60.0	54.5
Discharged against advice	0	2	2
One Day Cases	134	126	260
Admission Sources:			
Richland	72.4	74.4	73.5
North Richland	14.0	13.0	13.4
Other	13.6	12.6	13.1
Admissions by Employment:			
General Electric	70.3	69.7	70.0
Government	2.1	3.4	2.8
Facility	3.6	4.4	4.0
Contractors	19.0	18.1	18.6
Schools	.7	.4	.5
Others	4.3	4.0	4.1
Hospital Outpatients Treated-F.A.	504	502	1006
Recovery Bed Patients-F.A.	24	20	44
Physical Therapy Treatments			
Clinic	291	352	643
Hospital	120	80	200
Industrial: Plant	167	182	349
Total	578	614	1192
Pharmacy			
No. of Prescriptions Filled	2422	2525	4947
No. of Store Orders Filled	489	458	947

MEDICAL DEPARTMENT

FEBRUARY 1954

Hospital Section (Continued)	January	February	Year to Date
Kadlec Hospital (Continued)			
Patient Meals			
Regulars	3402	3957	7359
Children under 8	463	298	761
Specials	1470	1427	2897
Softs	927	1012	1939
Tonsils	169	88	257
Liquids	166	180	346
Surgical Liquids	85	70	155
Total	6682	7032	13714
Cafeteria Meals			
Noon	2032	1740	3772
Night	308	285	593
Total	2340	2025	4365

MEDICAL DEPARTMENT

FEBRUARY 1954

Public Health Section

The incidence of communicable diseases reported remains high. The epidemic of measles continued throughout the month. There seemed to be a leveling off the last days of the month due to the amount of children immunized with Immune Globulin. A sharp rise in influenza A' has also been experienced. This was indicated by the high incidence of absenteeism among the school children which doubled during the month giving rates as high as 25 per cent for a few days. Toward the end of the month this abated and virus studies made substantiated the infiltration of the influenza A' throughout the community.

As a consequence, the high incidence of communicable disease home nursing visits continued high. This is better shown by percentage of nursing case load rather than the number of calls since we are short two staff nurses. Arrangements were made to have many of the clients call at the office for services rather than the nurses making field calls. This is noted in the 200 per cent increase in Immune Globulin given in the office rather than in the home, for contacts to measles.

A tuberculosis chest clinic was held by Dr. C. E. March, of the Central Washington Tuberculosis Hospital, for post sanitarium cases now located in Richland.

The Health Officer attended an executive board meeting of the Washington State Public Health Association in Seattle and an executive board meeting of the Western Branch of the American Public Health Association in Berkeley, California. The Health Officer also participated in a Civil Defense workshop held in this area.

One staff and one section meeting were held with an attendance of 48.

During February the social service counselors had 61 interviews regarding marital difficulties, 102 interviews with parents concerned about children's problems. In the area of individual personality adjustments there were 40 contacts with children, 32 with adolescents and 38 with adults. In addition, each counselor spent an average of six hours in direct consultation with school teachers regarding children about whom they were concerned.

Field inspections of food handling establishments indicate most to be operating satisfactorily. Improper cleaning of garbage cans was the principal violation found. With warmer weather approaching, operators are being requested to clean cans daily and to keep covers on cans. One new restaurant was approved for operation. A foodhandlers training course was conducted by this department for the personnel of this restaurant.

One bakery was found to be in need of improvement. Violations consisted mainly of inadequate cleaning of equipment.

Bacteriological results of water samples proved negative for coliform bacteria. Field inspection and water samples in construction area barrels were satisfactory.

Public Health Section (Continued)

A higher coliform count will be obtained from sewage samples as a result of running higher dilutions on samples. Sewage samples for the month showed an improvement in reduction of bacteria over preceding months.

Two Grade A milk producers were degraded because of continued high bacteria counts. Field inspections of dairy farms were satisfactory.

MEDICAL DEPARTMENT

FEBRUARY 1954

Public Health Section (Continued)	January	February	Year to Date
Education			
Pamphlets distributed	9,038	11,032	20,070
News Releases	5	12	17
Staff Meetings	1	1	2
Classes	12	16	28
Attendance	0	1,319	1,319
Lectures and Talks	4	8	12
Attendance	767	235	1,002
Films Shown	7	13	20
Attendance	151	438	589
Community Conferences & Meetings	41	28	69
Radio Broadcasts	8	12	20
Immunizations			
Diphtheria	6	1	7
Diphtheria Booster	1	1	2
Tetanus	7	1	8
Tetanus Booster	0	1	1
Pertussis	5	1	6
Pertussis Booster	0	1	1
Smallpox	4	3	7
Smallpox Revaccination	3	81	84
Tuberculin Test	0	5	5
Immune Globulin	35	229	264
Social Service			
Cases carried over	86	85	171
Cases admitted	18	23	41
Cases closed	19	14	33
Remaining case load	85	94	179
Activities:			
Home Visits	7	7	14
Office Interviews	264	280	544
Conferences	57	60	117
Meetings	6	8	14
Sanitation			
Inspections made	100	146	246
Conferences held	8	30	38
Bacteriological Laboratory			
Treated Water Samples	168	176	344
Milk Samples (Inc. cream & ice cream)	36	40	76
Other bacteriological tests	518	727	1,245
Total	722	943	1,665

MEDICAL DEPARTMENT

FEBRUARY 1954

Public Health Section (Continued)	January	February	Year to Date
Communicable Diseases			
Chickenpox	18	55	73
German Measles	6	8	14
Impetigo	1	0	1
Influenza (U.R.I.)	0	1	1
Measles	82	560	642
Mumps	3	4	7
Ringworm	2	2	4
Roseola	0	1	1
Scabies	1	0	1
Scarlet Fever	18	20	38
Streptococcal Infections-Throat	2	1	3
Tuberculosis	0	1	1
Whooping Cough	0	2	2
Total	133	655	788
Total No. Nursing Field Visits	945	758	1,703
Total No. Nursing Office Visits	103	109	212

[redacted]

HW-31006 Del

Radiological Sciences Department

RADIOLOGICAL SCIENCES DEPARTMENT

FEBRUARY 1954

Summary

Twenty-four informal, 7 Class I, and one Class II radiation incidents were recorded. None affected the tolerance status of individuals. General ruthenium contamination from the January incident continued.

Tritium studies in rats led to a rather surprising revision in the current concepts of the dynamic balance of metabolism; this point will need to be investigated further before it can be generally applied.

[redacted]

Radiological Sciences Department

RADIOLOGICAL SCIENCES DEPARTMENT

FEBRUARY 1954

Organization

The month end force of 374 included 29 supervisors, 103 engineers and scientists, 19 clerical, and 223 other personnel.

Number of Employees on Payroll		
Beginning of month	-	374
End of month	-	374
Net increase	-	0

General

There were 24 informal, 7 Class I, and one Class II radiation incidents. None was known to have been of sufficient magnitude to affect the tolerance status of an employee.

Recently, extensive contamination has been found throughout various parts of the railroad track system. This may have an adverse effect on proposed track testing, and re-laying programs, which may be driven to radiation-controlled operations. The source appeared to be droppings from cask cars in addition to the general contamination from ruthenium.

Considerable time was spent on the writing of position analyses and position descriptions. The occasion was used to reconsider the clarity of assignment of function, responsibility and authority throughout the department. Some proposed minor changes have developed.

During the month, an employee received the highest suggestion award ($275.00) yet paid to a woman employee at HAPO.

General (Continued)

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

Inventor	Title
G.E. Driver	Phosphor Plates for Alpha Scintillation Counters.

RADIOLOGICAL ENGINEERING

Construction contractor work at the Biology laboratory addition and at the Area Personnel Meters laboratories was completed. The position ion accelerator laboratory construction was completed; installation of equipment will follow shortly.

Radiological engineering consultation activities were principally on scoping of facilities for sludge removal from reactor storage basins, use of nitrogen as a pile atmosphere, effluent monitoring facilities for 100-K, and performance of construction work in the presence of ground contamination problems around the Redox plant and on Plant railroad lines.

Disposal of 1st cycle supernatant to ground has totalled 1.53×10^6 gallons, clearing tankage valued at about $400,000. Pumping operations by Separations are continuing as conditions allow.

Study of the 300 Area radioactive waste streams was initiated to develop more economical disposal methods.

Calculation indicates that full containment of C reactor effluent in lakes at Gable Mountain is not feasible, as overflow would occur after about 6 months' operation. Hydrology tests in this area to check calculations were started.

The review of Columbia River contamination as a production limitation indicated that river water at Pasco may reach 20% of the estimated applicable MPC, based on current expansion plans and current effluent temperatures. Higher outlet temperatures would increase the problem. The P^{32} in fish

Radiological Sciences Department

Radiological Engineering (Continued)
may become a control problem. More detailed analysis of river water would improve the reliability of this evaluation, and appropriate recommendations were made to initiate such work.

RADIOLOGICAL RECORDS AND STANDARDS SECTION

1. Radiation Monitoring

General Statistics

	January	February	Total 1954
Special Work Permits	512	557	1,069
Routine and Special Surveys	1,519	1,542	3,061
Air Samples	1,835	1,579	3,414
Skin Contamination	25	9	34

Extensive contamination of plant railroad equipment resulted in localized skin overexposure of two train crewmen. The sources of the contamination appeared to be both the Redox stack and drippings from the cask cars used to transport process metal from the 100 to the 200 areas. (Class II)

During removal of waste material from one of the cells at the radiometallurgy laboratory, contamination was spread to the surrounding floor and the air. Air samples and film studies of the air sample filters indicated that high concentrations of radioactive particles were present in the air for several hours during which the employees were not wearing respiratory protection. No personal contamination was observed and initial bioassay samples were below detection limits. (Class I)

An employee at the Cold Semi-Works building was sprayed with high temperature neutralized UNH solution during startup of a circulating pump. Skin contamination was removed immediately but initial bioassay samples indicated a significant internal deposition of uranium. (Class I)

A contaminated equipment warehouse was established in the Cold Storage building at White Bluffs at the request of the Atomic Energy Commission. The warehouse will be used to store large and expensive excess equipment which is contaminated beyond conventional release limits.

Radiological Sciences Department

2. Radiological Standards

One Class II, seven Class I, and twenty-four informal radiation incidents were reported. The Class II incident is summarized above. In addition to the two other incidents reported above, the Class I incidents included a fire at the 300 Area burial ground, a spill of 10 mc of Cs^{134} on the steps of the 3706 building, uncontrolled entry into the Redox craneway, an excessive batch size in the 231 building, and the exposure of an employee to leaking pile gas at the 105-F reactor.

During the month, 24 claims for reimbursement for contaminated personal effects were approved and amounted to $467.16. During all of 1953, the total claims approved amounted to $476.75.

3. Exposure Records

(a) Personnel Meters, and Records and Photometry

General Statistics

	January	February	1954 Total
Gamma pencils read	203,820	228,754	432,574
Potential overexposures	13	12	25
Confirmed overexposures	0	1	1
Slow neutron pencils read	798	728	1,526
Potential overexposures	0	1	1
Confirmed overexposures	0	0	0
Beta-gamma film badges processed	35,965	37,401	73,366
Potential overexposures	63	103	166
Confirmed overexposures	0	1	1
Fast neutron badges processed	386	291	677
Potential overexposures	0	0	0
Confirmed overexposures	0	0	0
Lost readings (all causes)	42	30	72

Radiological Sciences Department

3. Exposure Records (Continued)

(b) Bioassay

1. Plutonium Analyses	January	February	1954 Total
Samples assayed	667	737	1,404
Results above detection limit*	17	32	49
Resamples assayed	35	23	58
Results above detection limit*	12	7	19
Maximum d/m/sample	2.12	1.35	2.12

*Detection limit was 0.05 d/m.

2. Fission Product Analyses	January	February	1954 Total
Samples assayed	705	866	1,571
Results above 10 c/m/sample	2	6	8

The 6 results above 10 c/m were in connection with radiation incidents, and are under study.

3. Uranium Analyses

Results of 298 samples processed this month are tabulated below:

Sample Description	End of 4th-Day Exposure µg/liter Maximum	Average	Number Samples	End of 2 Days-No Exposure µg/liter Maximum	Average	Number Samples
Metal Preparation	22.9	3.2	68	35.0	3.9	54
Technical	75.0	17.9	21	35.2	13.6	11
Minor construction	3.2	1.6	6	-	-	-
UO_3 Plant	18.7	1.7	107	-	-	-
Radiation incidents	75.2	28.3	16	-	-	-
Random samples	3.3	1.3	8	-	-	-

4. Tritium Analyses

	Activity Density (µc/cc x 10^3) 0-5	5-10	10-35	35-70	>70	Total	1954 Total
Number of samples	213	9	3	0	0	225	558

Radiological Sciences Department

(c) Thyroid Checks

All thyroid checks reported were below the warning level.

(d) Hand Score Summary

There were 40,997 alpha and 57,362 beta scores reported. None of the alpha and about 0.005% of the beta scores were above the warning level. Decontamination of the reported high cases was attempted and successful.

4. Calibrations

Number of Routine Calibrations

	January	February	1954 Total
Fixed Instruments	41	91	132
Portable Instruments	3,113	2,952	6,065
Personnel Meters	16,723	15,211	31,934
Total	19,877	18,254	38,131

BIOPHYSICS SECTION

CONTROL UNIT

Regional Survey

The general findings are summarized in the following table:

SAMPLE TYPE AND LOCATIONS	Activity Type	Average Activity Density (μc/cc)
Drinking Water and Related Materials		
Benton City Water Co. Well	alpha	1.5×10^{-8}
Richland, N.Richland, Benton City Wells	alpha	$(< 0.5 \text{ to } 1.0) \times 10^{-8}$
100 Areas	beta	$(< 0.5 \text{ to } 6.5) \times 10^{-7}$
Pasco, Kennewick, McNary Dam	beta	$(< 0.5 \text{ to } 1.4) \times 10^{-7}$
Backwash Solids-Pasco Filter Plant	beta	9.9×10^{-2} μc/g
Backwash Liquids-Pasco Filter Plant	beta	3.8×10^{-7}
Sand Filter-Pasco Filter Plant	beta	1.7×10^{-5} μc/g
Anthracite Filter-Pasco Filter Plant	beta	no sample

Radiological Sciences Department

CONTROL UNIT (Continued)

SAMPLE TYPE AND LOCATIONS	Activity Type	Average Activity Density (uc/cc)
Other Waters and Related Materials		
300 Area Wells #1, 2, 3.	alpha	$(0.1 \text{ to } 1.1) \times 10^{-7}$
300 Area Well #4	alpha	7.4×10^{-8}
Well #4 measured as uranium	U	8.9×10^{-8}
Other wells on the reservation	beta	$(< 0.5 \text{ to } 5.4) \times 10^{-7}$
Columbia River-Hanford Ferry	beta	1.3×10^{-5}
Columbia River-Below reactors	beta	1.6×10^{-5}
Columbia River-Patterson to McNary	beta	$(1.3 \text{ to } 1.8) \times 10^{-7}$
Columbia River-Shore mud	beta	$(0.3 \text{ to } 1.4) \times 10^{-4}$
Raw water-Operating areas	beta	$(< 0.05 \text{ to } 2.1) \times 10^{-6}$
Reactor effluent retention basins	beta	$(3.1 \text{ to } 6.7) \times 10^{-3}$
Reactor effluent retention basins	alpha	$< 5 \times 10^{-9}$
I^{131} in farm wastes	I^{131}	4.7×10^{-7}
I^{131} in Columbia River-Hanford	I^{131}	2.2×10^{-7}
Atmospheric Pollution		
Gross alpha emitters	alpha	$(< 0.4 \text{ to } 2.8) \times 10^{-14}$
Gross dose rate-Separations areas	beta-gamma	0.7 to 18 mrad/day
Gross dose rate-Residential areas	beta-gamma	0.3 to 0.6 mrad/day
Filterable beta-Separations areas	beta	$(0.5 \text{ to } 1.9) \times 10^{-12}$
I^{131}-Separations areas	I^{131}	$(0.6 \text{ to } 7.1) \times 10^{-13}$
I^{131}-Separations stacks	I^{131}	0.26 curie/day
Active particles-Wash.,Ida.,Ore.,Mont.	-	<0.001 to 0.03 ptle/m^3
Active particles - HAPO	-	0.02 to 0.2 ptle/m^3
Tritium (as oxides)-Reactor stacks	T	1.2 curies/day
Vegetation		uc/g
Environs of Separations areas	I^{131}	2.2×10^{-5}
Residential areas	I^{131}	$(< 3 \text{ to } 6) \times 10^{-6}$
Eastern Wash. and Oregon	I^{131}	$< 3 \times 10^{-6}$
Non-volatile beta emitters-Wash.& Ore.	beta	$(0.3 \text{ to } 2.5) \times 10^{-4}$
Alpha emitters-Separations areas	alpha	2.9×10^{-6}
Alpha emitters-300 Area	alpha	3.7×10^{-7}

Ruthenium emission from the Redox facility averaged 0.67 curie/day during the month; maximum daily emission was 3.9 curies. Spot analyses of stack samples showed maximum daily emissions of 0.17 curie rare earths, 0.19 curie Zr, and 0.07 curie Sr. Ground contamination remaining from the high emission during early January ranged from 10 to 225 mrad/hr at locations within 1200 feet radius of the 202-S stack, and up to 10 mrad/hr

Regional Survey (Continued)

two miles distant. A survey northeast of the plant on February 25 showed 2500-3000 c/m south of Othello and several hundred c/m east of Ritzville.

Contamination spread by a fire in the 300 Area burial ground was confined to an area within 50 feet of the location; ground readings ranged from 10 to 300 mrad/hr, and airborne concentrations were 10^{-12} uc/cc for alpha and beta particle emitters.

Reactor effluent released to the river through a break in the 107-B basin on February 25 did not result in an increase in activity densities at downstream river locations. Ground surveys at the perimeter of the pond formed by the break ranged from several thousand c/m to 13 mrad/hr.

Analytical Control Laboratory

Routine and special analyses were carried out as follows:

Laboratory	Analyses Completed		
	January	February	1954 Total
Type Sample			
Vegetation	1247	1405	2652
Water	1714	2053	3767
Solids	189	188	377
Air samples	404	617	1021
Uranium (flucrophotometer)	521	641	1162
Oil fog (flucrophotometer)	-	-	-
Special survey samples (RMSS)	24	8	32
Special survey samples (RMU and RS)	14	48	62
Phillips Petroleum (tritium in water)	-	-	-
Total	4113	4960	9073

Radiological Sciences Department

Analytical Control Laboratory (Continued)

	Analyses Completed		
	January	February	1954 Total
Counting Room			
Beta measurements (recounts included)	5878	6826	12,704
Alpha measurements (recounts included)	2119	1951	4,070
Control points (alpha and beta)	2679	2761	5,440
Decay curve points	3199	4574	7,773
Absorption curve points	99	325	424
Gamma-ray Spectrometer Scans	-	41	41
Total	13974	16478	30,452

The gross beta particle activity density of the effluent water from 100-B, 100-D, 100-DR, and 100-F reactors was higher than during a comparative period in 1953 by factors of approximately 1.2, 1.2, 1.9, and 1.3; respectively. The major portion of these increases is a reflection of increased power levels at 100-B, 100-D, and 100-F, and the elimination of chlorine feed to the influent water cooling one-half of the 100-DR reactor.

Control Services

Statistical evaluations of reactor effluent water analytical data showed significant increases in the activity density of gross beta particle emitters admitted to the Columbia River at the 107-DR and 107-F areas during the month.

Calculations were completed for the determination of maximum air contamination at ground level resulting from various stack gas emission rates and meteorological conditions.

Studies were carried out for Biology on the effect of changes in water quality upon the mortality rate of Chinook salmon. Computations were completed for the Bioassay laboratory establishing current detection limits of the electrodeposition procedure in the plutonium analysis.

Synoptic Meteorology

Forecasts	Number made	February Percent reliability
Production	84	86.9
24-hour	56	87.9
Special	85	87.1

Radiological Sciences Department

Synoptic Meteorology (Continued)

The over-all monthly average temperature, 39.3°F, was 3.8° above normal. Precipitation totalled 0.28 inch most of which came first as snow and then as freezing rain on the 11th and 12th of the month.

RESEARCH AND DEVELOPMENT ACTIVITIES

Experimental Meteorology

Field testing continued on various components of the portable mast equipment in preparation for full-scale experiments.

Following a study of the meteorological aspects of the Biology experiment involving the controlled contamination of sheep pasturage with I^{131}, modifications of an orchard sprayer and fabrication of a canopy-type applicator were completed and tested.

Earth Sciences

Contamination of the ground water by non-radioactive calcium ions parallels the contamination by nitrate ions in the three locations of ground water contamination in the 200 Areas where appreciable amounts of these ions are present. While the significance of these findings is not completely evaluated, it would appear that calcium ions lead the sodium ions and the beta-gamma and alpha emitters in the ground water at these locations.

The adsorption of Pu from silica gel regeneration waste, as determined by equilibrium experiments, was greatest at pH 1-2 and least at pH 3.5-5, ranging from >99% to about 15% removal. Adsorption also decreased as the oxalate concentration increased beyond 0.03 M. Soil column studies confirmed the importance of the pH values, when 10 column volumes of 0.24 M oxalic acid containing Pu passed through a soil column with no detectable Pu in the effluent and a change to the high pH values resulted in detectable breakthrough in eight column volumes.

Calculations continued on the movement of ground water by the mechanism of saturated flow. The iteration process, using symmetric and quadratic difference equations in the weighting factors, gave rapid convergence, indicating the practicability of using such equations in these problems.

Industrial Hygiene

Determinations were made of the efficiency of collection of ruthenium by the automatic filter sampler. Scrubbers in the effluent line of the apparatus indicated that the efficiency ranged from 96.3% to 99.9%.

The automatic filter sampler was transferred to Radiation Monitoring, Separations Section, for their use at Redox.

As a part of the study of the origin and characteristics of spherical particulates, arrangements were made to have two molecular filter air sampling units operated near the site of the spring Pacific nuclear tests; samples will be forwarded regularly to HAPO.

Preliminary tests were made on 329 building laboratory hoods to evaluate performance characteristics related to air velocity control. Similar tests will be made on hoods with airfoils to determine the feasibility of reduced airflow.

Methods

Replicate tritium standardizations were made with the improved G.M. tubes; "end loss" corrections agreed well with Libby's calculated values for the tube lengths used. Several additional standardizations will be required to provide the statistical data necessary and will complete the development of this method for the absolute standardization of tritiated hydrogen.

The six electrolysis cells for the concentration of tritium in contemporary and underground water studies were received from fabrication. Three samples of contemporary water (ice) were taken from the 300 Area, from Richland, and from a selected sampling station at Snoqualmie Pass.

Further work on the carrier-free distillation procedure for $Ru^{103,106}$ improved the yield to $80 \pm 4.6\%$. Applied to the determination of the $Ru^{103}:Ru^{106}$ ratio in dissolver solution, the procedure yielded preliminary results (1:1.5) differing largely from the expected ratio (3-10:1). Comparisons will be made using the carrier and the carrier-free procedure to determine the cause of this difference.

Experimental work was completed on the thoron counting method for the determination of the Th in soil samples.

Radiological Sciences Department

Methods (Continued)

A stainless steel cell for holding the caustic scrubber solution containing the isotopes scrubbed from the Redox stack gas was designed and fabricated. Tests are being made of simultaneous beta and gamma counting on the solution to yield data applicable to monitor design.

A study was completed of the rate of dissolution of UO_3 in a sodium bicarbonate solution of concentration similar to that in pleural fluid. The initial rate obtained, 8×10^{-4} g U/hr, is much higher than the 2×10^{-6} g U/hr literature value for the rate of dissolution in blood serum which has a similar bicarbonate content.

Physics

Studies were completed on the response of anthracene scintillators to beta radiation as a function of their thickness. The very thinnest scintillators approximated the response of the external extrapolation chamber and therefore may be suitable for survey instruments.

By the use of lead filters with the X-ray source, effective energies up to 200 Kev were obtained for energy sensitivity studies of instruments and personnel monitors.

Previous results showed that a good geiger counter gave an occasional spurious pulse when operating on background. Further tests showed that at typical sample counting rates, the proportion of spurious pulses is very much lower. This puzzling phenomenon may throw some light on geiger counter behavior encountered in the counting rooms.

Instrument Development

A thin crystal scintillation counter was assembled to monitor the beta activity of filtered Redox stack particulates. Other work on Ru-I monitoring yielded an analog integrator with virtually no drift in 8 hours; extension of the drift-free period to 24 hours will permit using this integrator for the measurement of the curie output of Ru isotopes and I^{131} from the Redox stack. A stack gas filter utilizing a continuously moving tape was designed for the planned Ru-I monitor.

A preliminary model of a gamma-ray survey instrument for making environmental surveys from a moving automobile was completed and preliminary tests were conducted; by the use of a channel selected from various alternates, I^{131}, $Ru^{103-106}$, or total gamma radiation may be measured and recorded.

BIOLOGY SECTION

AQUATIC BIOLOGY

Biological Chains

No result.

Absorption of Tritium by Aquatic Organisms

Techniques and equipment were developed for exposing small fish to tritium oxide. A pilot test to determine the order of magnitude and rapidity of absorption of tritium oxide by salmon fry was initiated.

Ecology

Survey of the Columbia River

The flow of the Columbia River was minimal for the year, and an appreciable increase in activity density of plankton resulted. Water temperature was also low for the year, and activity densities of other river organisms, which primarily depend on metabolism for incorporation of active material, declined further. Values were similar to those recorded one year ago. Average activity densities of organisms at Hanford were: plankton, 3×10^{-3} μc/g; bottom algae, 10^{-3} μc/g; caddis larvae, 3×10^{-3} μc/g; and small fish, 4×10^{-4} μc/g.

Midge fly larvae from the bottom of McNary Reservoir averaged 9×10^{-5} μc/g. Maximum activity of large fish was 2.5×10^{-3} μc/g of whitefish scales from Ringold, and 7×10^{-5} μc/g of whitefish flesh from below the 100-F Area; appreciable reductions from January. Sport fishing was poor at Priest Rapids; whitefish from this area had insignificant activity densities. Juvenile chinook salmon are beginning to appear near shore, indicating at least some success of natural spawning.

Effluent Monitoring

Results from subjecting chinook salmon fry to various concentrations of reactor area effluent were similar to those reported last month. Virtually all of the fish in 10% effluent have died, and appreciable mortality has occurred at the 5% level. A very slight, but statistically

Effluent Monitoring (Continued)

significant, increase in mortality occurred even in the weakest concentration (1%) tested, perhaps due to abnormally high river water temperatures during early egg incubation. Chemical toxicity of reactor effluent was evidenced by substantial mortality at 25% strength and slight retardation of growth at the 3% level.

No adverse effect has been observed yet in young of local salmon subjected to temperatures (1X) anticipated in the Columbia River when scheduled reactor capacity is in production. A mortality of 78% has occurred at the 2X level, however.

BIOLOGY CONTROL UNIT

Biological Monitoring

Specimens from waterfowl with varying degrees of exposure to contamination in the vicinity of 200-West Area revealed tissue activity densities up to 6×10^{-3} μc/g kidney.

On February 3, contamination (ruthenium) in the vicinity of the Separations areas produced a maximum rodent kidney activity density of 3×10^{-3} μc/g. After the middle of February, this value declined to 1×10^{-3} μc/g.

Rodent thyroid activity densities decreased from a maximum of 1.4×10^{-2} μc/g in January to a maximum of 5×10^{-3} μc/g in February.

Fission product contamination in animal feces ranged from 0.05 μc/g near 200-West Area to 1×10^{-6} μc/g over the rest of the reservation.

Clinical Laboratory

Routine services continued at the normal levels.

METABOLISM

Plutonium Absorption and Metabolism

A paper electrophoresis apparatus was placed in operation and preliminary experiments performed to determine the optimum procedures for fractionation of blood proteins.

Radiological Sciences Department

Tritium Absorption and Metabolism

Analytical data obtained from animals sacrificed after chronic exposure to tritium oxide are now sufficient to permit preliminary conclusions as to the relative abundance of tritium binding components of different biological half-lives. For the whole animal, about 50% of the organically-bound tritium is retained with a half-life of about 100 days. In specific tissues as much as 75% of the tritium is retained with such long half-lives. This is fairly direct evidence that the majority of the constituents of most of the tissues are not involved in a dynamic state, but are relatively inert. This finding is at variance with commonly held concepts, and, if supported by additional data to be obtained, will occasion considerable revision of fundamental thinking in the field of metabolic turnover rates.

PLANT NUTRITION AND MICROBIOLOGY

Absorption and Translocation of Radioelements in Plants

Toxicity of chromic ion to aerial portions of plants was shown to occur at concentrations above 1.0 μg/ml, but damage to roots was evident at concentrations down to 0.1 μg/ml.

RBE by Microbiological Methods

The autoturbidimeter, after resolution of the initial difficulties in its operation, is proving extremely useful. The last experiment completed indicates an RBE of from 1.8 to 2 for tritium, as compared with P^{32}.

EXPERIMENTAL ANIMAL FARM

Toxicology of I^{131}

The ratios of I^{131} in the thyroid gland to I^{131} fed daily in February appeared to have dropped somewhat as compared to recent months values in all groups of sheep.

PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS

Radioactive Particles, Metabolism, and Toxicology

Tests in tumor-sensitive mice indicated that non-radioactive particles

Radiological Sciences Department

Radioactive Particles, Metabolism, and Toxicology (Cont'd)

($BaSO_4$) introduced into the lungs did not cause pulmonary tumors during a 100-day exposure period. In another group of mice similarly exposed to 2.5 µg of PuO_2/mouse, a significant increase in lung abnormalities appeared. However, these appeared to be sterile necroses.

Plutonium Toxicity and Therapeutics

Preliminary results confirmed expectations in that: (a) I.V. administration of PuO_2 (colloidal) was poorly excreted via the kidney of the dog; and (b) otherwise therapeutic doses of zirconium citrate did not enhance the excretion of administered PuO_2.

FINANCIAL DEPARTMENT MONTHLY REPORT
FEBRUARY, 1954

Preparation of the budget for the fiscal year 1956 and revision of the 1955 budget is behind schedule due to delays in receipt of budget assumptions from the Atomic Energy Commission which also prevented completion of approved personnel estimates. However, every effort is being made to complete the budgets on the scheduled dates.

In addition, in February, the Washington, D. C. Office of the Commission advised that the fiscal year 1955 Plant and Equipment Budget had been amended substantially to provide funds for the impending 3X Program. Discussions were held with representatives of the Design Section to consider the effect of this increase in relation to the budget presently in progress for fiscal year 1956.

A revised financial plan for fiscal year 1954 for Research and Development was received which reduced the funds available by $792,000. A letter has been submitted requesting restoration of $434,000 which would permit, if approved, the Engineering Department to proceed with certain programs scheduled during the balance of this fiscal year. Despite the reduction, there remains a rate of expenditures of $755,000 per month for the balance of the period compared with $684,000 per month for the first seven months of the period. No changes in the operating budget are planned to incorporate this revision; however, analyses letters and other data which reflect control points and trends will make comparisons with the revised funds.

The budget for Special Controlled Materials (Zirconium, Beryllium, Hafnium, etc.) together with narrative justification was submitted to the AEC on February 25, 1954. Submission of this budget at this early date was considered necessary to insure adequate allocation of these critical materials to Hanford Atomic Products Operation.

With the cooperation of AEC budget personnel, a consolidated status report was completed listing funds allocated to Hanford Atomic Products Operation for Equipment Not Included in Construction Projects.

An analysis of funds required to finance graphite procurement for 100-K Reactors was started during the month since preliminary computations indicated present funds would be inadequate. The analysis will give consideration to the effect of cancellation costs in connection with reductions of Speer Carbon and National Carbon Company contracts and increased gross tons required for each reactor due to percentage of scrap graphite being considerably higher than anticipated. This analysis will be presented next month to the Manager - Engineering Administration. Fabrication costs of graphite are within the established estimates.

The report on cost reductions which included savings in SF materials conversion and depreciation costs, waste tank storage, and additional piles not built because of continued and higher productivity output was completed by representatives of Technical and Accounting Sections and issued in Top Secret Rough Draft. This report was prepared for the Engineering Department for use in a statement concerning evaluation of Research and Development from 1947 through 1953. Draft has not yet received final review by Engineering and Financial Departments.

Considerable work has been done in comparing costs of our municipal services on a per capita basis with latest budgets of other Washington cities having a population from 7,000 to 40,000. Results will be incorporated in the budget when submitted.

A Work Authorization list which consisted of 40 pages and included approximately 750 individuals was completed and distributed. This list was detailed to the dollar limitation of each individual in respect to new work, maintenance work and routine work in regard to inter and intra departmental Work Authorizations.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

SUMMARY OF CASH DISBURSEMENTS, RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of $8,600,000 and $6,250,000, respectively, by the Atomic Energy Commission) for the months of February, 1954, and January, 1954, is shown below:

Disbursements	February	January
Payrolls (net)	$2 716 589	$2 674 023
Payments to Subcontractors	2 035 387	2 235 473
Pension Plan - Employer's Portion	1 829 049	-0-
Materials and Freight	1 362 102	1 507 104
Payroll Taxes	708 738	628 834
United States Savings Bonds	183 000	207 923
Group Insurance Premium	131 509	131 400
Pension Plan - Employees' Portion	100 701	119 960
All Other	141 129	181 544
Total	9 208 204	7 686 261
Receipts		
Rent	142 938	131 576
Electricity	100 117	69 258
Hospital	69 010	59 497
Telephone	59 868	42 730
Sundry Accounts Receivable	20 945	24 817
Sales to AEC Cost-type Contractors	8 491	10 550
Bus Fares	7 841	8 013
Refunds from Vendors	991	2 075
Other	5 040	4 771
Total	415 241	353 287
Net Disbursements	$8 792 963	$7 332 974

Outstanding advances as of February 28, 1954, and January 31, 1954, were as follows:

	February	January
Cash in Bank - Contract Accounts	$3 304 583	$3 497 546
Cash in Bank - Salary Accounts	50 000	50 000
Travel Advance Funds	125 000	125 000
Total	$3 479 583	$3 672 546

GENERAL ACCOUNTING UNIT
MONTHLY REPORT - FEBRUARY 1954

ACCOUNTS PAYABLE

Disbursements by Accounts Payable during February, 1954, amounting to $6,308,615, were considerably higher than normal due to payments to National Carbon Company in the amount of $1,608,445 and to the Pension Trust amounting to $1,829,049.

Invoices have been received from the National Carbon Company covering shipments of graphite under Special Agreements No. G-5, G-12, and G-23, in the amount of $3,815,081.10, $3,375,394.80 and $998,020.14 respectively. Deliveries of graphite under Special Agreement No. G-5 and G-23 were completed during January 1954, and completion of deliveries under G-12 is contemplated during the first week of March. Although payments have been made for complete deliveries under Special Agreement No. G-5 and G-23, settlements involving backcharges to National Carbon Company for scrap and redetermination of prices have not been resolved.

Active contracts handled by Accounts Payable, excluding requirements contracts, numbered 17, and open contract commitments at the end of February amounted to $2,404,291. Payments on these contracts in February totaled $1,719,992. Disbursements relative to requirements contracts for the month amounted to $432,779.

Commitment records maintained on 27 construction projects indicated an open balance at the end of February of $4,028,946.

Necessary arrangements were completed in February for the issuance of a quarterly report to the Atomic Energy Commission relative to completed purchase orders and contracts where the amount of the order or contract is $25,000 or over.

Other Accounts Payable statistics are listed below:

	February	January
Vouchers Booked But Not Paid - Beginning of Month	$ 425 927	$ 629 824
Vouchers Entered During Month	6 491 839	4 598 342
Vouchers Paid During Month	6 308 615 Dr.	4 804 314 Dr.
Cash Receipts	991	2 075
Vouchers Booked But Not Paid - End of Month	$ 610 142	$ 425 927
Number of Vouchers Entered	3 376	3 411
Number of Checks Issued	1 904	1 994
Number of Freight Bills Paid	1 191	1 360
Amount of Freight Bills Paid	$ 278 865	$ 359 629
Number of Purchase Orders Received	1 700	1 971
Amount of Purchase Orders Received	$ 1 842 659	$ 1 731 378

ACCOUNTS RECEIVABLE

During February, approval of our request was received from the Atomic Energy Commission to write-off accounts under $5.00 in cases where the debtor has left this immediate area and where, in our opinion, adequate collection effort had been made. This will eliminate considerable clerical work including the necessity of submitting such accounts to the Atomic Energy Commission on assignment forms and the preparation of write-off schedules.

Procedure development continued in connection with conversion of electricity billings from IBM to Burroughs application. At the end of February the procedure was substantially completed, and rate schedules, controls and other related forms had been drafted. The delivery date on the machine is March 15, 1954, and it is anticipated initial billings will be made on April 1, 1954.

Other data reflecting the activity of the accounts handled by the Accounts Receivable group may be summarized as follows:

Accounts Receivable (End of Month Balance)	February	January
Hospital	$133 890	$132 199
Sundry	33 638	43 030
Rent	31 882	43 583
Electricity	30 451	48 168
Telephones	27 054	33 958
Equipment Sales to Facilities	26 873	27 571
Cost-Type Contractors	14 838	17 887
Safety Shoes	1 516	847
Loans to Employees	754	466
Sub-Total	300 896	347 709
Reserve for Bad Debts	25 369 Cr	24 509 Cr
General Ledger Balance	$275 527	$323 200
Hospital		
Number Out-Patient Invoices Issued	1 960	1 757
Charges During the Month	$ 75 022	$ 75 193
Collections - Cash	69 010	59 497
- Payroll Deductions	4 911	4 273
Cost-Type Contractors		
Number of Invoices Issued	24	33
Amount of Invoices Issued	$ 5 441	$ 10 397
Cash Received	8 491	10 550
Rent		
Houses		
Number of Houses Occupied	6 034	6 031
New Leases and Lease Modifications	77	83
Lease Cancellations	50	62
Charges During the Month	$307 291	$307 278
Collections - Cash	54 016	48 518
- Payroll Deductions	256 445	256 734

ACCOUNTS RECEIVABLE (Continued)

	February	January
Rent		
Dormitories		
Number of Rooms Occupied	784	799
New Assignments	102	53
Removals	117	59
Charges During the Month	$ 17 934	$ 18 248
Collections - Cash	5 658	5 236
- Payroll Deductions	12 647	12 974
Facilities		
Number of Facility Leases	164	162
Revenue	$ 83 264	$ 77 822
Sundry		
Number of Invoices Issued	243	246
Amount of Invoices Issued	$ 11 608	$ 32 168
Cash Received	20 945	24 817
Telephones		
Working Telephones (Excludes Official Telephones)	6 188	6 193
Telephone Work Orders Processed	306	396
Charges During the Month	$ 53 513	$ 50 535
Cash Received	59 868	42 730
Electricity		
Number of Bills Issued	7 273	7 274
Amount of Bills Issued	$ 81 702	$ 86 717
Cash Received	100 117	69 258

	Number	Amount
Uncollectible Accounts (Total to Date)		
Accounts Forwarded to Collection Agencies	596	$ 50 141
Accounts Returned as Uncollectible	264	29 128
Collections	204-1)	8 106-2)
Balance at Collection Agencies February 28, 1954	160	$ 12 907

(1- Includes 172 accounts collected in full and 32 accounts partially collected.

(2- Represents total collections, half of which is remitted to General Electric.

GENERAL ACCOUNTS

Unexpended advances from the Atomic Energy Commission totaled $3,479,583 at February 28, 1954 and consisted of $3,304,583 in contract bank accounts, $50,000 in salary accounts, and $125,000 in travel advance funds.

January financial statements for the Hanford Atomic Products Operation and the Atomic Products Division were issued on February 10th and 16th respectively. Trial Balance for the month of January was issued on February 5 as compared to the issue date of February 10 for January of 1953.

Work is under way to establish a central control for the accumulation of cost in connection with Special Requests and Back Charges. It is anticipated that this work will be completed sometime during March.

Activity in the Cashier's Office was unusually heavy this month. Approximately 17,000 remittances were handled as compared with 12,000 in January.

The revised system for billing and distribution of travel costs as explained in the January report was put into effect this month. In connection with this system, a new report was developed and will be issued monthly beginning with February. This report will provide Management with more detailed information, and will satisfy the requirement of the Commission for a detailed report of travel and living expense.

Additional information concerning travel and living expenses of employees is given below:

	February	January
Cash Advance Account		
Cash Advances - Beginning of Month	$ 75 936	$ 67 849
Advances During the Month	59 418	67 938
Expense Accounts Submitted	47 397 Cr	50 449 Cr
Cash Refunded	8 045 Cr	9 402 Cr
Cash Advances - End of Month	$ 79 912	$ 75 936
Outstanding Cash Advances		
Current	$ 70 968	$ 73 204
Over 30 Days	8 944	2 732
Total	$ 79 912	$ 75 936
Travel and Living Expenses		
Actual Expenses	$ 46 724	$ 50 293
Billed to Government	44 586	47 933
Balance in Variation Account at End of Month	4 498 Dr	2 360 Dr

INVENTORY ACCOUNTING

Review of accounting procedures, policies and internal controls relating to plant inventories continued during the first week of the month with a representative from the Washington, D. C. Controller's staff.

Preparatory work was started in formulating detailed instructions and routines with respect to the physical inventory to be taken in March of coal in the custody of the Manufacturing and Plant Auxiliary Operations Departments.

Report covering the physical inventory of fuel and lubricants in custody of the Transportation Section was completed and will be distributed in March.

PLANT ACCOUNTS

Distribution of temporary control cards to property control units was completed this month and 74 of the 85 control units are now operating in accordance with procedures outlined in OPG 04.6 - Plant and Equipment Accountability and Control. More than 9,000 individual cards have been distributed to these units and the procedures governing their purpose and use have been explained.

The demineralization equipment located in the 186-D Building was sold by the Commission during the month. The value of this equipment ($4,876,166) was retired from Plant and Equipment Not Used and Not Currently Useful in accordance with normal procedures.

Reconciliation of field inventories for all uninstalled plant and equipment is 70 per cent completed. A reconciliation was also completed of inventories of office machines and was forwarded to the Office Services Unit in order that they may adjust existing IBM records. This is the final reconciliation to be made of this account prior to discontinuance of detailed records by Plant Accounts.

Approximately 55 projects were reviewed and classified. Unitization of the following projects was completed during the month:

CA -362	Waste Metal Recovery Facilities (TBP)	$51 420 228
CG -486	Improvement of Existing Streets - FY 1952	113 623
CG -447	Portable Meteorological Mask	56 087
AEC-148	Heating System Alteration in Commerical Bus Depot - Richland	5 572

GENERAL COST UNIT
MONTHLY REPORT - FEBRUARY, 1954

Consolidated Costs and Budgets

In answer to a request by the Manager - Payroll and Auditing, the projected work force levels as of June 30, for each of the years 1951, 1952, 1953, and 1954, as included in each related budget preparation, were compared with the actual number on the roll at that date (except 1954) by departments. Explanatory comments with respect to reasons for the timing of additions or reductions are being prepared for the June 30, 1953 date where organization and responsibility are comparable.

IBM Liaison

A special summary, reflecting past performance relating to charges to and from each of the Cost Units, is being prepared which will compare the desired time of receipt of various charges and the actual time distributed. This information will serve as an aid in preparing future closing schedules and will reflect the desired priority of receipt of the charges.

At the suggestion of the AEC, the report of Motorized Equipment assigned to Minor Construction and the Transportation Section will be combined with IBM cards supplied by Kaiser Engineers for equipment assigned to Major Construction Contractors and changed from a monthly to a quarterly report. Formerly, in preparing this report, the Computing Unit was key punching cards for equipment assigned to Major Construction Contractors from an IBM listing as supplied by Kaiser.

Effective in March, work orders for the Mechanical Development Shops will be processed by IBM.

A detailed IBM work order procedure is being provided to representatives of the Internal Audit Unit for their consideration which, if adopted, should reduce the number of reports and the cost of processing work orders.

Plant Auxiliary Operations

An employees' information meeting was held with personnel in the Unit. Past activities and accomplishments were reviewed with special emphasis being placed on the fact that we are now preparing, in less time, more informative and factual cost data than ever before. Future plans and pending changes were discussed with the group.

A procedure has been developed to become effective in March for charging overtime premium pay as additional IME to a work order when overtime is requested by the customer unit.

Plant Auxiliary Operations Cont.

Costs incurred by the Plant Railroad are now being distributed by IBM, representing another step in the plan to utilize computing services wherever practical and economical. Monthly financial statements on costs of maintaining plant roads and railroad trackage were issued for the first time.

Community Operations and Real Estate

Last July, the reporting of costs for maintenance work, sewage, water and waste removal on commercial facilities located in Government owned buildings was changed from an individual facility basis to a total basis. The AEC has requested actual costs for each facility for use in their semi-annual audit report. This information has been submitted to the AEC and cost records have been changed which will permit the reporting of this data currently.

Medical

Salary suffix changes were assigned in connection with the transfer of the Safety and Fire Prevention Unit to the Health and Safety Section to be effective March 1. In addition, cost codes were established in order that the proper segregation of charges can be made. Consideration was given to the type of report which will be issued starting with the month of March.

Staff

The cost reports for the month of January were issued to management on February 5. This is the earliest date these reports have ever been completed.

A survey of radiation detection instruments made at the request of the Atomic Energy Commission was completed.

MANUFACTURING COST UNIT
MONTHLY REPORT - FEBRUARY, 1954

A study was completed on unit costs of plutonium at various pile exposure levels. This study included SF Material, conversion and depreciation costs.

A comparison of Work in Process Inventory at July 1, 1953 and December 31, 1953 was completed. Price and quantity changes were determined and analyzed and results of this comparison were issued in Document HW-30826.

Three comparisons of Manufacturing Costs and production quantities were made in February and submitted to the Manager - Manufacturing. These were:

1. Standard costs, actual costs and variances for the month of February and Fiscal Year to Date.

2. January actual compared with forecast prepared in November.

3. February six months forecast compared with January six months forecast.

A detailed listing of "Spare Equipment Held in Storage" for the Manufacturing Department was prepared for each section and will be issued to the Section Managers early in March.

Average unit costs for water and steam in Reactor Power were calculated for the first seven months of FY 1954 to be used in liquidating power costs in February. A further analysis is being made to arrive at standard rates with the hope of using these standards to liquidate March costs.

At the request of the Accountability Section, estimates were prepared of the cost of receiving and handling of enriched fuel slugs.

Progress has been made for the establishment of cost standards for the 300 Area P-10 Program.

An improved method of reporting Reactor Section standard and actual costs was adopted. The new reports will save typing time and will provide a more concise and informative report.

ENGINEERING COST UNIT
MONTHLY REPORT - FEBRUARY, 1954

Information has been received from the Atomic Energy Commission on the FY 1955, 2000 Program, Research and Development Budget submitted to Congress. Funds amounting to $9,183,000 (includes General Overhead of $663,000 and Radiological Engineering of $96,000) have been requested. Funds for FY 1955 include $700,000 for P-10 Development and require five program statements covering Metallurgy, Reactor, Separations, Chemical Processing and Reduction (Tasks I, II and III, 234-5) and P-10. The revised budget for FY 1955 is being prepared using these programs as bases and cost accounts will be established effective July 1, 1954 to reflect actual costs experience on these programs. No information has been received concerning the 3000 Program (Tasks IV to VII incl., 234-5) for FY 1955 from the Atomic Energy Commission. The Budget for FY 1956 and Revision of Budget for FY 1955 is proceeding on the assumption that there will be no change in the 3000 Program which was originally submitted to the Atomic Energy Commission in the amount of $337,000 (includes General Overhead). Present budget assumptions for Engineering Department Research and Development do not include provision for prototype and test facilities as was originally planned. It is believed by the Engineering Department that increased costs resulting from the P-10 Program plus reductions made in over-all Research and Development funds by the Washington, D. C., Office of the Atomic Energy Commission will not permit the financing of prototype and test facilities from the funds available for Research and Development, but will require financing this function from Plant and Equipment funds as has been done in the past.

The standard rate for Minor Construction Management Unit Indirect Expense continued to be less than actual costs incurred; however, there was some improvement during February. Discussions were held with the Manager - Project Section and the Manager - Minor Projects and, based on their force forecasts, it is believed that beginning in April the standard rate will liquidate actual costs. Work in connection with the 3X Program and Pile Modifications will require a direct work force which should adequately support the attendant overhead.

Meetings were held during the month with representatives of the Atomic Energy Commission Finance Division relating to their request to make adjustments of the plant accounts retroactive to June 30, 1953. These adjustments result from action taken by the Atomic Energy Commission, Washington, D. C., and consist of transferring from Construction Work in Progress to Plant and Equipment In Service certain projects which were determined to be physically completed on June 30, 1953. Adjustment to the depreciation reserves as of this period will also be

required. Entries reflecting these adjustments were drafted and reviewed with the Atomic Energy Commission and will be made effective with March business.

Operating statements and cost reports for January were issued between February 5 and February 9, 1954. Analyses letters were completed by February 15.

Financial Closing Statements were issued during the month covering the following projects:

CA-257	Biophysics Laboratory
CA-381	Radiochemistry Building, HW Laboratory Area
CA-385	Radiometallurgy Building, HW Laboratory Area
CA-394	Plot Plan and Utilities, HW Laboratory Area
CA-406	Mechanical Development Building, HW Laboratory Area
CA-414	Pile Technology Building, HW Laboratory Area
CA-421	Library and Files Building, HW Laboratory Area
CA-525	Permanent Auxiliary Combined Civil Defense and Plant Disaster Control Center

APPROPRIATIONS SECTION
MONTHLY REPORT - FEBRUARY, 1954

Project proposals, informal requests and appropriation requests which were processed by the Appropriations and Budget Committee and directives issued by the Commission during the month of February are shown in the following list:

CA-362 - Waste Metal Recovery Facilities (TBP)

Physical Completion Notice was issued by the AEC January 28, 1954.

CG-496 - Recuplex Installation - Building 234-5

Propcsal requesting minor scope revisions and additions and an increase in funds to $1,482,000 was approved by the A & B Committee January 22, 1954, and AEC February 19.

CA-512 - 1952 Hanford Expansion - 100-K Area Facilities - 1706-KE Recirculation Facilities

Proposal forwarded to AEC January 26, 1954, requesting inclusion of 1706-KE recirculation facilities in the next revised proposal to be issued by AEC was recalled February 18.

CA-513 - Expansion of 200 Area Facilities

Hot Semi-Works Conversion

Proposal requesting authorization to initiate design and procurement of stainless steel pipe for the Hot Semi-Works Conversion was approved by the Committee January 26, and AEC February 15. Facilities consist of a prototype tank to investigate self-concentration problems of Purex wastes and a pipe line to existing tank farm system to supply additional storage facilities for Hot Semi-Works wastes.

First Aid Facilities

Establishment of basic area First Aid System by W. K. MacCready on January 26 resulted in withdrawal of Revision to Project Proposal CA-513 requesting AEC to incorporate a first aid facility in the Purex Area.

CA-514-Rev. 2 - Expansion 300 Area Production Facilities

Revised proposal requesting funds in the amount of $5,085,000 ($4,135,000 for GE) was approved by the Committee February 8 and forwarded to the Commission.

CG-535 - Redox Capacity Increase, Phase II

Letter dated February 18, R. H. Beaton to J. I. Thomas, stated that a change in the construction schedule for portions of this project is necessitated by an unforeseen condition of heavy ground contamination in the Redox exclusion area and stated further that the present completion date of October 1, 1954, (exclusive of silica gel) cannot be met.

CA-539 - Additional Waste Storage Facilities for Redox

The concentration of short-lived active fission products in Redox wastes has risen because of increased production rates and the violence of boiling of the stored wastes has increased to a marked degree, resulting in condensate and vapor being blown through the condensers in the Redox tank farm.

In anticipation of similar problems arising in the SX tank farm which is now under construction, GE recommended that design of a vapor manifold system be initiated which would route vapors from tanks 101 - 105, inclusive, into tank 106 and from tank 106 to a condenser bank, using six of the water cooled condensers (now on order) shielded by concrete sufficient to reduce the radiation level to accepted standards.

It was further recommended to the Commission that negotiations with the lump sum contractor for the new SX farm be initiated at once reducing the original bid and suspending work until new design is sufficiently complete to renegotiate a modified contract for the new work.

The recommendations were approved by the A & B Committee February 3 and by the Commission February 8.

CA-555 - New 3741 Graphite Hot Shop & Storage Building

Letter W. E. Johnson to D. F. Shaw dated February 1, 1954, requested action on this project proposal which has been delayed for an extended period of time.

CG-570 - Replace Raw Water Line - #5 Well to Lee Boulevard

The project proposal requesting $110,000 for the subject work was approved by the A & B Committee January 22, 1954, and forwarded to the Commission January 26. Directive dated February 24 authorized this work.

Hanford 3X Program

Letter from D. F. Shaw to W. E. Johnson dated February 24, 1954, established a single budget item for the 3X Program with a total estimated cost of $96,000,000.

CG-574 - Hanford 3X Program - P-10 Irradiation

Project proposal requesting $600,000 to modify certain existing reactors and to provide additional equipment and facilities for storage, handling and transportation of slugs was approved by the Committee February 9, and forwarded to the Commission.

CG-575 - Hanford 3X Program - P-10 Extraction

Project proposal requesting $200,000 for design only of extraction and isotope enrichment facilities was approved by the A & B Committee February 2 and by the AEC February 10.

CG-576 - General Improvements to Laboratory Building

Proposal requesting $60,000 was approved by the A & B Committee January 22, 1954. Directive authorizing this expenditure was issued February 19.

CG-577 - Improvements to Existing Streets - George Washington Way - FY 1954

Project proposal requesting $65,000 for the subject work was approved by the A & B Committee January 25, 1954, and forwarded to the AEC. Directive dated February 19 authorized AEC $65,000. Work Authority has not been received to date.

CG-578 - Effluent Water Monitoring Improvements - Existing 100 Areas

Project proposal requesting $670,000 for this work was approved by the Committee February 11, 1954, and forwarded to the Commission. AEC has decided to go to Washington for approval of the "C" portion of this work because the construction data sheet did not specifically mention the gamma monitoring system at the "C" pile. Cost estimates are being prepared separating "C" from the rest of the scope.

INFORMAL REQUESTS

IR-171 - Installation of Automatic Bar Screens at Sewage Lift Station

Informal approval requesting $16,000 was approved by the Committee January 25, 1954, and by the AEC February 19.

Appropriation Requests approved were as follows:

Replacement of 3 1/2 Ton Gasoline Fork Lift Truck with 4 Ton Electric Fork Lift Truck	$14,700
High-Pressure, High Temperature Autoclaves	6,950
Others	10,070

PAYROLL UNIT
MONTHLY REPORT
FEBRUARY, 1954

A payment of $1,829,049 was made during February to General Electric Pension Trust, representing the 1953 future service pension cost of the Company with respect to Hanford Atomic Products Operation employees.

Copies of Withholding Statements, Form W-2, covering earnings and tax deductions for 1953 were forwarded to Accounting Services Division in Schenectady for filing with the Director of Internal Revenue.

A program for more effective use of office equipment in Payroll was inaugurated in February. As a result, 25 office machines and one typewriter stand charged to Payroll were returned to the Office Unit-Office Equipment. Included were 11 calculators, 11 adding machines, and 3 typewriters.

Identification wallet cards for participants in the General Electric Insurance Plan indicating current benefits under the Plan, were prepared. These cards will be distributed to employees in March.

In accordance with our established program for regular employee communications meetings, round-table discussions were held by supervisors with all non-exempt Payroll employees during February.

At the request of Employee and Public Relations Department, brochures covering the results of the recent Employee Attitude Survey were distributed by Payroll to all employees on February 12.

Reimbursement Authorizations were received from the AEC in February, covering the following items:

Revision of Wage Rate rules for Technical and Business Graduates
Patent Bonus Payments
A non-exempt classification, Service Manual Writer
Non-exempt classifications: deletion of Reproduction Assistant D, grade 4; revised classifications of Reproduction Assistants, Litho Assistant, Litho Copyist, and Litho Copy Maker; and addition of the classification of Offset Operator. This is a revision of Reimbursement Authorization 63.

Revisions of the following OPG's were prepared in February and forwarded to Administrative Practices Planning:

OPG 13.7 - Company Benefits for Employees Entering the Armed Forces
OPG 18.5 - Holidays
OPG 18.7 - Overtime
OPG 18.8 - Monthly Attendance Report
OPG 13.10 - G. E. Employees Savings & Stock Bonus Plan

Two schedules were prepared in February and were forwarded to the Manager, Employee and Public Relations Department, summarizing information shown by employees on Withholding Exemption Certificates (U. S. Treasury Department Form W-4). One schedule indicates the number of married and single employees by departments, segregated by the number of male and female employees. The other schedule indicates the number of employees by place of residence, segregated by departments.

The audit by the Finance Division of HOO-AEC of personnel administration and payroll policies and practices continued during February.

Payroll Unit (continued)

STATISTICS

NUMBER OF EMPLOYEES Changes During Month	Total	Monthly Payroll	Weekly Payroll
Employees on Payroll at beginning of month	8 540	2 285	6 255
Additions and transfers in	83	9	74
Removals and transfers out	(52)	(3)	(49)
Transfers from weekly to monthly payroll		16	(16)
Transfers from monthly to weekly payroll		(3)	3
Employees on payroll at end of month	8 571	2 304	6 267

OVERTIME PAYMENTS DURING MONTH	February		January	
	Number	Amount	Number	Amount
Weekly Paid Employees -a)	6 610	$118 824	4 874	$71 082
Monthly Paid Employees	369	30 913	263	16 750
Total	6 979	$149 737	5 137	$87 832

NUMBER OF CHANGES IN SALARY RATES AND JOB CLASSIFICATIONS	February	January
Temporary changes	41	58
Retroactive changes	76	6
Normal changes	432	730
Total	549	794

OSS PAYROLL PAID DURING MONTH -a)	February	January
Engineering	$ 786 581	$ 764 814
Manufacturing	1 636 543	1 598 144
Plant Auxiliary Operations	831 556	830 510
Community Operations & Real Estate	177 121	179 174
Other	498 615	496 547
Total	$3 930 416	$3 869 189

EMPLOYEE BENEFIT PLANS Participation in Benefit Plans at Month End	Number Participating		Percent Participation	
	Feb.	Jan.	Feb.	Jan.
Pension Plan	7 874	7 846	97.4%	97.3%
Insurance Plan				
Personal Coverage	8 483	8 450	99.0	99.0
Dependent Coverage	5 885	5 838	-	-
U. S. Savings Bonds				
Stock Bonus Plan	4 087	4 060	47.7	47.5
Savings Plan	1 087	1 070	12.7	12.5
Both Plans	4 684	4 651	54.6	54.5

(a- Payments to weekly paid employees are for four week periods.

Payroll Unit (continued)

PLOYEE BENEFIT PLANS (continued)

	February	January
Pension Plan		
Number Retired	2	2
Number who became eligible for participation	43	34
Number who applied for participation	41	33
Number who elected not to participate	1	-
Replies not received	1	1
Insurance Plan - Claim Payments		
Employee Life Insurance	1	2
Employee Accident & Health Insurance	465	472
Dependent Accident & Health Insurance	446	383
Total	912	857
GOOD NEIGHBOR FUND		
Number Participating	5 772	5 703
Percent of Participation	67.3%	66.8%
SUGGESTION AWARDS		
Number of awards	1	39
Total amount of awards	$275	$1 660
'EFERENTIAL RATES		
Number (Eliminated) or added	(29)	12
Number Currently in Effect	643	672
NUMBER OF MILITARY ALLOWANCE PAYMENTS		
Number	5	-
NUMBER OF PAYROLL DEDUCTIONS - OTHER THAN TAXES		
Barracks Rent	17	19
Dormitory Rent	543	571
Good Neighbor Fund	9 452	9 338
Hospital	535	447
House Rent	5 126	5 133
Insurance	8 456	8 351
Pension -a)	24 200	24 100
Safety Shoes	347	551
Savings Bonds	14 334	14 028
Trailer Space	156	156
Union Dues	1 759	1 718
Other	170	170
Total	65 095	64 582

(a- Approximate number of payroll deductions rounded to nearest hundred.

INTERNAL AUDIT UNIT
MONTHLY REPORT

FEBRUARY, 1954

Reports were issued for the following audits:

Accounts Receivable - Telephone
Accounts Receivable - Safety Shoes, Equipment Sales to Employees and AEC Cost-Type Contractors.

The following audits were continued:

Accounts Receivable - Rent
Accounts Receivable - Electricity
Accounts Receivable - Kadlec Hospital
Accounts Receivable - Sundry
Source and Fissionable Accountability Record - 300 Area
Work Order Procedures

Audit reports on the four Accounts Receivable audits listed above will be issued in March.

An audit of Plant Library Reference Materials was started on February 12, 1954.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION
FEBRUARY, 1954

	Current Month	Prior Month
Personnel Changes During Month		
Employees at beginning	339	340
Additions and transfers in	1	4
Removals and transfers out	(4)	(5)
Employees at end of month	336	339
Personnel by Unit at Month-End		
General	8	9
Reimbursement Unit	4	4
General Accounting Unit		
General Accounts	19	19
Inventory Accounting	10	10
Plant Accounts	33	33
Accounts Payable	33	33
Accounts Receivable	23	23
General	3	3
	121	121
General Cost Unit		
Consolidated Costs and Budgets	5	5
Plant Auxiliary Operations	16	16
Community Operations and Real Estate	7	7
Radiological Sciences and Other	6	7
Medical	3	3
General	4	4
	41	42
Manufacturing Cost Unit		
Costs and Budgets	34	34
General	8	8
	42	42
Engineering Cost Unit		
Project Section Costs	17	17
Design Section Costs	7	7
Technical Section Costs	10	10
General	7	7
	41	41
Payroll Unit		
Preparation and Employee Records	33	33
Confidential Payroll Records	8	8
Employee Benefit Plans & Payroll Reports	20	21
IBM Procedures	1	1
General	2	2
	64	65
Internal Audit Unit	15	15
Rotational Trainees	0	0
Total	336	339

PLANT PROTECTION SECTION

MONTHLY REPORT - FEBRUARY 1954

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	Beginning of month	End of month	Increase	Decrease
Staff	2	2		
Administration Area Maintenance	62	63	1 (a)	
Security and Patrol	510	509		1 (b)
Safety and Fire Protection	156	156		
Office Unit (Laundry and Building Services, Clerical, and Records Control)	303	303 (c)		
TOTALS	1,033	1,033	1	1

(a) - Administration Area Maintenance

1 - New Hire
1 - Transferred in
1 - Transferred out

(b) - Security and Patrol

1 - New Hire
2 - Terminations

(c) - Laundry and Building Services

1 - Reactivated
1 - Transferred out
1 - Deactivated
1 - Retirement

Clerical Services

6 - New Hires
4 - Transferred out

SAFETY AND FIRE PROTECTION UNIT

Injury Statistics

	JANUARY	FEBRUARY	YEAR TO DATE	COMPARATIVE PERIOD, 1953
Major Injuries	2	1	3	2
Sub-Major Injuries	1	2	3	2
Minor Injuries	282	252	534	671
Exposure Hours	1,335,092	1,262,146	2,597,238	2,740,737
Major Injury F/R	1.50	0.79	1.15	0.72
Major Injury S/R	0.06	0.003	0.034	0.006
Penalty Days:	75	0	75	0
Actual Days lost:	17	4	21	17
Minor Injury F/R	2.11	2.00	2.06	2.45
Estimated Medical Treatment Time Required:	1,136 hours	1,024 hours	2,161 hours	2,700 hours

Safety Activities

On February 11, 1954, the 100-B Area completed their seventh injury-free year of operation. Arrangements were made for pictures of the flag and a writeup in the Works NEWS.

Supervision in Safety is putting forth special efforts to revive the idea of discussing at all safety meetings that are held in the industrial areas, the injuries that occurred during the preceding period, for the purpose of reminding the employees repeatedly of the hazards associated with their jobs.

Industrial Fires

Department	Area	No. of Fires	Cause	Loss
Manufacturing				
Metal Preparation	300	1	Spontaneous Ignition	Nil
Metal Preparation	300	1	Flammable liquids	Nil
Separations, Oper.	200-W	1	Smoking or matches	Nil
Plant Auxiliary Oper.				
Transportation	Outer	1	Combustibles too near heat or flame	$10
Engineering				
Technical	300	1	Electric	Nil
Design	300	1	Electric	Nil
	TOTAL	6		$10

Fire Prevention Activities

Fire prevention building survey was completed on Building 1709-H. Surveys on the 222-S in 200-West Area and the Central Stores building are in process.

The solvent storage facilities for 234-5 Building's analytical laboratory were reviewed and will be located outside the building.

GE Stores is vacating the old temporary building in the 200-East Area. The building will be used by Blaw-Knox until construction is complete and at which time the building will be dismantled.

A hydrogen gas cylinder in Room 4-Y in Building 222-S will be installed outside the building and the gas piped in.

The recommended corrections on 2726-U propane system have been completed.

Approval was given for taking monitoring instruments into the 276-S (solvent handling) process tank area when they are completely sealed in plastic bags.

Eight fire alarm boxes in the Purex construction area have been put into service.

Operational tests were conducted on the recently installed sprinkler system in the 272-E Building. All tests were satisfactory.

A combustible gas alarm was recommended for the tunnel area of the 222-S Building.

OFFICE UNIT

Laundry and Building Services

200-West Laundry	January	February
Pounds delivered	187,234	256,307
Pounds rewashed	8,307	13,480
Total Dry Weight	195,541	269,787
Monitoring Section		
Poppy Check - Pieces	182,511	232,317
Scaler Check - Pieces	273,921	342,882
Total Pieces	456,432	575,199
700 Area Laundry		
Flatwork - Pounds	33,896	38,646
Rough Dry - Pounds	28,661	69,179
Finished - Pounds	2,300	2,191
Total Weight	64,857	110,016
Estimated Pieces	84,962	144,121

The 700 Area Laundry processed in the past month 110,000 pounds of laundry or an increase of approximately 69 percent over the normal volume. The major portion of this increased volume was coveralls and canvas gloves processed for the 2101 Building involving construction work on the 100-K Area. To perform this work and to give the 2101 Building two deliveries a day, seven days a week, it was necessary to put two additional men on the night shift operating the washers and driers along with our regular day shift and to operate the laundry seven days a week.

Over 269,000 pounds of laundry was processed in the 200-West Laundry the past month, an increase of 38 per cent over the previous month. Because of shutdowns for maintenance, 72 per cent of the increased work came from the 100 Areas, the remainder came from the "T" plant and Redox in the 200 Areas because of heavy maintenance and contamination clean-up work being done.

To accomplish the above work it was necessary to operate the laundry on a six-day schedule to keep these buildings adequately supplied with protective clothing.

Clerical Services

Central Mail and Addressograph

Addressograph work increased during the past period and requests for new files include plates for electrical billing (7200), Union Relations (1250), new plates and revision of files for Radiological Sciences (1800). Completion of the Union Relations and Radiological Sciences files have been affected. Tentative completion date for Electrical Billing is March 15, Union Relations March 4.

Types and Pieces of Mail Handled	February	January
Internal	1,953,371	1,973,449
Postal	89,098	86,778
Special	2,197	2,043
	2,044,666	2,062,270
Total postage used	$3,541.24	$3,552.71
Total teletypes handled	2,984	2,966
Total store orders handled	838	812

Addressograph	February		January	
Type of List	Number of Runs	Total Copies	Number of Runs	Total Copies
Plant name list	112	173,642	106	166,486
Housing List	16	69,182	13	71,235
Payroll list	11	39,688	12	57,853
Total new plates		5,326		2,121
Total corrected plates		4,125		2,566
		9,451		4,687

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Office Equipment - Furniture

The movement of office furniture from warehouse 12 and 13 to New Central Stores has been completed and this warehouse space has been vacated by Office Equipment. The new facilities will provide adequate warehousing for office furniture required by HAPO. Stores personnel is segregating and marking each piece of equipment with stock numbers preparatory to taking a physical inventory during the first week in March.

The issues and receipts of furniture was high during the month. The total disbursed was approximately 12% greater than number of items received back into stock. The following is a list of items, by quantity, handled.

Item	Received by Credit S.O.	Issued	Salvaged
Blackboard	1	15	0
Bookcase	1	3	0
Chair	173	168	12
Costumer	14	19	4
Card File	4	5	0
Cabinet	18	99	1
Desk	123	88	2
Table	34	39	2
Miscellaneous	81	92	2

Office Machines

A total of 69 machines were excessed, 111 machines were added to inventory through reconciling office machine repair cards and service tickets with master IBM listing. Sixty-four machines were issued to fill plant requirements and 65 were returned to stock for reissue and excess.

No office machines were issued to contractors during the month. This would indicate that their requirements for additional machines have been substantially filled

The utilization survey of electric typewriters is approximately 50% complete. The purpose of survey is to determine the hours each machine is used in typing correspondence, reproduction, pre-carbon and tabular type work. The final report on this survey will be completed in March.

Office Machine Repair

A Serviceman was hired during February to do the necessary pickup and delivery of office machines.

Special design work was performed by the Instrument section on a Flo Film camera located in the 712 Building.

Trouble has existed with the time clocks binding due to dirt thus causing clock motors to burn out. A time delay fuse is being installed in all clocks so that when a jam occurs and does not clear up in 15 seconds the fuse blows and by so doing saves a motor from burning up.

Central Printing

Priority jobs handled this month included orders for GE Employees Attitude Survey, requiring 95,700 machine impressions, and the Exempt Employee Position Analysis forms requiring 93,000 machine impressions. Other large orders completed were form G-59-DS 60,000, Blaw Knox Letterhead 60,000 and form 88-DS 300,000.

In addition to the above, Central Printing completed 378 routine orders for a total of 1,627,484 printed copies.

Work Completed	February	January
Orders received	418	395
Orders completed	402	381
Back log	81	67
Copies printed	1,627,465	1,548,189
Negatives masked	667	668
Negatives processed	624	736
Photo copy prepared	159	217
Litho Plates processed	760	871

Stenographic Services

The Cost Unit has requested that overtime worked by Stenographic Pool employees on loan assignments be charged direct to the Stenographic Pool cost code and billed to the customer unit at month's end instead of being charged direct to the Unit as has been done in the past. This will necessitate budgeting for overtime on future budgets.

Quite a number of loan assignment requests had to be refused in February due to combination of heavy work load in the pool and continued low number of personnel. Employment of stenographers is still slow and requests for transfers and loan assignments continue to be heavy.

Breakdown of Hours	February	January
Dictation and Transcription	12	7.5
Machine Transcription	--	12
Letters	38	104.5
Rough drafts	72	169.5
Ditto, duplimats, xerography	271	403.5
Miscellaneous	478	230.5
Training time	81.5	54
Meeting Time	3.5	4
Unassigned time	32	49
Absentee time	--	2.5
Holiday and vacation time	56	128
	1,044	1,165
Employees on loan to other units	971	951.5
	2,015	2,116.5

Area Mail and Duplicating

Effective February 15, Area Mail personnel in 100-D and 200-W areas are providing twice daily mail service to the Extension Files Office in 1717-D and 2704-Z Buildings. The addition of these services will involve considerably heavier work loads in registered delivery mail at these locations.

Among several priority duplicating jobs handled this monthwas an order processed for Salary Administration by 703 Duplicating consisting of 43 originals and 12,900 copies. The order was completed on the day it was received.

Duplicating and Mail Statistics	February	January
Orders received	3,118	3,176
Orders Completed	3,093	3,118
Orders on hand	37	58
Offset plates	15,097	16,030
Offset copies	817,996	914,356
Stencils	387	476
Stencil copies	3,589	6,342
Ditto masters	578	763
Ditto copies	14,807	22,160
Verifax masters	2,851	1,789
Verifax copies	9,540	4,833
Zerox plates	1,031	1,146
Internal Mail	630,773	576,329

Records Control

Quantity of records received, processed and stored:

Administrative Practices	9	Standard	Storage	Cartons
Employee & Public Relations Department	18	"	"	"
Engineering Department	57	"	"	"
Financial Department	115	"	"	"
Manufacturing Department	60	"	"	"
Plant Auxiliary Operations Department	33	"	"	"
Radiological Sicences Department	12	"	"	"
Sub-Contractors				
Charles T. Main Company	18	"	"	"
TOTAL	322	Standard	Storage	Cartons

Persons provided records service: 1,522

Records Destroyed: 184 cartons

Records Cartons issued: 372

Percentage of Records Service Center vault (exclusive of North Richland) occupied by records if 84.2%.

Twenty-one requests for file cabinets were received; 13 requests were filled, 4 requests were cancelled, 4 requests are pending. Nine fireproof combination locked cabinets were picked up in exchange for key locked cabinets resulting in a saving of $1,350.00 ($225.00 cost of combination cabinet minur $75.00 cost of key locked cabinet equals $150.00 savings per cabinet exchanged). Four key locked cabinets and two combination locked cabinets were picked up with no exchange and returned to stock.

Nineteen "Requests for Authorization for Records Disposal" were submitted to the Atomic Energy Commission for approval. Eight "Requests for Authorization for Records Disposal" were returned approved by the Atomic Energy Commission. Six Evaluations of Records for disposal were developed and submitted for internal approval.

Uniform filing was established in four offices during the month. A total of 471 offices have installed the system to date. Eight rechecks were made on established files.

In the classified search of records, 1,770 cartons of records were reviewed. An additional 1,245 cartons of blueprints and tracings were reviewed by the Reproduction Unit. Total number of cartons reviewed to date is 4,028 cartons.

ADMINISTRATION AREA MAINTENANCE UNIT

--- New Administration Building: Information from AEC indicates they have received no reply to their letter to Washington Office regarding possible new building.

AEC-114 New Transportation Facilities: Actual completion 29%; scheduled completion 34%. All structural steel has been erected.

CA-434 Bio-Assay Laboratory: Phase I, 98% complete; Phase II, 67% complete; General Electric, 40% complete.

CA-561 713 Building Alterations: Proposal still being held by AEC.

IR-169 Warehouse #13 Alterations, Stores Yard #2: Final design and specifications approved and delivered to AEC Engineering on February 28.

CA-571 703 Basement Alterations, Fifth Wing, North: Additional information supplied in response to AEC inquiry.

A total of two doors and twenty-nine lineal feet of Hauserman partitioning were installed on three requests from 700 Area

Twelve office furniture moves were made during the month.

Property Disposal Report was issued on 712-A Hutment.

General Maintenance

Responsibility for charging batteries of electric warehouse equipment was assigned to electricians February 23. The plugging in of batteries to chargers and setting of charging rates will be done at the close of each work day, along with other routine maintenance and repair to the equipment.

Radio service wiring was installed for Civil Defense in basement of fifth wing, 703 Building; conduit and coaxial cable installed from basement to roof, for Radiation Monitoring unit.

Installed two door frames and doors in basement of fifth wing, 703 Building, for security purposes.

Eight antenna poles were installed on Mobile Civil Defense Center and four on roof of 703 Building for Emergency Officer and Civil Defense.

Replaced old light fixtures in third wing, 703 Building, with eight Smithcraft fluorescent fixtures.

Air conditioning motor circuits in fifth wing, 703 Building, were tied in to fire alarm system to shut down fans in case of alarm.

Replaced panel and changed all wiring in Building 744 from three phase to single phase, to accommodate service for new Bio-Assay Laboratory.

Designed and installed "slip ring assembly" for Civil Defense siren, to correct trouble resulting from metal-to-metal contacts.

Phone and radio conduits were installed in Mobile Civil Defense Center.

Receptacles were relocated and power wiring extended for new equipment in 722-A. Partitions were removed in southwest corner of building to provide more room and convenience.

Airshaft in fourth wing, 703 Building, was floored for use as janitor closet and former closet remodeled to provide larger lounge space in ladies restroom.

Approximately eighty feet of Hauserman top filler was installed in 761, 713 and 703 Buildings.

Miscellaneous carpenter time spent included: excess shipping, 128 hours; cabinets for IBM; gravel boxes for Transportation; furniture repair; plate racks; replacing broken floor boards in 703 Building; repair to truck beds and canopies.

Roof leaks and other miscellaneous carpenter repairs were made at Meteorology Tower.

One trip per week is made to the three area patrol barricades and pistol range for minor electrical repairs and light bulb and tube replacements. Other types of work are performed as sufficient volume is accumulated to warrant a trip.

Scheduled painting of 713-A interior is approximately 50% complete.

Work done by sign painter included: 36 signs for Stores Excess; 196 bumper log numbers for 700 Area Motor Pool; 80 radiation signs; 11' x 22' Government property signs and several miscellaneous traffic, security and name plate signs.

Heat exchanger at 784 Building was descaled and cleaned. One leaking tube in No. 4 boiler required replacement. Boiler feed pump at 1131 Heating Plant was overhauled.

Steam condensate meter was installed in Seattle First National Bank and placed in operation March 1, inasmuch as new lease calls for steam charges to be made on a metered basis.

Plumbing and steam fixtures were removed from 712-A in preparation for excessing of building.

Checked and tested thirty-five relief valves for Real Estate Section.

Replaced push nipples in fifteen radiators.

Racks and cabinets were built and installed in two trucks to accommodate photographic equipment.

Air conditioning duct was altered in 770 Building so that first and second floors can be served by separate cooling units.

Replaced one blower with larger fan and installed "Farr-Air" cooling units on two coolers in 705 Building, which were in need of major repairs.

Extensive repair was made to large washer at 723 Laundry after breakdown of $3\frac{1}{2}$" support shaft for inside drum. Replacement involved fabricating new shaft, loosening staves and removing wooden end of outer drum. New sections were required in replacement.

Steam Operation

Numbers 1, 2 and 4 boilers were in service at the beginning of the month, with No. 3 in reserve. Moderating weather permitted No. 4 boiler to be removed from the line on February 16. Following removal, a leaking tube was detected and replaced.

Numbers 1 and 2 boilers remained in service for the remainder of the month, with No. 3 in reserve and No. 4 undergoing minor repairs.

Rail coal receipts were resumed at the close of the month, eliminating additional expense of bulldozing coal from stockpile.

The quantity of steam generated at 784 Plant was 6.2% greater than in February, 1953.

A tank car load of sulphuric acid was received and unloaded at 784-A Water Softening Plant on February 16.

A program of correcting the piping hookup of boiler feedwater regulators on each boiler was completed at the close of the month. Program was initiated in November on No. 2 boiler, after consultation with Boiler Inspector from Travelers Insurance Company as to approved method. Previously, water connection from bottom of thermostat tube had been connected to the water column. When column was blown down once per shift water would drain from thermostat tubes, expansion of which completely opened regulator valves. This unnecessarily raised water level in boiler, resulting in disturbed steaming conditions, increased possibility of carry-over of wet steam, and racing of boiler feed pump. Piping change consisted merely of routing water connection from bottom of thermostat tube directly to drum in accordance with regulator manufacturer's instruction. Time required for change was approximately four hours per boiler. Results to date have been completely satisfactory.

Coal consumed:	1,762.65 net tons
Steam generated:	24,676.8 M. Lbs.
Steam leaving plant:	21,355.1 M. Lbs.
Steam delivered:	19,339.1 M. Lbs.

Total water softened:	3,192,100 gallons
Total soft water sent to Kadlec Hospital:	72,000 gallons
Total soft water sent to 784 Heating Plant:	3,120,000 gallons

Operations at 1131 Area Heating Plant were normal throughout the month. Two boilers were in service at the beginning of the month but single boiler operation was resumed on January 28.

Operation at Central Stores Heating Plant was normal throughout the month. Accomplishment of several detailed refinements and increasing familiarity with this equipment is resulting in a smoother operation.

SECURITY AND PATROL UNIT

Document Report

Number of classified documents unaccounted for as of February 1: 344
(146 of the above 344 documents are chargeable to E. I. du Pont de Nemours & Co.)

Number of classified documents reported as unaccounted for during February: 1

Number of classified documents either recovered or downgraded during the month: 8
(Three of the above eight documents are chargeable to E. I. duPont de Nemours & Co.)

Number of classified documents remaining unaccounted for as of March 1: 337
(143 of the above 337 documents are chargeable to E. I. du Pont de Nemours & Co.)

Security Education

Three security items appeared in the Works NEWS during the month.

Three hundred and seven security meetings were held and attended by 4,538 employees of the General Electric Company. A representative of the Security and Patrol Unit showed one of the security films at some of these meetings as indicated below:

"The Calculated Risk" was shown at eleven meetings, each with an average attendance of 21 employees per meeting.

"The Tallest Shadow" was shown at five meetings, each with an average of 16 people in attendance.

"Signal 99" was shown at two meetings , each with an average attendance of 60 employees.

"Only the River" was shown at one security meeting with twelve employees.

"Sabotage" was shown at four meetings, each with an average attendance of 15 people present.

following security posters were posted throughout the plant during February:

450 large size posters with the slogan "Rumors can Sabotage" were posted in the buildings.

200 posters were placed in the plant busses during this period.

Two thousand copies of the security "A-B-C" pamphlet bearing the slogan "Censor All Phone Calls" were distributed to personnel during February.

Twenty-four employees of the General Electric Company received a "Q" security orientation talk from either a representative of the Security Unit or a Security Patrol Supervisor during the month of February.

Non-Technical Document Review Board Activities

The Board held one meeting during the month of February. Of the 32 classified documents reviewed

11 were downgraded to "Official Use Only",
20 had their classification retained, and
1 was not within the scope of the Board.

Statistical Report of Security Patrol Activities

	100-B	100-D	100-F	100-H	100-K	200-W	300
Pat Searches	84	87	47	85	0	0	3
Escorts	14	8	12	45	42	41	61
Ambulance runs	6	1	3	3	0	5	5
Passes issued:							
One day temporary	57	5	9	17	0	38	39
Travel	3	0	0	0	0	0	45
Red Tag	127	162	54	31	0	535	107
Telephonic	0	3	0	1	0	0	14
Supervisor's post contacts	430	352	300	242	174	799	555
							300 & 700

Other Security Patrol Activities (computed by hours:

Security File Check	153	220.5	*184.4	350.5	435	533	1,288
Building check	317.5	29	-	8	465	591	672

*File check and building check are combined into one figure.

Other Security Patrol activities:

Buildings and doors opened:	301
Railroad Gates opened:	212
Master System Keys issued:	189
Operation Gas pumps:	182

Arrest Report

Violations	Number of Violations	Cont. Cases from Jan.	Cases Cleared	Pending	Fined	Jailed	Dismissed
Speeding	2	0	2	0	2	0	0
Negligent Driving with Liquor Involved	2	0	2	0	2	2	0
Public Intoxication	1	0	1	0	1	1	0
Failure to Yield Right-of-Way to Pedestrian at Crosswalk	1	0	1	0	0	0	1
Failure to Obey Traffic Officer's Hand Signal	0	1	0	0	0	0	1
Total	6	1	6	0	5	3	2

Citation Tickets Issued: 6
Warning Tickets Issued: 25

Security Patrol Training Activities

119 Security Patrolmen received classroom instruction during the month of February.

166 Security Patrolmen received Firearms training during the same period.

Training courses were as follows:

Safety Class	1/4 hour
Security Class	1/2 hour
Operations Class	1 1/4 hours

Security Patrol Post Changes

There were five temporary construction posts established February 15 at 105-KW occasioned by the packing of the 105-KW Unit and as needed during the remaining construction of the building. These five posts include:

"Visitor's Level"
"X" Level
Front Block
Rear Block
"X" Level Rover

Field Inspection Activities

Contacts made to locate unacoounted for documents:	38
Contacts made concerning security violations:	25
Searches conducted to locate unaccounted for documents:	6

General

On February 12, the listing of all sensitive positions of General Electric Company personnel at Hanford Atomic Products Operation was completed and forwarded to the Atomic Energy Commission at their request. There were 971 employees found to be employed in sensitive positions as a result of this survey.

During the month of February a resurvey of Hanford Atomic Products Operation personnel who are authorized to classify defense information was completed and certified to the Atomic Energy Commission.

On February 25 and 26, representatives of various industrial concerns visited Hanford and were escorted during the tours by Security personnel.

Security Administration Information

Daily Badge Log Entries	2,156
"Q" Clearances	59
Formal "P" clearances issued	18
"P" approval clearances issued	21
Category Access granted	62
Category Access withdrawn	17

315 photo passes were laminated and issued.
342 "A" type badges were assembled and distributed to the proper areas.
359 "A" type badges were received from the areas.
117 "visitor", "construction", and "A" badges were received from the areas.

Rephotographing Project

During February, the following number of photographs were processed by the Security Office:

Number of "A" badges	19
Number of "B" badges	79
Photos for Passes	19
Total	117

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HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

DECLASSIFIED

REPORT OF VISITORS FOR PERIOD ENDING FEBRUARY 28, 1954

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
ENGINEERING DEPARTMENT - ADMINISTRATION SECTION							
I. Visits to other Installations							
A. B. Greninger to: Cal. Research & Development Livermore, California	Inspection and discussion of engineering work on atomic energy programs	F. Powell	2-24-54	2-24-54	X		
A. B. Greninger to: Radiation Laboratory Berkeley, California	Inspection and discussion on engineering work on atomic energy Programs	E. O. Lawrence G. T. Seaborg	2-24-54	2-24-54	X		
ENGINEERING DEPARTMENT - TECHNOLOGY SECTION							
I. Visitors to this Works							
H. W. Alter Knolls Atomic Power Lab. Schenectady, New York	Chemical processing and waste problems associated with Program 2000	F. W. Albaugh A. H. Bushey F. W. Woodfield E. R. Irish	2-8-54	2-10-54	X	200-W 231, 221-U, Redox 300-L XXX	
M. S. Bloomsburg E. I. du Pont de Nemours & Co. Augusta, Georgia	Inspect 300 Area facilities and discuss fuel elements	E. W. O'Rorke	2-1-54	2-5-54	X	300-L 303	
R. J. Christl E. I. du Pont de Nemours & Co. Wilmington, Delaware	Discuss problems on weapon elements, accountability and final inspection and P-10	J. C. L. Chatten	2-23-54	2-24-54	X	100-B 108-B 300 XXX	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
J. Delaplane Catalytic Construction Oak Ridge, Tennessee	Process consultation	F. W. Woodfield	2-10-54	2-11-54	X		300-L XXX
R. C. Feber Knolls Atomic Power Lab. Schenectady, New York	Chemical processing and waste problems associated with Program 2000	F. W. Albaugh A. H. Bushey F. W. Woodfield E. R. Irish	2-8-54	2-10-54	X		200-W 231, 221-U, Redox 300-L XXX
J. F. Flagg Knolls Atomic Power Lab. Schenectady, New York	Discuss chemical process-of Hanford products	F. W. Albaugh V. R. Cooper F. W. Woodfield R. B. Richards	2-9-54	2-10-54	X		100-B 108-B 300-L XXX
E. E. Hayes E. I. du Pont de Nemours & Co. Wilmington, Delaware	Discuss fabrication problems	G. E. McCullough	1-27-54	2-3-54	X		300 303
A. A. Jonke Argonne National Laboratory Chicago, Illinois	Discuss separations processes and fluidi-	F. W. Woodfield M. J. Szulinski J. G. Bradley	2-10-54	2-12-54	X		100-B 105-B 200-W Redox, 221-U 300-L XXX
W. J. Lindsey U. S. Atomic Energy Comm. Washington, D. C.	Technical discussion on plutonium	L. P. Bupp	2-15-54	2-19-54	X		100-D 105 300 XXX
C. C. Lockhart E. I. du Pont de Nemours & Co. Augusta, Georgia	Discussions on P-10 problems in connection with Savannah River Plant	J. C. L. Chatten	2-22-54	2-26-54	X		100-B 108-B 300 XXX
J. Marsden Knolls Atomic Power Lab. Schenectady, New York	Discuss chemical process-ing of Hanford products	F. W. Albaugh V. R. Cooper F. W. Woodfield R. B. Richards	2-9-54	2-10-54	X		100-B 108-B
N. C. Miller Los Alamos Scientific Lab. Los Alamos, New Mexico	Discuss radiographic problems	A. E. Smith	2-4-54	2-5-54	X		200-W 234, 235 300-L XXX

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
R. H. Miller Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Technical discussions involving 234-5 and final product specifications	O. F. Hill A. E. Smith V. R. Cooper	2-10-54	2-12-54	X		200-W 234, 235 700
H. Parker U. S. Atomic Energy Comm. Washington, D. C.	P-10 Liaison	J. C. L. Chatten	2-23-54	2-24-54	X		100-B 108-B 300-L XXX
J. P. Patnovic E. I. du Pont de Nemours & Co. Wilmington, Delaware	Discussions on P-10 problems	J. C. L. Chatten	2-23-54	2-26-54	X		100-B 108-B 300-L XXX
C. A. Pippin Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Technical discussions involving 234-5 and final product specifications	O. F. Hill A. E. Smith V. R. Cooper	2-10-54	2-12-54	X		200-W 234, 235 700
H. A. Pray Battelle Memorial Institute Columbus, Ohio	Corrosion on reactor materials	E. A. Eschbach	2-5-54	2-6-54	X		100-D 105, 189, 105-DR 200-E 222-B 200-W 221-T, 221-U 300 303 700
O. D. Purdie E. I. du Pont de Nemours & Co. Wilmington, Delaware	Discussions on P-10 problems	J. C. L. Chatten	2-23-54	2-26-54	X		100-B 108-B 300-L XXX
H. H. Uhlig Mass. Institute of Tech. Cambridge, Massachusetts	Assistance to Hanford on corrosion problems	R. S. Dalrymple	2-4-54	2-5-54	X		100-D 105 200-E 222-B 300 303 200-W 221-U, 221-T
II. Visits to other Installations							
R. W. Benoliel to: E. I. du Pont de Nemours Augusta, Georgia	Consultation on fuel elements	T. W. Evans	2-16-54	2-17-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
M. H. Curtis to: Oak Ridge National Lab. Oak Ridge, Tennessee	Consultation concerning thorex process and critical mass problems on 234-5	F. L. Culler	2-16-54	2-20-54	X		
J. L. Daniel to: Applied Research Lab. Los Angeles, California	Discuss quantometer instrument	W. Davis	2-15-54	2-26-54	X		
W. R. DeHollander to: E. I. du Pont de Nemours Aiken, South Carolina	P-10 liaison on extraction and purification technology	W. Morris	2-15-54	2-16-54	X		
W. R. DeHollander to: Knolls Atomic Power Lab. Schenectady, New York	P-10 liaison on extraction and purification technology	D. H. Ahmann	2-17-54	2-18-54	X		
W. R. DeHollander to: General Engineering Lab. Schenectady, New York	P-10 liaison on extraction and purification technology	C. Mannal	2-17-54	2-18-54	X		
W. R. DeHollander to: Argonne National Lab. Lemont, Illinois	Discuss non-aqueous chemistry on P-10 extraction and purification technology	W. J. Mayer	2-19-54	2-19-54	X		
E. A. Eschbach to; Mallinckrodt Chem. Wks. St. Louis, Missouri	Consultation on uranium quality	C. H. Harrington W. M. Leaders	2-23-54	2-25-54	X		
E. A. Eschbach to: National Lead Co. Cincinnati, Ohio	Consultation on uranium quality	G. Wunder J. Ciborski	2-26-54	2-26-54	X		
J. E. Faulkner to: Argonne National Lab. Lemont, Illinois	Discuss physics experiment	M. G. Inghram	2-1-54	2-1-54	X		
J. E. Faulkner to: Knolls Atomic Power Lab. Schenectady, New York	Discuss proposed physics experiment	J. B. Sampson	2-2-54	2-2-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. E. Faulkner to: Argonne National Lab. Lemont, Illinois	Physics experiment	M. G. Inghram	2-3-54	2-4-54	X		
D. P. Granquist to: Oak Ridge National Lab. Oak Ridge, Tennessee	Consultation concerning thorex process and critical mass problems on 234-5	F. L. Culler	2-16-54	2-20-54	X		
O. H. Greager to: Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL assistance to Hanford Program	K. R. Van Tassel	2-11-54	2-12-54	X		
W. T. Kattner to: Mallinckrodt Chemical Wks. St. Louis, Missouri	Consultation on uranium quality	W. M. Leaders	2-23-54	2-25-54	X		
W. T. Kattner to: National Lead Company Fernald, Ohio	Consultation on uranium quality	J. Ciborski	2-26-54	3-1-54	X		
W. T. Kattner to: Battelle Memorial Inst. Columbus, Ohio	Consultation on uranium quality	H. A. Saller	3-2-54	3-2-54	X		
D. C. Kaulitz to: Radiation Laboratory Berkeley, California	Inspect remote control equipment	N. B. Garden	2-17-54	2-17-54	X		
R. S. Paul to: Brookhaven National Lab. Upton, Long Island, New York	Technical consultation on physics problems	A. W. Schardt	2-1-54	2-1-54	X		
R. S. Paul to: Knolls Atomic Power Lab. Schenectady, New York	Technical consultation on physics problems	E. R. Gaerttner E. J. Wade	2-2-54	2-2-54	X		
J. W. Riches to: Iowa State College Ames, Iowa	Consultation on metallurgy of uranium	F. H. Spedding	2-15-54	2-16-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. W. Riches to: Battelle Memorial Inst. Columbus, Ohio	Consultation on metallurgy of uranium	H. R. Nelson	2-17-54	2-17-54	X		
J. W. Riches to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on metallurgy of uranium	J. E. Burke	2-18-54	2-19-54	X		
E. E. Voiland to: Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss zirconium chemistry	W. E. Johnson	2-4-54	2-12-54	X		
E. E. Voiland to: Battelle Memorial Inst. Columbus, Ohio	Discuss zirconium chemistry	H. R. Nelson	2-1-54	2-1-54	X		
W. K. Woods to: Knolls Atomic Power Lab. Schenectady, New York	Discuss KAPL assistance to Hanford	K. R. Van Tassel	2-22-54	2-23-54	X		
J. L. Daniel to: Applied Research Lab. Los Angeles, California	Quantometer instrument	W. Davis	2-15-20	2-19-20	X		
L. J. Lucas to: U. S. Atomic Energy Comm. Augusta, Georgia	Inspect equipment and shop operations	J. Hopkins	2-1-54	2-2-54	X		
L. J. Lucas to: Knolls Atomic Power Lab. Schenectady, New York	Inspect equipment and shop operations	J. Marsden	2-3-54	2-5-54	X		

ENGINEERING DEPARTMENT - DESIGN SECTION

I. Visitors to this Works

T. J. Rosenthal Knolls Atomic Power Lab. Schenectady, New York	Consultation on mass spectrometers	E. S. Day, Jr.	2-8-54	2-8-54	X		700 Area

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
II. Visits to other Installations							
J. W. Kolh to: General Engineering Lab. Schenectady, New York	Discuss induction welding techniques	D. E. Garr	2-1-54	2-1-54	X		
ENGINEERING DEPARTMENT - PROJECT SECTION							
I. Visits to other Installations							
G. A. Daigle to: Electric Boat Company Groton, Connecticut	Inspect material on order VKC-1560, Project C-513-A	E. Ward	2-1-54	8-1-54	X		
C. F. Gabel to: National Carbon Co. Clarksburg, West Virginia	Evaluate graphite fabrication equipment on loan to that firm	V. Wells R. Mansfield	2-23-54	2-26-54	X		
C. F. Gabel to: National Carbon Co. Columbia, Tennessee	Evaluate graphite fabrication equipment on loan to that firm	N. Swentzel	2-25-54	3-2-54	X		
L. S. Sandlin to: National Carbon Co. Clarksburg, West Virginia	Evaluate graphite fabrication equipment on loan to that firm	V. Wells R. Mansfield	2-23-54	2-26-54	X		
L. S. Sandlin to: National Carbon Co. Columbia, Tennessee	Evaluate graphite fabrication equipment on loan to that firm	N. Swentzel	2-25-54	3-2-54	X		
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT							
I. Visitors to this Works							
D. C. Anderson Knolls Atomic Power Lab. Schenectady, New York	Training in connection with assistance on reactor operational techniques	W. D. Smyth A. R. Maguire J. T. Baker	1-11-54	2-2-54	X	100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105	
			2-2-54	2-2-54	X	200-W 221-T, 231, Redox, 221-U	
			2-2-54	2-2-54	X	300 303	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
W. E. Barkley Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	1-11-54	2-2-54	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			2-2-54	2-2-54	X		200-W 221-T, 231, Redox, 221-U
			2-2-54	2-2-54	X		300 303
E. W. Cole Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	1-11-54	2-2-54	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			2-2-54	2-2-54	X		200-W 221-T, 231, Redox, 221-U
			2-2-54	2-2-54	X		300 303
O. O. Everetts Knolls Atomic Power Lab Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	1-11-54	2-2-54	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			2-2-54	2-2-54	X		200-W 221-T, 231, Redox, 221-U
			2-2-54	2-2-54	X		300 303
A. L. Kimmey, Jr. Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	2-8-54	3-2-54	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			3-2-54	3-2-54	X		200-W 221-T, 231, Redox, 221-U
			3-2-54	3-2-54	X		300 303
G. H. King Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	1-11-54	2-2-54	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			2-2-54	2-2-54	X		200-W 221-T, 231, Redox, 221-U
			2-2-54	2-2-54	X		300 303

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass	Areas
F. G. Lee Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	2-8-54	3-2-54	X	100-B 100-D 100-F 100-H	105-B, 105-C 105 105 105
			3-2-54	3-2-54	X	200-W	221-T, 231, Redox, 221-U
			3-2-54	3-2-54	X	300	303
F. T. Lewis General Electric Company Schenectady, New York	Discuss personnel	D. W. McLenegan	2-8-54	2-10-54	X	100-H 200-W 300	105 Redox 303
D. R. MacNaughton Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	1-11-54	2-2-54	X	100-B 100-D 100-F 100-H	105-B, 105-C 105 105 105
			2-2-54	2-2-54	X	200-W	221-T, 231, Redox, 221-U
			2-2-54	2-2-54	X	300	303
E. F. Peterson Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	2-8-54	3-2-54	X	100-B 100-D 100-F 100-H	105-B, 105-C 105 105 105
			3-2-54	3-2-54	X	200-W	221-T, 231 Redox, 221-U
			3-2-54	3-2-54	X	300	303
P. B. Tierney Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	2-8-54	3-2-54	X	100-B 100-D 100-F 100-H	105-B, 105-C 105 105 105
			3-2-54	3-2-54	X	200-W	221-T, 231, Redox, 221-U
			3-2-54	3-2-54	X	300	303
W. P. Wallace California Research & Dev. Livermore, California	Discussion on reactor materials	D. W. McLenegan	2-23-54	2-24-54	X	300	303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
G. B. Walrath Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	2-8-54	3-2-54	X	100-B 100-D 100-F 100-H	105-B, 105-C 105 105 105
			3-2-54	3-2-54	X	200-W	221-T, 231, Redox, 221-U
			3-2-54	3-2-54	X	300	303
J. H. Ward Knolls Atomic Power Lab. Schenectady, New York	Training and assistance on reactor techniques	W. D. Smyth A. R. Maguire J. T. Baker	2-8-54	3-2-54	X	100-B 100-D 100-F 100-H	105-B, 105-C 105 105 105
			3-2-54	3-2-54	X	200-W	221-T, 231, Redox, 221-U
			3-2-54	3-2-54	X	300	303
L. E. Fuller Sandia Corporation White Sands, New Mexico	Wage survey	W. I. Patnode J. J. Tagen	2-3-54	2-4-54		X	700
T. L. Daniel Sandia Corporation White Sands, New Mexico	Wage Survey	W. I. Patnode J. J. Tagen	2-3-54	2-4-54		X	700
FINANCIAL DEPARTMENT							
I., Visits to other Installations							
D. M. Johnson to: Knolls Atomic Power Lab. Schenectady, New York	Discuss mutual contract and financial problems	R. Turner S. MacMackin	2-1-54	2-2-54	X		
D. M. Johnson to: Savannah River Plant Augusta, Georgia	Discuss mutual accounting, auditing and financial problems	G. W. Coulson	2-8-54	2-10-54	X		
D. M. Johnson to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss mutual accounting, auditing and financial problems	L. B. Emlet	2-11-54	2-12-54	X		

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
W. W. Smith to: Savannah River Plant Augusta, Georgia	Discuss mutual accounting, auditing and financial problems	G. W. Coulson	2-8-54	2-10-54	X		
W. W. Smith to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss mutual accounting, auditing and financial problems	L. B. Emlet	2-11-54	2-12-54	X		
MANAGEMENT - ADMINISTRATIVE PRACTICES							
I. Visitors to this Works							
C. C. Lockhart E. I. du Pont de Nemours & Co. Wilmington, Delaware	Discussion on P-10 problems	W. K. MacCready J. C. L. Chatten	2-23-54	2-26-54	X	100-B 108-B 300 XXX	
R. J. Chrigtl E. I. du Pont de Nemours Wilmington, Delaware	Discuss problems on weapon elements, accountability and final inspection of P-10	W. K. MacCready J. C. L. Chatten R. S. Bell	2-23-54	2-25-54	X	100-B 108-B 200-W 221-T, 231, Redox, 221-U, 234, 235 300 XXX	
J. P. Patnovic E. I. du Pont de Nemours Wilmington, Delaware	Discussion on P-10 problems	W. K. MacCready J. C. L. Chatten	2-23-54	2-26-54	X	100-B 108-B 300 XXX	
O. D. Purdie E. I. du Pont de Nemours & Co. Wilmington, Delaware	Discussion on P-10 problems	W. K. MacCready	2-23-54	2-26-54	X	100-B 108-B 300 XXX	
MANUFACTURING DEPARTMENT							
I. Visitors to this Works							
M. S. Bloomsburg E. I. du Pont de Nemours & Co. Wilmington, Delaware	Inspect 300 Area facilities	E. W. O'Rorke	2-1-54	2-5-54	X	300-303 300-L 303	
J. R. Drier E. I. du Pont de Nemours & Co. Wilmington, Delaware	Inspect 300 Area facilities and fuel element development activities	E. W. O'Rorke	2-1-54	2-3-54	X	300 303 300-L 303	

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
II. Visits to other Installations							
E. W. O'Rorke to: U. S. Atomic Energy Comm. Savannah River Plant Augusta, Georgia	Discuss specifications for the 3-X Program	T. Evans	2-17-54	2-18-54	X		
E. W. O'Rorke to: Aluminum Company of America New York, New York	Specifications of components for 3-X Program	- -	2-19-54	2-21-54	X		
E. W. O'Rorke to: Olin Industries East Alton, Illinois	Specifications of components for 3-X Program	- -	2-22-54	2-22-54	X		
E. W. O'Rorke to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Attend Metal Quality Working Committee Meeting	W. M. Leaders	2-22-54	2-25-54	X		
RADIOLOGICAL SCIENCES DEPARTMENT							
I. Visits to other Installations							
J. De Pangher to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on radiation problems	L. Tonks L. L. German	2-1-54	2-3-54	X		
G. E. Driver to: Motorola Incorporated Chicago, Illinois	Investigate radio telemetering links	M. Whitney	2-16-54	2-16-54	X		
W. C. Roesch to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on radiation problems	L. Tonks L. L. German	2-1-54	2-3-54	X		
PLANT AUXILIARY OPERATIONS DEPARTMENT - OPERATIONS ANALYSIS SECTION							
I. Visits to other Installations							
D. D. McCracken to: Aircraft Nuclear Propulsion Cincinn. 1, Ohio	Discuss transfer possibility to ANP	D. B. Price	2-23-54	2-24-54	X		

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PURCHASING AND STORES SECTION
PLANT AUXILIARY OPERATIONS DEPARTMENT
SUMMARY FEBRUARY 1954

Discussions were held with representatives of the Pacific Scientific Company relative to their claim on HWC 20073 for $6,160.64. Mr. J. I. Thomas of A.E.C. concurred in our conclusion that the claim could not be paid. The vendor representatives felt they had received a fair hearing.

With the assistance of the Legal Department, we have drawn up and are using a Letter Order for placing purchase orders with vendors during the negotiation period and prior to receiving their quotations on a fixed price basis. These Letter Orders are receiving A.E.C. prior approval before starting any negotiation with the vendor. We have used two of these Letter Orders to date, which have allowed us to place orders and have vendors start work prior to receiving the quotation. This has the effect of speeding up the delivery dates of critical materials and engineered items.

The 300 Area Stores contemplated for the 325 Building has been further delayed because the space to be used by Stores does not meet fire requirements.

The movement of office furniture from warehouses in Stores Yard #2 to Central Stores has been completed.

Issues from the General Supplies Inventory not including Automotive Parts, totaled approximately $281,000 for February which represents the highest issues ever made in one month.

During February material and equipment valued at $33,363 were withdrawn from Excess Accounts for use on the project.

By splitting the shipment of parts for a constant potential accelerator between Railway Express, for the delicate items, and a carloading company, for the heavier parts, a lower rate classification was possible on the havy parts thus resulting in a savings of about $533 in freight charges.

Organization and Personnel	1-31-54	2-28-54	Change
Employees on Roll	271	271	0

PURCHASING AND STORES SECTION
ADMINISTRATION UNIT
FEBRUARY 1954

The following table shows the net dollar value of business, by cost category, and the number of procurement actions placed with different types of vendors.

February 1954

Cost Category	Government Agency	Small Business	Big Business	Educational and Other
$0 - $ 24.99	$ 28.80	$ 3,107.21	$ 1,910.06	$ 103.84
$25 - $ 499.99	316.62	110,125.53	57,121.28	342.66
$500 - $ 24,999.00	21,490.90	314,870.28	364,778.49	
$25,000 - $ Up		102,578.01	520,229.14	
	$ 21,836.32	$530,681.03	$944,038.97	$ 446.50
Number of Actions	8	1279	656	13

Vendors Contacts. 192
Claims Processed. 3
Damage Reports Processed 12
Over & Short Reports Processed 1
Accounts Payable Requests Handled 255
Difference Slips Processed 42
Clearance Slips & Purchase Order Change Approvals 198
Material Exception Reports 219
Return Orders Issued. 143

Shown below is a summary of the net value of procurement actions placed with vendors for manufactured or shelf items in the states of Washington, Oregon, Idaho and Other Areas.

State	Manufactured	Shelf	Total
Washington	$ 639,868.76	$219,238.67	$ 859,107.43
Oregon	49,331.26	57,329.65	106,660.91
Idaho	- -	- -	- -
Other	441,707.78	89,526.70	531,234.48
Total	$1,130,907.80	$366,095.02	$1,497,002.82

PURCHASING AND STORES SECTION
ADMINISTRATION UNIT

Requisitions on hand 2-1-54	G	D	Total
Operations Procurement	819	0	819
Construction Procurement	0	153	153
A.E.C. Procurement	296	45	341
Total	1115	198	1313
Requisitions Assigned during February			
Operations Procurement	1975	0	1975
Construction Procurement	0	365	365
A.E.C. Procurement	315	49	364
Total	2290	414	2704
Requistions Placed during February			
Operations Procurement	1974	0	1974
Construction Procurement	0	318	318
A.E.C. Procurement	391	50	441
Total	2365	368	2733
Requisitions on hand 2-31-54			
Operations Procurement	820	0	820
Construction Procurement	0	200	200
A.E.C. Procurement	220	44	264
Total	1040	244	1284

Purchase Orders Placed	HW	HWC	Total
Operations Procurement	1590	0	1590
Essential Material	43	0	43
Construction Procurement	0	203	203
Local Purchases	23	2	25
Total	1656	205	1861

Value of Orders Placed			
Operations Procurement	$ 648,806.19	$.	$ 648,806.19
Essential Materials	565,521.56		565,521.56
Construction Procurement		257,563.26	257,563.26
Local Purchases	180.71	12.60	193.31
Total	$1,214,508.46	$257,575.86	$1,471,984.32

Alterations Issued	Increase	Decrease	No Change	Total
HW Operations	51	29	5	85
Essential Material	0	5	0	5
HWC Construction	19	6	5	30
Total	70	40	10	120

Value of Alterations Issued	Increase	Decrease	Total
HW Operations	$34,433.86	$ 8,997.53	$ 43,431.39
Essential Materials	- -	33,279.09	33,279.09
HWC Construction	35,358.14	2,403.57	37,761.71
Total	$69,792.00	$44,680.19	$114,472.19

Government Transfers	OR	ORC
	1	0

Organization and Personnel	1-31-54	2-28-54	Change
Employees on Roll	25	25	0

PURCHASING AND STORES SECTION
CONSTRUCTION PROCUREMENT UNIT
FEBRUARY, 1954

The representatives of the Pacific Scientific Company of Portland visited Richland on February 9 and 10 to discuss their claim on HWC-20073 for $6,160.64. The problem was discussed with them and we then visited Mr. J. I. Thomas of the Atomic Energy Commission who concurred in our conclusion that this claim could not be recognized and paid. The vendor representatives felt that they had received a fair hearing.

On HWC-14516 with the General Electric Company, the Apparatus Department furnished considerable switch gear equipment. We have been advised that we have 2 - 230 KV oil filled bushings on the plantsite which are defective and should be taken out of service and returned to Pittsfield for repairs. The 2 bushings have been removed from service and are now in route to Pittsfield for repairs. The Apparatus Department will accept the cost of the repairs and the cost of transportation both to and from Pittsfield.

With the assistance of the Legal Department, we have drawn-up and are using a Letter Order for placing purchase orders with vendors during the negotiation period and prior to receiving their quotations on a fixed price basis. These Letter Orders are receiving A.E.C. prior approval before starting any negotiation with the vendor. We have used two of these Letter Orders to date, which have allowed us to place orders and have vendors start work prior to receiving the quotation. This has the effect of speeding up the delivery dates of critical materials and engineered items.

The following figures depict the work load trend of this Unit:

	1953			1954		1954	
	Oct.	Nov.	Dec.	Jan.	4 Month Average	Feb.	% Change
Requisitions assigned	315	255	362	307	310	365	18
Requisitions placed	260	223	348	373	301	318	6
Requisitions on hand	173	205	219	153	187	200	7

Organization and Personnel	1-31-54	2-28-54	Change
Employees on Roll	17	19	+ 2

The high level of activity in this unit due to increased construction necessitated the addition of 1 Supervisor and his Secretary.

PURCHASING AND STORES SECTION
OPERATIONS PROCUREMENT UNIT
FEBRUARY - 1954

Statistical and General

Workload of the buying group leveled off during the month at an approximate 10% above normal. The brunt of the past few months increase is now falling on the expediting group, as orders placed during the period are now coming due for delivery. The extremely high level of emergency requirements through this period have placed a heavy burden on the expediting group and has required the use of overtime to handle.

Open orders on hand as of January 31 totalled 1873. This had climbed to 2203 as of February 28, an increase of 17.6%.

Essential Material Contracts

1. The following contracts have been completed and are in force:

   Caustic Soda - Pa. Salt Mfg. Company & Hooker Electrochemical Company.

2. Bids have been received from the vendors on our requirements of Aluminum Sulphate and Sodium Dichromate. Records of Purchase have been prepared and submitted to the Commission.

3. Forecasts have been requested from the operating departments on requirements for coal and for Tributyl Phosphate for fiscal year 1955.

Organization and Personnel -

	1/31/54	2/28/54	Change
Employees on roll	32	32	0

PURCHASING AND STORES SECTION
STORES UNIT
FEBRUARY 28, 1954

A physical inventory was made on Account 0401 Inventories - Bulk Steel and the dollar value was transferred to Excess. The physical inventory was short of the General Ledger approximately $625.00 or 1% of the total.

The 300 Area Stores contemplated for the 325 Building has been further delayed because the space to be used by Stores does not meet fire requirements.

Outside paint used by Community was booked in Stand-by in January 1954 at approximately $7000.00. We transferred this material to General Supplies in February.

The movement of office furniture from warehouses in Stores Yard #2 to Central Stores has been completed.

Issues from the General Supplies Inventory not including Automotive Parts, totaled approximately $281,000 for February which represents the highest issues ever made in one month.

Declarations of Excess containing 111 items of Standby material valued at $37,672 were prepared.

In the Excess Material and Equipment Accounts, the following items were reported:

Disbursement by Store Order	$ 29,873
Transfers to Inventories	3,490
Offsite Shipments	237,997
Receipts	434,753

Organization and Personnel	1-31-54	2-28-54	Change
Employees on Roll	186	184	-2

PURCHASING & STORES SECTION

TRAFFIC UNIT

February, 1954

STATISTICAL AND GENERAL

Through negotiations with the Emery Air Freight Corporation, we were successful in having through air freight rates published to Richland, Washington. This will result in a reduction of rates ranging from $1.06 to $3.07 per cwt. on future movements via this carrier.

As a result of our shipping instructions to the High Voltage Engineering Corporation, they shipped a Constant Potential Accelerator to us in two lots. The delicate and scientific portion was forwarded by Railway Express, thus assuring the most careful handling enroute. The balance of the machine was forwarded via a carloading company. By splitting the shipment, the heavier parts could be classified as Electric Generator and Parts and therefore entitled to a lower rate, affecting a savings of approximately $533.00 in freight charges.

As a result of rate reductions obtained from the carriers, there was a total savings in freight charges for the month of February amounting to $1,229.50. This makes a total savings from September 1, 1946 to date of $1,758,903.50.

Savings Report

1. Rate reductions obtained from carriers:

Commodity	Origins	Savings for February, 1954	Savings from 9-1-46 thru January, 1954	Savings from 9-1-46 to date
Aluminum Extrusions, C/L	Edgewater, N.J.	$ 537.89		
Aluminum Extrusions, LTL	Phoenix, Ariz.	73.83		
Limestone	Aragonite, Utah	320.00		
Machinery, T/L	Los Angeles, Calif.	275.83		
Sand	Pioneer Spur, Wash.	21.95		
		$1,229.50	$1,757,674.00	$1,758,903.50
2. Freight Bill Audit		1,037.91	116,856.43	117,894.34
3. Loss & Damage & Overcharge Claims		757.15	136,135.22	136,892.37
4. Ticket Refund Claims		1,109.47	35,209.36	36,318.83
5. Household Goods Claims		00.00	17,528.80	17,528.80
		$4,134.03	$2,063,403.81	$ 2,067,537.84

Work Volume Report

Completed Travel Requests		137
Reservations resulting from above:	Rail	112
	Air	165
	Hotel	179

PURCHASING & STORES SECTION
TRAFFIC UNIT
February, 1954

Work Volume Report (cont.)

Expense Accounts Checked		219
Household Goods & Automobiles	Movements Arranged Inbound	2
Ticket Refund Claims	Filed	29
	Collected - Number	28
	Collected - Amount	$1,109.47
Freight Claims	Filed	4
	Collected - Number	6
	Collected - Amount	$757.15
	Over and Shorts Processed	12
	Damage Reports Processed	9
Freight Bill Audit Savings		$1,037.91
Freight Shipments Traced		37
Quotations	Freight Rates	203
	Routes	183
Bills Approved	Air Freight	2
	Air Express	25
	Boat	15
	Carloading	121
	Express	146
	Rail	703
	Truck	229
Carload Shipments	Inbound	708
	Outbound	0

Report of Carloads Received

Commodity	CMSTP&P	NP	UP	TOTAL
Acetic Acid		1		1
Aluminum Extrusions	1			1
Aluminum Sulphate		6	1	7
Caustic Soda	10	10	10	30
Chlorine	1	1	1	3
Chromium Nitrate			1	1
Coal	113		505	618
Electrical Appliances		1		1
Electric Transformers	2			2
Electrical Transformer Parts	3			3
Electric Motors		1		1
Face Brick		1		1

PURCHASING & STORES SECTION
TRAFFIC UNIT
February, 1954

Report of Carloads Received (cont.)

Commodity	CMSTP&P	NP	UP	TOTAL
Furnace Liners	1	11		12
Lacquer Solvent		1		1
Lime		1		1
Limerock			1	1
Naphtha, Petroleum	1			1
Nitric Acid		3	4	7
Pallets	1	1		2
Permanganate of Potash	1			1
Phosphoric Acid	1			1
Plywood		1		1
Salt	1	1	1	3
Sand		1		1
Soda ash		1	1	2
Sodium Phosphate			1	1
Steel Containers	1			1
Steel Plates	1			1
Sulphuric Acid			1	1
Water Heaters, Parts & Condensers	1			1
	139	42	527	708

Organization & Personnel	1-31-54	2-28-54	Change
	9	9	0

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TRANSPORTATION SECTION
MONTHLY REPORT
February 1954

GENERAL

Transportation Section personnel forces decreased from 493 to 488 by three transfers out and two deactivations - personal illness.

Extremely hazardous road conditions were prevalent during the night of February 11-12 as Plant roads were covered with a thick sheet of ice and sleet. All personnel were safely transported to their work locations although buses ran somewhat behind schedule. Motor Pools were closed as a precautionary measure to protect personnel and equipment.

Tentative arrangements have been made whereby the Transportation Section will accept certain property management responsibilities as recently requested by the Atomic Energy Commission. These include the maintenance of the present code numbering system for government owned HO and OC equipment and necessary control records: and the exercising of custodial functions for license plates with respect to registration and issuance.

A purchase requisition written October 21, 1953 for the replacement of 60 sedans and 10 station wagons was forwarded to the General Services Administration on February 3, 1954 by the Atomic Energy Commission and bids are to be opened on March 16. This release followed the recent visit of Mr. Fred D. O'Berg, Equipment Section, Division of Construction and Supply Washington, D.C., who conducted a survey of equipment control and maintenance practices at Hanford during the latter part of January.

The Atomic Energy Commission has issued a purchase order for 33 units of heavy mobile equipment for upgrading purposes. This action is in keeping with a recently established program by the federal government for replacing existing equipment with better equipment, if available, wherever warranted and disposing of the less desirable units. Formal A & B Committee approvals have not been granted for the transfer of this equipment to Plant Accounts; however, it was included in the FY 1954 Midyear Budget Review.

Assisted Inventory Accounting in completing reconciliatory work on the recent physical inventory of fuels and lubricants. The over-all results reflected a variance of $58 between the physical inventory value and the reconciled book value. The shortage represents .018% of the 1953 disbursements which totaled $323,412 or 1,920,005 gallons of fuel, 38,791 gallons of oil, and 38,773 pounds of grease. A final status report indicating detailed results and an explanation of variances for each type of fuel has been jointly developed and will be issued on or about March 1.

Completed arrangements on February 3 with the General Cost Unit, Inventory Accounting Unit, and the Computing Unit to accomplish a month end audit and reconciliation of IBM disbursements with actual disbursing documents. Variances from IBM key punch errors reflect as physical shortages or overages by the Transportation Section. This method of control is being incorporated in the Accounting and Document Control Procedure for the Fuel and Lubricants Inventory which was placed into effect concurrent with the physical inventory on January 20.

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Transportation Section

Tentative arrangements have been completed with the General Cost Unit and the Computing Unit for the issuance of IBM Motor Vehicle Operating Reports on a quarterly basis rather than monthly as in the past. The new quarterly report will furnish additional historical data as to the average cost per mile and cumulative mileage since acquisition. This data has been sought for about three years and should prove of considerable value with respect to maintenance and replacement programs.

Initiated and collaborated with the General Cost Unit in devising new monthly financial statements for Railroad Track Maintenance and Plant Road Maintenance.

Greater emphasis has been placed on the proper processing of work orders in accordance with established Plant guides. Steps have been taken to more adequately furnish or obtain required data.

Completed budget estimates and a narrative justification on materials and other costs for FY 1955 and FY 1956; also on civil defense and office furniture and equipment.

Construction of the Consolidated Transportation Facility progressed from 20% on January 22 to 25% on February 19. This is still approximately 6% behind schedule primarily because of adverse weather and carpenter strike in January. The Contractor now has approximately 65 craftsmen engaged in this activity.

RAILROAD ACTIVITIES

Commercial cars handled during February decreased 1.86% over January. The following recapitulation indicates the distribution of commercial cars handled:

Carload Movements -	Loads In	Empties In	Loads Out	Empties Out
General Electric Company	790	13	12	804
A.E.C.	47	-	-	34
A.E.C. - Kaiser Engineers	71	-	-	61
Blaw-Knox	34	-	-	34
Gaasland Construction Co.	4	-	-	4
Granston Inc.	0	-	-	1
Grove,Wilson,Shepard & Kruge	1	-	-	1
L. H. Hoffman Company	4	-	-	4
Kaiser Engineers	83	-	-	105
D. V. Libby & Co.	3	-	-	4
Soule Steel Co.	1	-	-	4
Sound Construction Co.	9	-	-	9
U. S. Army	13	-	-	15
	1,060	13	12	1,080

Transportation Section

Process service has been severely restricted since January 25 due to uncontrolled contamination. Considerable personal clothing of train crew personnel has been confiscated and serious difficulties have been encountered by equipment being frequently out of service. Service is still being rendered under strict SWP control. These restrictive operating conditions in conjunction with scheduling complexities necessitated 639 hours of overtime in February as actual cars handled increased 4.27%over January.

Total car movements including process service totaled 2,624 in February compared to 2,545 in January.

The modification of well car 10B-3639 to accommodate a third cask has been completed by the Minor Projects Sub-Section. This car was brought to Riverland for annual inspection and maintenance services which were completed on February 4.

AUTOMOTIVE ACTIVITIES

The Plant Bus System transported 8.1% more passengers in February than in January. Increased passenger volume largely resulted from adverse weather conditions. The following statistics indicate the magnitude of service rendered:

Passenger volume	158,715
Revenue - bus fares	$ 7,391.36
Earnings - transit advertising (January)	$ 67.18
Bus trips	6,968
Bus miles - passenger carrying	194,003
Passenger miles	4,763,792

A survey was made on February 23 at the request of the Community Operations and Real Estate Department to determine the feasibility of eliminating certain shuttle bus stops on Jadwin Street adjacent to the uptown shopping district. This survey disclosed that three of the stops could be discontinued in the interest of additional parking facilities.

Special bus transportation was provided on February 25 for a tour of the Manufacturing Areas for approximately 35 official visitors.

The Richland Bus System transported 14.58% more passengers in February than in January primarily because of inclement weather. The following statistics indicate the volume of service rendered:

Total passengers including transfers	15,339
Revenue - bus fares	$ 906.25
Earnings - transit advertising (January)	$ 3.08
Bus trips	1,194
Bus miles - passenger carrying	6,328
Passenger miles	23,467

Transportation Section

Off-Plant chauffeured automobile trips (Company business and/or official visitors totaled 175 which were rendered to the following locations as indicated:

Benton City, Washington	6
Enterprise, Washington	1
Grandview, Washington	3
Hinkle, Oregon	14
Kennewick, Washington	15
Pasco, Washington	101
Pendleton, Oregon	11
Prosser, Washington	3
Richland "Y", Washington	1
Sunnyside, Washington	10
Walla Walla, Washington	4
Whitstrand, Washington	4
Yakima, Washington	2

The following tabulation indicates the volume of fuel distribution by Equipment Maintenance personnel:

	Gasoline	Diesel Fuel	50 Cetane	Kerosene	White Gas
Stock at start of month	43,867	24,277	5,500	2,950	395
Received during month	135,934	25,300	42,700	7,112	0
Dispensed during month	141,866	23,107	39,100	8,105	164
Stock at end of month	37,935	26,470	9,100	1,957	231

The following tabulation indicates the volume of inspection and maintenance service rendered to Hanford Atomic Products Operation automotive and heavy equipment by Equipment Maintenance personnel:

Motor overhauls	71
Class A Inspections and Repairs	120
Class B Inspections and Lubrications	942
Semi-monthly Inspections - Buses	78
Weekly Inspections - Fuel Trucks and Off-Plant Vehicles	57
Other Routine Maintenance Repairs and service calls	2,130
Accident Repairs and Paint Jobs	34
Tire Repairs	572
Wash Jobs	378
	4,382

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Transportation Section

The following tabulation indicates the Plantwide usage of automotive equipment:

Code	Type	No.of Units	Total Mileage
1A	Sedans	337	514,442
1B	Buses	102	178,421
1C	Pickup Trucks	460	234,945
1D	Panel,Carryall,Station Wagon	153	135,386
1E	Armored Cars	3	131
1G	Jeeps	2	213
68 Series	Trucks	206	78,618
		1,263	1,142,156

LABOR ACTIVITIES

Produced 1,518 cubic yards of 5/8" to 1/4" mineral aggregate for the annual seal coating program requiring 342 man-hours; and 200 tons of pre-mix material requiring 60 man-hours.

Maintenance of primary roads required 1,859 man-hours (includes 1,218 man-hours for sanding operations and snow removal): walkways, parking lots, and related ground maintenance in the Manufacturing Areas required 43 man-hours.

The following tabulation indicates in tons the volume of road asphalt material handled by Road Maintenance personnel:

	MC 3	MC 5
Stock at start of month	83.91	79.97
Received during month	0	0
Used during month	0	0
Stock at end of month	83.91	79.97

The following tabulation indicates the volume of road aggregate materials handled by Road Maintenance personnel:

	3/4" to 0 Pre-mix Tons	½" to 0 Pre-mix Tons	5/8" Chips Cu.Yd	¼" Chips Cu.Yd.	3/4" Crushed Rock Cu.Yd.
Stock at start of month	281	0	1,799	4,872	2,136
Made during month	0	0	1,518	0	0
Used during month	49	0	0	127	94
Stock at end of month	232	0	3,317	4,745	2,042

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March 4, 1954

ELECTRICAL DISTRIBUTION AND TELEPHONE SECTION

MONTHLY REPORT

February, 1954

GENERAL

The Section total work force was one hundred and sixty-nine (169) as of February 28, 1954, an increase of one from last month.

Process power peak demand for February:

Date	Demand KW	January Comparative KW Demand
2-16-54 (9:30 AM-10:00 AM)	113,000	116,125

All position analyses for the proposed position evaluation plan were completed and delivered to Salary Administration on February 23. Work was immediately begun on the next program step, position descriptions.

ELECTRICAL DISTRIBUTION UNIT

Maintenance and Operation

During a four hour planned outage on February 13, broken insulators at four locations on the 66 KV lines were replaced. Previous cold weather apparently caused the failures.

Modernization changes to the MA-18 pneumatic operating mechanisms on the 4FK-39-230 KV breakers were started on February 15. The work on the breaker located at the 251 substation is scheduled for completion on February 26; the work on the remaining three breakers which are located in 100-H Area are scheduled for completion during the month of March. The work on the breaker at 251 substation is being done under direct supervision of L. W. Baur, GE Field Engineer of the Seattle office. Mr. Baur's services will not be required on the remaining breakers.

ELECTRICAL DISTRIBUTION

Maintenance and Operation (Continued)

Inspection and tests of all 230 KV bushings in the 151-B-C switch yard indicated that bushings on A and C phase of breaker A-325 should be replaced. These were replaced by bushings from our spare parts warehouse. Negotiation with the GE Apparatus Sales Office in Pasco resulted in the faulty bushings being returned to the factory for repair. Because of defective materials used in their assembly, the repair will be made at no cost to the project.

Electric service was interrupted in the Hanford Area from 7:23 to 9:51 PM on February 8. The trouble was the result of a wild goose coming in contact with the primary line.

On February 19 at approximately 9:00 PM, personnel were called out to repair security lighting circuits in the vicinity of 221-T Building. Repairs were completed and the circuit energized at 1:30 AM. High winds caused a break in the circuit.

System Expansion and Planning

The electrical demand telemetering installation was placed in operation on February 8.

The second 3750 KVA transformer for the 300 Area was placed in position during the month and will be energized following ratio and Doble testing.

Numerous cables and new equipment in 100-K west were hi-potted and Doble checked during the month.

In order to minimize power outages at 100-K during the stacking and pump test periods, twenty-four hour operator coverage has been established at the Hanford Substation.

TELEPHONE UNIT

Maintenance and Operation

Two cable crews were assigned to preventive maintenance work on area exchange and trunk cables. Approximately 22 lead repair sleeves were installed and 600 lashing wire clamp, cable spacer and support assembly installations were made.

Repeating coils and condensers to be used for providing ten additional Richland-North Richland trunks for Richland residential phones were installed on the North Richland exchange.

System Expansion and Planning

Installation of telephone equipment in the mobile Civil Defense Control Center was completed during the month.

TELEPHONE UNIT

System Expansion and Planning (Continued)

Installation of telephone equipment in the Control Center located in the basement of 703 Building was completed during the month except for the locations of the desk sets.

A line cutover plan for transferring official lines out of the Richland Exchange was prepared.

Detailed plans were begun for the installation of a 10 KVA emergency generator to serve the auxiliary Civil Defense Control Center and Patrol Emergency Officer communication requirements.

A proposed distribution cable layout was begun for the Richland heavy industrial area which extends along the east side of Wellsian Way.

A summary of telephone service is as follows:

	Subscriber Stations In Service		Lines Available For Service	Sides Available For Service	Exchange Lines In Service
	Res. and Misc.	Official			
Richland	6078	985	48	236	3985
N.Richland	357	217	172	37	418
Process Areas	25	1834	344	-	1677
Total	6460	3036	589	273	6080

Richland Exchange four-party service:

	February 20, 1954	January 23, 1954
Number of Subscribers	1209	1144
Number of Vacant Sides	147	164

Eighty-two (82) new requests for residential telephone service were received, making the backlog four hundred and forty-nine (449).

Service orders during the month were as follows:

Residential and commercial	271
Official (permanent)	213
Official (temporary)	75
Total	559.

R B Britton
ELECTRICAL DISTRIBUTION
AND TELEPHONE SECTION

RB Britton:MAW:ag

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POWER STATISTICS
ELECTRICAL DISTRIBUTION AND TELEPHONE SECTION
FOR MONTH ENDING FEBRUARY 28, 1954

	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)	27490	21730	42800	42400	86.3	76.3
A-4 Out (100-D)	16600	15180	23400	24800	95.3	91.1
A-5 Out (100-H)	9420	9130	16200	16200	78.2	83.9
A-6 Out (100-F)	7120	7070	11800	12700	81.1	82.8
A-8 Out (200 Area)	5830	5560	9500	9500	82.5	87.1
TOTAL OUT	66460	58670	103700**	105600**	86.1	82.7
MIDWAY IN	67209	59130	103200*	102400*	87.5	85.9
115 KV System						
B1-S4 Out (N. Richl.)	2846	2371	5587	5126	68.5	68.8
B1-S5	122	108	518	518	31.7	31.0
Richland	12798	10724	29440*	25920*	58.4	61.5
BB3-S4 Out (300 Area)	2104	1712	3520	3520	80.3	72.4
TOTAL OUT	17870	14915	39065**	35084**	61.5	63.2
Benton In	17940	15220	37600*	39600*	64.1	57.2
So. Richland In	80	100	0	0	0	0
TOTAL IN	18020	15320	37600**	39600	64.4	57.6
66 KV System						
B9-S11 Out (100-K)	1524	1578	2640	3040	77.6	77.2
B7-S10 Out (W. Bluffs)	609	546	1755	1553	46.6	52.3
Hanford Out	76	80	300**	300**	34.0	39.7
TOTAL OUT	2209	2204	4695**	4893**	63.2	67.0
HANFORD IN	2189	2238	4300*	5600*	68.4	59.5
Project Total						
230 KV Out	66460	58670	103700**	105600**	86.1	82.7
115 KV Out	17870	14915	39065**	35084**	61.5	63.2
66 KV Out	2209	2204	4695**	4893**	63.2	67.0
TOTAL OUT	86539	75789	147460**	145577**	78.9	77.5
230 KV In	67209	59130	103200*	102400*	87.5	85.9
115 KV In	18020	15320	37600**	39600**	64.4	57.6
66 KV In	2189	2238	4300**	5600**	68.4	59.5
TOTAL IN	87418	76688	145100	147600	81.0	77.3

* Denotes Coincidental Demand
** Denotes Non-Coincidental Demand

Average Power Factor-230 KV System 91.1
Average Power Factor-115 KV System 92.3
Average Power Factor- 66 KV System 85.8

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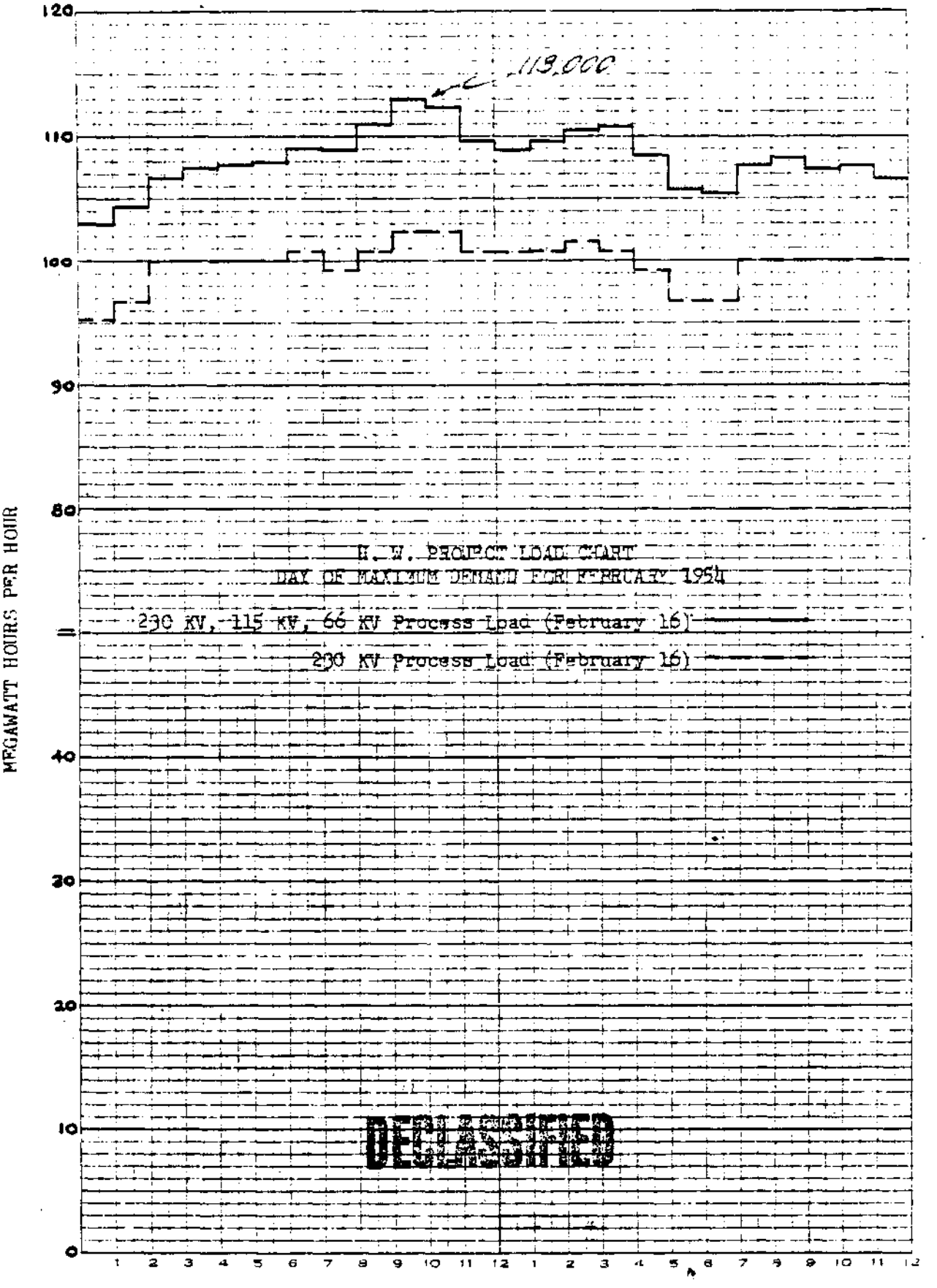

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PLANT AUXILIARY OPERATIONS DEPARTMENT
OPERATIONS ANALYSIS SECTION

MONTHLY REPORT - FEBRUARY, 1954

Personnel Statistics

Following is the month end summary of personnel:

Operations Analysis Section

	As of 1-31-54			As of 2-28-54			Net Change		
Unit	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
General	1	1	2	1	1	2	0	0	0
Applied Mathematics	20	6	26	22	5	27	+2	-1	+1
Computing	8	43	51	6	47	53	-2	+4	+2
Graphics	1	10	11	1	10	11	0	0	0
Procedures	11	4	15	12	3	15	+1	-1	0
TOTAL	41	64	105	42	66	108	+1	+2	+3

Applied Mathematics Unit

	As of 1-31-54			As of 2-28-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	2	3	1	3	4	0	+1	+1
Administrative Statistics	5	0	5	5	0	5	0	0	0
Technical Statistics	3	2	5	5	0	5	+2	-2	0
Mathematical Analysis	3	0	3	3	0	3	0	0	0
Numerical Analysis	8	2	10	8	2	10	0	0	0
TOTAL	20	6	26	22	5	27	+2	-1	+1

During the month one steno-typist was added to the staff. Two technical graduates of the Technical Statistics Sub-Unit were added to the exempt roll.

[redacted]

Computing Unit

	As of 1-31-54			As of 2-28-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	0	1	1	0	1	0	0	0
Audit and Control	1	6	7	1	6	7	0	0	0
Key Punching	1	17	18	1	20	21	0	+3	+3
Machine Processing	5	20	25	3	21	24	-2	+1	-1
TOTAL	8	43	51	6	47	53	-2	+4	+2

Three key punch operators were hired during the month of February. One exempt supervisor was transferred to non-exempt operator status due to a re-organization which eliminated one shift. One exempt scheduler terminated.

Graphics Unit

	As of 1-31-54			As of 2-28-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	1	2	1	1	2	0	0	0
Illustrators	0	7	7	0	7	7	0	0	0
Graphic Designer	0	2	2	0	2	2	0	0	0
TOTAL	1	10	11	1	10	11	0	0	0

Procedures Unit

	As of 1-31-54			As of 2-28-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	1	2	1	1	2	0	0	0
Clerical	0	2	2	0	2	2	0	0	0
Procedure Analysts	10	0	10	11	0	11	+1	0	+1
Technical Graduate	0	1	1	0	0	0	0	-1	-1
TOTAL	11	4	15	12	3	15	+1	-1	0

One technical graduate on the rotational training program was transferred to another department. One operations analyst was transferred into the Unit effective 2-1-54.

[redacted]

FOR THE MANUFACTURING DEPARTMENT

Because of changes in test pile calibration and also in the actual specifications of P-10 pieces, it was necessary to develop a new sampling plan for the reactivity testing of P-10 slugs. The new plan calls for more testing than was previously used until the quality and variability of the material can be established. Should the amount of variation within the product be small, it may be possible to return to a "reduced" sampling plan. (HW-30882, "Sampling Plan for Reactivity Tests on P-10 Slugs - Effective February 1, 1954", to H. A. Fowler.)

A preliminary appraisal of the recently completed F-reactor reorificing has been made. Items of major interest in this appraisal are the accuracy with which the calculations predicted the actual post-startup conditions, and the savings realized by making these predictions on a tube-by-tube basis on electronic computing equipment. It was found after start-up that only 350 out of some 2000 panellit gauges had been incorrectly set. The majority of these were in the fringe zones where the anticipated amount of sloughing did not take place. This figure is well below that expected in carrying out the reorificing on a semi-empirical basis. The calculations saved an estimated three days outage time. In terms of product actually gained at G-reactor, and the gain in production at B, H, DR, and D-reactors realized by moving their reorificing dates up three days, a saving of some $75,000 was realized. This saving is in addition to that resulting from the reorificing alone, namely, a saving in pumping costs of approximately $100,000 a year per reactor. Throughout the calculations a rigid time schedule had to be met. After the orifice pattern was established, three days were allowed to predict panellit pressures, header pressures, individual tube and total water flows, and panellit gauge bases, all for two different modes of pile operation. Work is now proceeding on the reorificing calculations for H-reactor.

Statistical services are being rendered on the current project of the Process Sub-Section, Separations Section, to place precision statements on product transfer and inventory figures. These services have included such problems as supplying them with the best estimates based on current information for precisions on the assigned MWD/t and the precisions on grams/ton predicted from assigned MWD/t. Also the best methods from a statistical standpoint for combining the individual precision statements into statements to be applied to over-all material balance reports were investigated. Oral reports have been made covering each stage of the investigation and such reports will continue to be made until the project has been completed.

Routine computational work for the Manufacturing Department this month consisted of a D-reactor panellit gauge report and reduction of data from DR, H, and D-reactors.

The procedural and utilization study of the IBM 602-A calculator in the 100-H Production Scheduling Group was completed. It was recommended that the present machine be retained and not replaced by an IBM 604 calculator. (Letter dated February 12, 1954 to E. T. O'Sullivan from C. B. Poland III.)

The final plates for the Manufacturing Annual Report and Yearbook were completed by Graphics in February. A decision was made by Manufacturing Department management to eliminate the use of more than one color. This change made it necessary to transfer all overlay material previously prepared, back to the master plates. All of the revised material is now being printed and a review at this date of a number of pages just off the press, indicate the report will be quite satisfactory without the use of color.

Additional graphics work for the Manufacturing Department included posting of current data to twenty charts to be used in the monthly "Statistical Quality Report -

Additional computational work on the fast effect in hollow slugs has been requested. Previous calculations will be repeated using different cross-section values. This work is part of the continuing study on the suitability of hollow slugs.

As part of the disaster study the safety circuits in K pile were investigated to determine what combination of safety device failures could conceivably result in some kind of disaster. Critical conditions of various types, e.g., drop in water pressure, power failure, etc., were considered from the viewpoint of how the safety circuits operate in each case. This makes it possible to determine which devices must fail in order for a disaster to result. The next problem is to get some estimate of the reliability of such devices. This information, together with information on the expected frequency of the various critical conditions, could be combined to give an over-all estimate of the probability of a disaster.

The Heat Transfer group has recently expressed interest in the work being done for the Design Analysis group on the theoretical distribution of pressure and quality of water in a reactor process tube. Results previously obtained for the case of uniform heat generation show marked discrepancy with experimental results in the regions of boiling. Attempts are presently being made to reconcile these results before proceeding with the case of non-uniform heat generation, which is of more practical value. The two groups referred to above will share the results of this work, which will assume paramount importance in the design of reactors to be operated at greatly elevated power and water pressure levels.

Plans for the accurate determination of the exposure of a single column in connection with Project Bluenose have been set. Data necessary to the calculation of exposure will be recorded in punched tape at the reactor. These data will then be transcribed into punched cards on the tape-to-card converter. A table look-up operation will then be required to convert the coded data into meaningful numbers for computation. Approximately 115,000 digits of coded data will be processed daily in this manner. The availability of the tape-to-card converter will prove indispensable to this problem, as some 3000 cards will be punched daily. By using the converter rather than keypunch methods the recording of the original data will be greatly facilitated, and a direct saving of at least 30 man-hours per day will be realized.

Radioactive decay tables for the elements gold and polonium have been completed. These tables, containing over 12,000 entries, are useful in foil counting measurements of pile flux. Copies of the tables have been sent to the plant library, where they will be available to interested personnel.

The Radiochemistry group has requested the computation of the concentration of eight to ten isotopes of uranium, neptunium, and plutonium as a function of exposure in a reactor. The method of computation is outlined in the October, 1951 issue of Nucleonics, which demonstrates the solution of a set of simultaneous linear first order differential equations. The neutron capture and fission cross sections and beta decay constants for the various isotopes appear as parameters in these equations. These cross sections and constants will be adjusted to give agreement between the calculated and observed concentrations of the isotopes. A

more refined version of this problem has been formulated by the Advanced Technology Sub-Section. The problem remains essentially the same; however, the refined version contains strong non-linearities, and the computational procedure referred to above will not be feasible. Since extreme accuracy is not important, the possibility of solving the problem on an off-site electronic differential analyzer has been discussed and is now being further investigated.

The relationship between grams of plutonium per ton and MWD per ton was estimated from specially collected data. The precison which can be attached to MWD/t values assigned to pushes was estimated from the data. The precision of g/t values estimated from the relationship between g/t and MWD/t was determined for dissolver batches, pushes, and accountability periods. The relationship and associated precision will be used for predicting the plutonium content in irradiated metal for various assigned MWD/t push values. (Letter to E. M. Kinderman, "Precision of g/t Estimated From MWD/t.")

A sampling plan is being formulated which will facilitate the investigation of the distribution of fission products within irradiated slugs. The results of this experiment will supply information as to the optimum size and shape of slugs.

Calculations relating to the galvanic corrosion effect of dissimilar metals immersed in various solutions have been partially completed. Some 380 numerical integrations were performed on the electronic calculator to yield the net charge transferred in a given time interval by each of 380 galvanic cells involved in the study. The results were displayed in a somewhat unique fashion. The new tabulator was used to plot the individual data points as a function of time, with the time axis running in the direction of paper feeding. This technique affords a rapid, economical way of obtaining a graphical picture of data in punched cards, and may form the basis of a more general plotting system.

A large number of aluminum polarization curves had been fitted by assuming that the curves could be broken into two distinct parts--that caused by the anodic effect and the due to the cathodic effect. Since there was some question in the experimenter's mind that this was a legitimate assumption, the question of whether or not the curve could be fitted "better" without making this assumption was considered. The criterion of judgment used was to see if some other method would cause the sum of squares of distances from the experimental points to the fitted line to be made smaller.

Purex and Redox extraction scrub studies have been conducted with plant- and laboratory- prepared dissolver solutions. Decontamination factors of the various dissolver solutions were determined. Statistical analyses are being conducted in order to determine which laboratory solutions are best. Tests will be conducted to determine which experimental laboratory solutions resulted in better decontamination than the plant solutions currently used in the scrub columns.

At a meeting with personnel of the Separations Technology Sub-Section an experiment was laid out for the collection of data to establish the average percentage of product recovered from slag and crucibles in the new recuplex process. It is desired to establish an average recovery figure and also an average percentage

product charged to wastes. These data are now being collected and an analysis will be made in the near future.

Three gaseous mixtures sampled at different points in the 108-B building were analyzed using the mass spectrometer to determine whether or not a sample at one point were sufficient to determine the percentage contents. The precision which may be attached to the mass spectrometer analysis alone is very important in answering this question. A number of mixtures of H_2 and He were formed, and several determinations of the percentage of H_2 made for each mixture. The resulting data were used to estimate the reliability of the instrument. A report on the entire problem is being prepared.

An extension of the recently completed Bessel integral tables has been requested. This extension will actually produce the Ki_3 functions, which have found repeated application in theoretical studies of neutron behavior in slugs. In addition to being required immediately for a physics problem, this work is an excellent example of the usefulness of the original tables. The original tables are presently being prepared for publication.

Consultations with members of the Advanced Technology Sub-Section and others on problems related to some economic studies were continued.

Routine computational work for the Engineering Department this month consisted of curve fitting to exponential pile data, lattice conductance calculations for October, November, and December, 1953, data from DR-reactor, special request exposure calculations, and group nine metal studies calculations. Incidental hand-computing service was rendered the Advanced Technology Sub-Section during the month on work associated with a new slug design study.

The conversion of the Classified File from a manual to a punched card system is 33% complete in key punching and 11% completed in error checking. All other operations are progressing satisfactorily in relation to these two. The "HW" series of documents has been completely punched. Proof listings created as a by product of the conversion can be used in the contemplated inventory of the central file holdings at a savings of approximately 130 overtime man days.

The details of a recommended system of routing and field transfer of Classified copies were presented to the Classified File management. The principles of the routing system were accepted. The designing of the forms and the planning of the details of the mail operation are now in process.

At the request of Process Engineering of the Design Section, Graphics constructed two modeled dimension adjustment units and installed them in a nozzle discharge fitting. This adjustment was made as an aid to the vendor for re-casting the nozzle discharge unit and due to the intricate internal curvature of the unit it would have been extremely difficult showing the desired changes on drawings.

Work is progressing on the Purex Section Model being prepared for Process Engineering. The greatest amount of detail requested in the original specifications

involved development of the H Cell complete with all jumpers, connectors, and piping 2" O.D. and over. The specifications were changed to include 1" piping and ½" pile indications. This phase of the project is now 100% complete. Work on the Hot Pipe Trench is now in progress.

Routine Graphics work for Process Engineering included preparation of four log-log charts on "Calculated Dose Rates - Vacuum Head Tank, Reactor, and S N Receiver"; and preparation of four lecture aid charts for Design Analysis.

Graphics work for Applied Research included preparation of seven graphs, one schematic drawing and one section view illustration for document HW-30543 titled "Gamma Scintillation Photometry Using Radioactive Sources"; completion of four graphs for document HW-29751 titled "In-Line Analysis of Metal Recovery Process Field"; preparation of one detail and assembly drawing, one arrangement drawing, one electrical diagram and eleven graphs for document HW-30638 titled "Gamma Ray Spectroscopy Using a Gas Filled Proportional Counter"; preparation of two graphs for document HW-30643 titled "Determination of Dibutylphosphate"; preparation of two graphs for document HW-29645 titled "Dye Injected Into Input Stream"; and preparation of photo copy for documents HW-29782 and HW-30635.

Graphics work for Fuel Technology included preparation of flow charts for slides on "Aluminum Corrosion"; preparation of thirty-eight pages of photo copy for a report titled "Electromagnetic Detection of Al-Si Penetration"; completion of illustrations and graphs for a report titled "The Hydrogen Content of Fabricated Uranium"' preparation of material for a "Quarterly Report - FY 1954 - ROS-TFI"; preparation of photo copy for a report titled "Hot Press Nickle Plated 8" Slug"; and preparation of photo copy for the Monthly TAR Report.

Graphics continued working on a series of twenty-seven drawings for Pile Technology. These illustrations are to be used in a manual of "Special Irradiation" and include detailed cross-section views of process tubes, channels and magazine facilities.

Additional graphics work for Pile Technology included preparation of an illustration showing details of a Pigtail Venture; preparation of one graph and retouching fifteen photos for a publication in the Journal of Reactor Science and Technology; and preparation of photo copy for informal reports.

Eighteen non-routine jobs were completed for the Engineering Department by IBM.

FOR THE PLANT AUXILIARY OPERATIONS DEPARTMENT

Detailed information on employee attitudes in particular organizational groups is being supplied to department and section managers requesting more information than was presented in the report to management on the 1953 attitude survey. At present, reports have been issued to the managers of the Operations Analysis Section and the Electrical Distribution and Telephone Section. Seven additional studies have been requested to date. Machine techniques similar to those used in the over-all attidue survey are being used for these analyses.

At the request of the Safety and Fire Protection Unit a major injury award plan was designed for all Community activities. Injury data for these activities has been kept separately since January 1, 1954. The newly designed plan will have probabilities of winning awards similar to those of the present plant major injury award plan. (Letter to F. J. McKinnon, "Community Injury Annual Plan", dated February 25, 1954.)

Twenty new or revised IBM internal operating procedures were prepared for the Computing Unit by the Procedures Unit.

A new system of production control of IBM machines and operators was initiated for the Computing Unit. This system includes a daily analysis of the operation of the key punches and verifiers, and a weekly analysis of all other machines. These analyses will cover card volume, operating time and efficiency on a detail and summary basis.

As a part of the conversion from the IBM type 403 to the IBM type 407 Accounting Machine, the Procedures Unit is wiring the control panels. As of the end of the month, 13 completed panels had been delivered to the Computing Unit and 12 panels were in various stages of completion.

Work is progressing in the graphical development of flow charts to be used in Operation Analysis reports. Additional design in format, mechanics and standards was required to facilitate recent requirements in Operations Research presentation.

One consolidated drawing is being prepared which will show existing Procurement and Accounts Payable flow together with the proposed flow. Similar layout will be used on the existing and proposed Receiving flow charts.

Other graphics work for Operations Analysis included preparation of two curve charts on Receiving; one flow chart on File Operations; preparation of two master plates for 1954 Monthly Accident Statistics Reports; and posting of current data to the Operations Analysis Control Charts.

For the Plant Auxiliary Operations Department, 14 routine IBM machine reports and four non-routine jobs were completed for a total of 18 service requests.

FOR THE RADIOLOGICAL SCIENCES DEPARTMENT

An extensive correction of all past aquatic biology data has been completed. Some 25,000 cards were corrected and listed. The listings were made on the new tabulators, which will be used to process aquatic biology data routinely in the future.

Additional computational work has been requested in determining the probability of atmosphere contamination on the basis of data gathered at the area weather tower. An analysis similar to that performed on 1951 and 1952 weather data will now be made on 1953 data. A three-way frequency distribution of weather recordings will be made. The variables are wind speed (5 categories), wind direction (18 categories), and vertical temperature gradient (3 categories). The data to

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be used is part of that routinely collected and processed. This information is essential to the prediction of atmospheric trends and their possible bearing on radioactive contamination.

Several experiments have been conducted on pigs and sheep to determine what effect the feeding of radioactive materials has on the various constituents of the blood. The resulting data will be analyzed for seasonal, age, and time effects. The results of these experiments will supply information pertinent to radiological health standards.

Routine computational work for the Radiological Sciences Department this month consisted of Aquatic Biology calculations, sheep thyroid and radioanalysis calculations, wind study calculations for December, and weather calculation for January. The present procedure for recording weather data on punched cards may possibly be revised in the near future, to conform with procedures followed by the various U.S. Weather Bureau stations throughout the country. The chief advantage of this revision will lie in the ability to exchange weather information with off-site groups.

Graphics completed a "dummy" layout for an instruction booklet on "Radiation Protection" and submitted it to Radiological Sciences management for review. The "dummy" has been approved and work is in progress on the final plate masters.

A graphic illustrator was sent to the animal farm to prepare sketches of a surgical thyroidectomy. Three finished illustrations were prepared from the rough sketches and have been submitted to Toxicology of the Biology Section. The illustrations will be used in a report to be published as "Scientific Literature" at a later date.

Twenty-five graphs and charts were completed by Graphics for the Biology Section Annual Report - document HW-30437.

Graphics work for Exposure Illustration of the Radiological Standards Unit included preparation of a large area map for "Regional Survey Control Plot Locations"; completion of a "107 Basin Effluent"chart; completion of detailed "Waste System" maps; and completion of a graph titled "National Limit for Adult External Exposure".

Graphics work for Radiological Engineering included preparation of eight graphs and tables on "Characteristics of Water Effluent" and seven charts for document HW-30280 titled "Computations of a Reactor Accident".

Five routine IBM reports and one non-routine job, a total of 6 IBM service requests were completed for the Radiological Sciences Department.

FOR THE MEDICAL DEPARTMENT

A letter was issued to the Public Health and Welfare Section explaining the use of a nomographic chart prepared for use with the Wetzel physical fitness grid. (Letter: "Nomographic Aid for Wetzel Grid", to R. R. Sach, M. D.)

A procedure was developed for the routine preparation of personal accidents reports for Dr. Fuqua of Industrial Medicine. This procedure will provide an analysis of minor, sub-major and major injuries received.

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FOR THE EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

The composite results of the 1953 attitude survey as well as comparisons with the 1952 results were discussed with management at the Manager's Meeting. A letter presenting the highlights of the survey was prepared for the Manager, Employee and Public Relations Department, for offsite distribution.

IBM procedures covering special job requests were written to prepare: Labels to be used for addressing the Attitude Survey Report; Good Neighbor envelope stickers to be used for mailing membership materials, and, average hourly rates by job classification for the wage administration group.

The two cards per exempt employee in the current Salary Administration file have been combined into one card. A panel for IBM type 407 Accounting Machine has been prepared to be used for report preparation. This panel will be used for the preparation of all monthly reports. The procedures will be revised during March as the various reports are prepared. It is anticipated that in addition to the above changes there will be numerous changes and adjustments required during the next few months in connection with the new Salary Administration plan.

A rush assignment was given to Graphics jointly by the Manager of the Public Relations Section and a representative of the Public Relations Service Division to develop drawings of the proposed Hanford Dual Purpose Reactor. The drawings included a perspective cut-a-way scope illustration of the overall proposed plant and a schematic flow diagram of the process. These drawings are to be used together with a round up story for publicity purposes when approval by the AEC is granted.

For the Employee and Public Relations Department 40 routine reports and 7 non-routine jobs were completed for a total of 47 IBM service requests.

FOR THE FINANCIAL DEPARTMENT

A short table of logarithmic scale factors was computed for the Financial Department The calculations were performed on the card-programmed calculator.

A list of electric customers as of the end of January was prepared at the request of W. W. Kiester. This list was reconciled to the January billing totals. The processing of electric bills by Computing will end with the February billing. Beginning with the March billing, the work will be done on key driven equipment.

IBM procedures covering special job requests were prepared to perform a machine audit of Personnel and Payroll master files and to prepare a listing of the annual vacation detail file for control purposes.

Revisions were made to the procedures for preparing Work Order Summary reports, for calculating motorized equipment motor pool charges, for distributing the cost of printing and duplicating, and for distributing the labor cost for regular earnings or vouchers.

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A new procedure was prepared to enable Computing to prepare a listing of railroad cars showing the distribution of switching costs. The first report was prepared for the month of February.

A revised time card form as proposed by Financial has been accepted. The revised card will provide additional statistical information and will permit printing on the card by the interpreter rather than the bill feed. The various payroll procedures and cards forms are currently being revised to accomodate the new form and the additional information. New forms for the time card, "Weekly Salary Roll" register and the IBM detail card have been ordered. The new procedures are scheduled to be put into effect for the week ended April 4, 1954.

New forms for weekly payroll checks and earnings statements and a new weekly salary register are being prepared for proposal to the Financial Department. The new forms will permit a complete change over to the IBM type 407 accounting machines. The target date for this revision in the payroll procedure is July 1, 1954.

In spite of a 24 hour loss of production time during the month end closing week due to Washington's birthday, all month end closing reports were completed earlier in the week than ever before in the history of IBM at Hanford. The major reports were completed in an elapsed time of 2½ days. The best previous elapsed time of completion was 6½ days.

Delivery of principal month end reports to Financial Department are as follows:

Monthly Salary Distribution	2-26-54	10:00 A.M.
Vehicle Liquidation	2-25-54	10:35 A.M.
Servicing Unit Customer Breakdown		
Community	2-26-54	2:00 P.M.
Manufacturing	2-26-54	4:20 P.M.
Plant Auxiliary Operations	2-26-54	2:00 P.M.
Customer Billing		
Community	2-26-54	5:30 P.M.
Manufacturing	2-27-54	9:10 A.M.
Plant Auxiliary Operations	2-27-54	10:00 A.M.

For the Financial Department 532 routine IBM machine reports and 18 non-routine jobs were completed for a total of 550 service requests. In addition, 25,262 paychecks and 25,262 earnings statements were prepared and 25,183 cancelled paychecks were reconciled.

FOR THE ADMINISTRATIVE STAFF

Work was done for Administrative Practices to determine the approximate distribution for recent product per cent recoveries across the 224-T building. The data were tested for a typical individual observations and finally to determine whether or not the average per cent recovery differed significantly from the expected value of 100 per cent. There was significant evidence that the recent average recovery has been biased low.

Plans for a study of production data handling have been completed. Final approvals for collecting data for this study are expected soon. When this study is completed information will be available from which intelligent decisions can be made about: 1) Security control of these data; 2) Data handling systems; 3) The relationship and importance of production data precision and accuracy studies that are being and have been conducted.

With regard to production scheduling in the 100 areas, definite progress has been realized in determining the precision associated with the present method of determining MWD/t assignments to tubes, buckets, and pushes. Alternative methods of processing exposure are being considered, and the precision of the MWD/t assignment under each alternative will be determined and compared with the present method.

Considerable effort has been directed toward a re-examination of the empirical relationship between grams of plutonium per ton of uranium and MWD/ton as reported for a given push. The precision of this relationship for predictive purposes has been thoroughly investigated. The application and usefulness for accountability purposes is now being formulated and firmed-up by actual accountability data.

An over-all investigation has been initiated in the 200 Area to determine precision and accuracy statements required at the various measurement points. At present, flow diagrams for the operations in that area are being contructed to give a clear indication of all measurement points which require precision and accuracy statements. When these diagrams have been finished the present method of data collection will be analyzed to establish the adequacy of the system for providing the necessary information for precision and accuracy studies as well as information for other purposes.

To further study paper work and related operations in the material control project, it was necessary to make certain inferences concerning the receiving operations. To accomplish this, a statistically designed sampling of the receiving report file was undertaken and the data subjected to statistical analysis. (Letter: "Statistical Analysis of Receiving Reports", to E. W. Slusher.)

In order to evaluate the distribution of costs in accounts-payable operations, a statistically designed sampling was made of accounts-payable vouchers to estimate the properties of the vouchers for various types of purchase orders. From the tabulated results of the sampling the desired information was obtained. (Letters: Statistical Analysis of Accounts-Payable Vouchers", to E. W. Slusher.)

A detailed statistical study of present purchasing practices has been made to provide complete information on the situation before the new purchase order forms are put in use. After the new forms have been in use, it is anticipated that another study of purchasing will be undertaken. From this study an evaluation of the effectiveness of the forms and suggestions for improving the system still further can be made. A report presenting the purchasing practices is in progress.

The investigation of procurement functions in connection with the Operations Research on Inventory Control is nearly completed. The charts of current paper flow were completed and reconctructed charts were prepared showing recommended flow and procedures. A recommendation was made that Purchasing, Accounts Payable and Inventory Accounting be transferred to Central Stores. As part of this recommendation was to establish a central file for the joint use of Purchasing and Accounts Payable. It is estimated that the direct annual savings that would result from the above recommendations would be in excess of $140,000. This savings includes a reduction in paper of 3,000,000 sheets and a reduction in active files to three instead of the ten currently being kept.

An evaluation survey of the Area Stores is currently being conducted.

Aggressive work on the electrical substation operations project has begun. The nature of this project was clarified at a meeting with representatives of the Electrical Distribution and Telephone Section and the Manufacturing Department. The method to be used in this study will be to compare the costs of different methods of doing sub-station switching and of different operating procedures. These costs will include capital costs, operating costs, and production losses resulting from inadequate electrical power supplies. Close contact is being maintained with both Electrical Distribution Unit and Manufacturing Department personnel since the operating practices of both these groups must be critically reviewed. Present indications are that greater savings may be possible by changes in operating practices rather than changes in the methods of sub-station switching.

The immediate purpose of the telephone project is minimizing the proportion of uncompleted calls occurring within the Richland exchange until such time as an additional Richland exchange is constructed. Although some consideration has been given to an investigation of the plant-wide telephone system, it was decided to restrict the present project to a minimization of loss among calls between subscribers of the Richland exchange. A more ambitious analysis would be impractical for several reasons: First, since the various exchanges throughout the system differ in the number of ranks of switches involved in the routing of calls, it would be necessary to employ a formulation of sufficient generality to apply to them all. This would be of prohibitive complexity. Second, a more comprehensive analysis would require consideration of traffic within and between all connecting exchanges, thus greatly extending the time needed for data collection and analysis. Third, there appears to be relatively little problem of lost calls outside of the Richland exchange.

During a review of mechancial restriction with the Telephone Unit personnel, it was decided that there is at present only one set of connections which are capable of modification. Therefore, as the first step in data collection, a plan has been devised to collect data permitting an estimate of the amount of improvement in service that is possible by optimizing this particular set of connection. As an indication of the causes of lost calls, the plan will investigate the occurrence of busy signals for each step in the dialing of numbers. In addition, it may be possible to determine which hundred groups have the greatest proportion of lost calls. If there appears to be good prospect of affecting an appreciable improvement, further data will be collected on the distribution of traffic and call lengths. From data

already available, a study of the latter has been made for official phones. It will be necessary to make similar studies for business and residential subscribers.

Finally, from the data and knowledge of telephone operations, an optimization will be sought for the switching connections of the Richland exchange. An attempt was made to formulate a mathematical model, but because of the near-infinite number of connections possible at the rank of selectors accessible to this program, a workable mathematical model seems out of the question. A stochastic, or Monte Carlo, method of attack to the problem was subsequently suggested. A large, fast computer would be vital to the success of this approach. By using the IBM 701 computer, it has been estimated that the eight-hour operation of a given exchange selector configuration could be simulated in a minute and a half. Decision to proceed with this calculation will depend on the results of preliminary studies to determine the suitability of the analysis.

FOR THE ATOMIC ENERGY COMMISSION

The backlog of computational work on the Hanford release calculations has been cleared up, and work is now in progress on the January, 1954 report. New decay tables have been completed for simplifying certain phases of the calculation.

A recently conducted "Pre-School Survey" was processed on IBM to provide lists of pre-school children by age groups within school districts.

METHODS DEVELOPMENT

D. E. Gowan of the Numerical Analysis group has recently completed a paper on the rational approximation method of evaluating fractional powers. Such evaluations are frequently required in problems of water flow in closed channels. A number of approximations developed by Mr. Gowan in his paper are presently being used in the routine reduction of water flow data from all reactors; they represent a marked improvement over the conventional (e.g., logarithmic) methods of evaluating fractional powers. Mr. Gowan's work is of sufficiently general interest to warrant publication in a journal of applied mathematics such as Mathematical Tables and Other Aids to Computation, and inquiries along this line are presently being made.

SUMMARY

During the month of February 97 statistical, mathematical, procedural, and graphical problems were completed, and as of February 28, a backlog of 158 problems were on hand. In addition 594 routine IBM reports and 55 non-routine IBM jobs were completed for a total of 649 IBM service requests; 25,262 paychecks, 25,262 earning statements, 7,357 electric bills were prepared; and 25,183 cancelled paychecks were reconciled.

A total of 108 new forms were designed; 373 orders for forms were reviewed of which 13 were rejected and 360 were approved for a total of 1,415,658 copies.

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Department Serviced	Percent of Services Rendered				
	Units				Operations Analysis Section
	Applied Mathematics	Procedures	Computing	Graphics	
Manufacturing	14	3	5	7	7
Engineering	38	13	6	43	20
Plant Auxiliary Operations	9	35	2	16	9
Community Operations & Real Estate	0	1	4	0	2
TOTAL OPERATING DEPARTMENTS	61	52	17	66	38
Radiological Sciences	2	1	3	15	4
Medical	0	1	0	1	0
Employee & Public Relations	2	1	5	6	4
Financial	0	15	72	7	39
Administrative Staff	28	28	0	5	12
TOTAL STAFF DEPARTMENTS	32	46	80	34	59
A. E. C.	7	2	3	0	3
TOTAL	100	100	100	100	100

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SUMMARY - FEBRUARY 1954

EMPLOYEE RELATIONS SECTION

The number of applicants interviewed in February was 2,163, as compared with 1,434 for January. In addition, 354 new applicants applied by mail. Open, nonexempt, nontechnical requisitions increased sharply from 111 at the beginning of the month to 342 at month end. Eighty-three employees were added to the roll and 56 removed during the month. Separations rate increased from .47% (adjusted rate) for fiscal month of January to .52% for fiscal month of February. These rates when converted to annual rates are 6.13% (adjusted rate) and 6.78%, respectively. During February 69 new requests for transfer to other type work were received by Employment, and 25 transfers were effected. Attendance recognition awards were distributed to 316 employees in February, including 145 who qualified for four-year awards.

One employee died during the month and three employees retired. Eighty-three visits were made to employees confined to Kadlec Hospital, and 46 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 97.4%, in the Insurance Plan 99%, and the Employees Savings and Stock Bonus Plan 47.7%. At month end there were 738 registered under Selective Service and 754 military reservists were on the roll. Since August 1, 1950, 321 employees have terminated to enter military service, of which 82 have returned, 17 have not claimed reemployment rights, leaving 222 still in military-leave status.

A total of 67 new employees attended orientation meetings. Of this number, 100% have signed up to participate in the Pension Plan, 100% in the Insurance Plan, and 80.6% in the Good Neighbor Fund.

Training and Development programs and activities were as follows: Conference Leading, Effective Human Relations, Customer Relations, HOBSO II, Principles and Methods of Supervision, Stenographic-Secretarial program, and a special program on HOBSO I.

PUBLIC RELATIONS SECTION

The News Bureau issued 37 news releases during the month. Of these, 22 were sent to the local list, 6 to the daily newspapers, and 9 received special distribution.

This month saw the News Bureau start distribution of a new "Hanford Atomic Science Series". News releases in this series will be sent out periodically, and will contain information about unique instruments, processes, or research activities at Hanford, explained in layman's terms.

Extensive publicity was given to speeches which were made by the Manager-Engineering and the Manager-Design Section in California. Biographies, portraits, and advance copies of the speeches and the news releases concerning the speeches were sent to the San Francisco Office. Advance copies of the news release also were sent to six other GE publicity outlets throughout the country.

PUBLIC RELATIONS SECTION (Continued)

Nat Farbman, LIFE photographer, and Robert Schulman, LIFE magazine writer, visited Richland to take pictures and gather information for a story on our plastic suit, which has been publicized in national magazines and newspapers recently.

Officials of the Inland Empire Science Fair, to be held April 7 and 8 at Spokane, have asked General Electric for a general exhibit. HAPO will supply the type of exhibit requested, and space also has been allotted for an educational aids exhibit.

"Here's Hanford," the feature-length motion picture produced in color for Employee Relations, was completed and delivered to Employee Relations. This film, intended for use in the new employee orientation program, also can be used for showings to public groups.

A very thorough story of the construction of an atomic moderator was recorded on 16mm motion picture film. This footage will play an important part in the Construction Progress Motion Picture being produced for HAPO and the Atomic Energy Commission.

Three Hanford Science Forum radio programs, on which two regional high school students and a HAPO scientist appeared as guest panelists, were written, produced, and broadcast this month. Four programs in the current Public Health Radio series, "For Better Living," which featured four Richland doctors and three Columbia High School students, also were written, produced, and broadcast this month.

A total of 185 photography assignments were covered during the month of February, and a total of 7,529 prints were produced. Of the total prints, 4,029 were "A" and "B" badge prints. A total of 3,500 were area and news work.

In an attempt to reduce the cost of photographic work at HAPO and to better utilize personnel and facilities of the Photography Unit, every opportunity is taken to send reprint work off the Plant to Commercial photographic facilities on a bid basis.

SALARY ADMINISTRATION SECTION

The normal administrative work of the Section, and the continued study of organization structure proceeded according to schedule. Audits in the field involving conformance with position descriptions and organization structure, and the review and evaluation of position descriptions were curtailed in favor of work described below.

R. C. Grant left for an extended trip to the East on February 19, in order to collect salary information from other components of the Company, and to reconcile Hanford salary levels with others.

A Position Analysis form was devised and distributed to all exempt employees. At month's end, over 95% of the forms had been completed and returned.

Employee and Public Relations Department Summary

SALARY ADMINISTRATION SECTION (Continued)

A Position Description form was devised and distributed to selected supervisors who began to write position descriptions for all exempt positions, based upon the position analyses.

A Position Evaluation Guide was devised jointly with Department Managers and was released to selected managers to be used in ranking positions.

An audit of salary administration records and practices was begun by HOO-AEC auditors. That part of the audit pertaining to the National Comparative Salary Survey was completed. Work was begun to collect position descriptions, comparison sheets, and salary record cards for about 100 positions selected by the auditors.

Approvals of the HOO-AEC to discontinue the National Salary Survey this year, and to abandon the existing Professional Salary Plan concurrent with the adoption of the Company-wide plan, were received.

UNION RELATIONS SECTION

An IBEW grievance charged us with a violation of the Washington State Safety Code for utilizing an electrical engineer and a shop foreman to rotate with the line superintendent and line foreman on week-end emergency coverage. At the request of the Union, Kenneth Scalf, Department of Labor and Industries, checked the matter and found the Company was in compliance with the Statute.

On February 16, radiation monitoring Inspectors presented their proposals on items requiring resolution prior to their becoming a party to the existing Agreement.

AEC internal auditors spent two weeks checking this Section's procedures, practices, records, and survey material.

The 1954 Northwest Area Wage Survey is underway with a completion deadline of April 1, 1954. A reimbursement authorization was received covering the requested approval for revised classification titles and progression schedules for bargaining unit reproduction and printing jobs. A reimbursement authorization for the establishment of a revised hiring rate program for Technical and Business Graduates was received from the Atomic Energy Commission. A jurisdictional agreement between the Electrical Workers and the Plumbers and Steamfitters, and an agreement between the Painters and Carpenters were submitted to the Company by the HAMTC. Arrangement was made with the Electrical Workers to remove the Richland electric meter reading job from the jurisdiction of the electrical craft. The classification of Instrument Worker was placed in a separate seniority group. Reclassifications and rate increases for 67 Engineering Assistants were effective February 15, 1954.

A plantwide review of all Laboratory Assistant jobs is in progress, and a review of nonexempt jobs in the Financial Department was completed. The annual review of preferential rates was completed and results forwarded to the respective department managers. Representatives of the Sandia Corporation and the Wage Rates group spent one day discussing wage problems and making a wage survey. The Wage Rates Unit also participated in a survey of personnel practices conducted by the Carbide and Carbon Chemical Company at Oak Ridge.

Employee and Public Relations Summary

TECHNICAL PERSONNEL SECTION

In the recruiting of experienced engineers, new PhD candidates, and BS or MS candidates, we are trying to maintain flexibility to meet any reasonable changes in requirements which may occur. PhD candidates interviewed earlier at the major universities are being invited selectively to visit Richland. Interview visits for BS-MS candidates are now nearly 50% completed, and offers are being made to the most promising students in the categories which match our need.

There are now 51 trainees on the Rotational Training Program, as compared to 58 at the end of January. Additional placements already negotiated but not completed will bring us down to 42 early in March. Suitable placement of most of this remainder by June is foreseen.

During the first semester of the School of Nuclear Engineering, 171 students successfully completed their courses, representing 75% of the 229 who paid tuition. The spring semester is started with 14 graduate and 9 college-level courses and an initial enrollment of 250.

Counseling activity, plus assistance in negotiating transfers where necessary, is being continued actively so as to afford all possible opportunities to present employees.

ORGANIZATION AND PERSONNEL

Total on Roll February 1, 1954	185
Accessions	6
Separations	9
Total on Roll February 28, 1954	182*

*This includes 51 Rotational Trainees

Employee and Public Relations

EMPLOYEE RELATIONS

ACTIVITIES

General

A summary of the utilization to date of the GE Selection Program For Supervisors was distributed to all Section and Department Heads to stimulate further interest in the Program.

Personnel Practices

	January, 1954	February, 1954
Applicants interviewed	1,434	2,163

900 of the applicants interviewed during February were individuals who applied for employment with the Company for the first time. In addition, 354 applications were received through the mail.

	January, 1954	February, 1954
Open requisitions		
Exempt	4	3
Nonexempt	111	342

Of the 111 open, nonexempt, nontechnical requisitions at the beginning of the month, 72 were covered by interim commitments. Of the 342 open, nonexempt, nontechnical requisitions at month end, 213 were covered by interim commitments. During February, 81 new requisitions were received requesting the employment of 264 nonexempt, nontechnical employees.

	January, 1954	February, 1954
Employees added to the rolls	70	83
Employees removed from the rolls	54	56
NET GAIN OR LOSS	+ 16	+ 27

Separation Rate:	Fiscal Month January, 1954		Fiscal Month February, 1954	
	Male	Female	Male	Female
	.44%	1.60%	.30%	1.41%

Over-all Separation Rate:	Fiscal Month January, 1954	Fiscal Month February, 1954
	.47%	.52%

Employee and Public Relations

EMPLOYEE RELATIONS

During February, 6 employees left voluntarily to accept other employment, 1 left to enter military service, and 3 left to enter business for self.

Transfer Data

Accumulative total of requests for transfer received since 1-1-54	101
Number of requests for transfer received during February	69
Number interviewed in February, including promotional transfers	63
Transfers effected in February, including promotional transfers	29
Transfers effected since 1-1-54, including promotional transfers	61
Number of stenographers transferred out of steno pool in February	2
Transfer requests active at month end	327

ADDITIONS TO THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
New Hires	7	53		60
Re-engaged	1	1		2
Reactivations	-	20	1	21
TOTAL ADDITIONS	8	74	1	83

TERMINATIONS FROM THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
Actual Terminations	3	20	1	24
Removal from rolls(deactivations)	1	30		31
Transfers	1	-	-	1
TOTAL TERMINATIONS	5	50	1	56

GENERAL

	1-1954	2-1954
Photographs taken	142	157
Fingerprint impressions	157	253

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	1-1954	2-1954
General Electric cases	52	81
Facility cases	27	9
TOTAL	79	90

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Employee and Public Relations

EMPLOYEE RELATIONS

INVESTIGATION STATISTICS

	1-1954	2-1954
Cases received during the month	147	347
Cases closed	74	44
Cases found satisfactory for employment	81	181
Cases found unsatisfactory for employment	1	7
Special investigations conducted	11	9
Cases closed before investigation completed	19	12

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	6403
One-year awards made in February for those qualifying in January	50
Total two-year awards to date since January 1, 1950	2041
Two-year awards made in February for those qualifying in January	61
Total three-year awards to date	815
Three-year awards made in February for those qualifying in January	60
Total four-year awards to date	145
Four-year awards made in February for those qualifying in January	145

During February, 8 people whose continuity of service was broken while in an inactive status were so informed by letter.

Ads were placed in the Walla Walla, Yakima, and Spokane papers for Production Operators. Due to the employment situation in the State at this time, results were somewhat overwhelming as will be noticed by the number of applicants applying personally. Four hundred and sixty-three inquiries were received by mail.

Employment representatives recruited Production Operators personally in Yakima February 15. Fifty-seven applicants previously screened by the Employment Security Department were interviewed of which 32 were placed in process.

In addition, ads were placed in the American Journal of Nursing, American Journal of Public Health, and Nursing Outlook, for Public Health Nurses. It is too early as yet to determine the results.

Supervisory Selection Program - During February, appropriate test batteries were administered to 29 candidates and test results were interpreted and reported to the interested evaluators.

Clerical - The Minnesota Clerical Test was used in 22 cases to test clerical applicants and the Wonderlic Test was administered in 24 instances.

Employee and Public Relations

EMPLOYEE RELATIONS

Metal Handlers - Four new employees in that classification were tested to add to the data for the validation study.

Instrument Trainees - Two prospective instrument trainees were tested neither of which was selected for further consideration.

The Secretarial and Stenographic Training Program was presented again for the 700,1100, and 3000 areas on February 12, 19, and 26. Seventy-seven invitations were sent and forty-six employees attended. All stenographers and secretaries have attended this training program with the exception of 15 in the outer areas, plus the 31 that were unable to attend this month.

The third annual style show and luncheon was presented by Gen Trics on February 27, 1954. Approximately 300 women attended. Proceeds from the affair are to be added to the fund established for Richland's handicapped children.

On February 27, 1954, an Employment representative attended the annual tea sponsored by the American Association University of Women for Columbia High School students planning to attend college. The students were seated at tables in groups according to their interests, for example, those interested in Art were grouped together, likewise, those individuals interested in Personnel Work as a career were seated together, at which table the representative presided.

Employee Benefits

The following visits were made with employees during the month:

Employee contacts made at Kadlec Hospital	83
Salary checks delivered to employees at Kadlec Hospital	46
Salary checks delivered to employees at home	2

At month end participation in Benefit Plans was as follows:

	January	February
Pension Plan	97.3%	97.4%
Insurance Plan	99%	99%
Employees Savings and Stock Bonus Plan	47.5%	47.7%

One employee died during February, namely:

Manufacturing

Thirteen letters were written concerning deceased employees and their families during February, regarding payment of monies from the Company and answering questions.

67 new employees attended Orientation Programs given by members of this group during the month of February. Of this number, 100% have signed up to participate in the Pension Plan, 100% have signed up to participate in the Insurance Plan, and 80.6% have signed up to participate in the Good Neighbor Fund.

Employee and Public Relations

EMPLOYEE RELATIONS

Since September 1, 1946, 139 life insurance claims have been paid totaling $872,013.

Three employees retired, namely:

Anthony J. Smith	W-6714-942	Normal Retirement
Nora P. Overman	W-3556-944	Optional Retirement
Joseph M. Francois	W-9164-942	Optional Retirement

During February, 25 letters were written to retired employees providing them with information of general interest. To date, 282 employees have retired at Hanford, of which 150 are continuing their residence in the vicinity.

During February, the Orientation film "Here's Hanford" was received and has been placed in use for Orientation purposes.

One Board of Trustees meeting for the Good Neighbor Fund was attended by a member of this group during February. To date, 538 new participants in the Fund have been added as a result of the last canvas for members. The present percentage of participation in the Good Neighbor Fund is 67.3%.

During the month, one member of this group made a trip in the Upper Yakima Valley to visit all high school principals to discuss with them the Company's Educational Assistance Program. Also, all GE dealers cooperating under the Employee Purchase Plan were contacted on this trip as a good will gesture and to assist them with any problems which they may have in the administration of the Plan.

Military Reserve and Selective Service

Statistics with respect to employees who are members of the military reserve are as follows:

Number of reservists on the rolls		754
Number of reservists classified in Category A	109	
Number of reservists classified in Category B	72	
Number of reservists classified in Category C	62	
Number of reservists classified in Category D	511	
Number who returned to active duty to date		136
Number who returned to active duty in February		—
Number of reservists for which 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	

Employee and Public Relations

EMPLOYEE RELATIONS

Delays requested (including renewals)	114
Delays granted	106
Delays pending	—
Delays denied	5
Delay requests recalled	3

The statistics with respect to employees registered under Selective Service are as follows:

Employees registered		738
Employees registered who are veterans		217
Employees registered who are non-veterans		521
Deferments requested to date (including renewals)		1230
Deferments granted		997
Number of employees for which deferments have been requested		175
Number of employees classified in Category B	—	
Number of employees classified in Category C	1	
Number of employees classified in Category D	174	
Deferments denied and appealed at state levels		17
Deferments denied and appealed at local levels		1
Deferments denied and held pending appeal at national level		5
Deferments denied by local board and not appealed		9
Deferments denied by state board and not appealed		35
Deferments denied at national level (by Gen. Hershey's office)		2
Deferments denied at national level (by President)		4
Deferments requested, employees later reclassified		—
Deferments requested, later withdrawn		1
Deferments pending		28

Military terminations since 8-1-1950 are as follows:

Reservists recalled	114
Selective Service	202
Women employees enlisted	5
TOTAL	321

Employees returned from military service:

Reservists	52
Selective Service	30
TOTAL	82

Known number not claiming reemployment rights	17
Number or employees still in military-leave status	222

PRIVACY ACT MATERIAL REMOVED

Employee and Public Relations

EMPLOYEE RELATIONS

Suggestion System, Workmen's Compensation and Liability Insurance

	January	February	Total Since 7-15-47
Suggestions Received	185	197	13422
Acknowledgements to Suggesters	219	162	
Suggestions Pending Acknowledgement	60	95	
Suggestions Referred to Depts. for Investigation	219	162	
Investigations Completed & Suggestions Closed	227	190	
Suggestions Pending Referral to Departments	60	95	
Suggestions Adopted - No Award	2	3	
Adopted Suggestions Approved by Committee for Award	40	44	
Total Net Cash Savings	$ 15,254.75	$ 6,000.30	
Total Cash Awards	$ 1,660	$ 785	
Total Suggestions Out to Investigators	658	774	

An award of $275 was paid to an employee in the Radiological Records and Standards Section for his suggestion of consolidating lists in the photometry group so that entire lists are used to record readings of badge films worn by personnel in the process areas. A savings of labor resulted from the adoption of this suggestion.

Workmen's Compensation

— Date of Death: 1-20-54; Employer: General Electric Company; Nature of Incident: Heart Attack.

On January 20,1954 with three fellow employees answered a fire call at a private residence in Richland. When they arrived it was determined that soot or an accumulation of some sort in the chimney was causing the trouble and one of the men scraped a few ounces of soot onto a newspaper and handed it to He walked to the back yard of the residence where he stood for a few moments watching the chimney to see if any sparks were coming out. As he stood there he collapsed and was taken to Kadlec Hospital where he was pronounced dead by Dr. Liddington. The incident was reported to the Department of Labor and Industries. On February 23, 1954, the Department published a general order stating that there was no injury within the contemplation of the Act, that death was due to natural causes and that there had been no claim filed by a surviving beneficiary or dependent. Case closed.

EMPLOYEE RELATIONS

Liability Insurance

vs. General Electric Company -

On August 28, 1953, age 3, was drowned in the irrigation ditch near the intersection of Duportail and Thayer Drive. Suit was brought by the parents based upon wrongful death arising out of the alleged negligence of General Electric in maintaining an unguarded irrigation ditch in the City of Richland. The case was tried beginning February 1, 1954, in the Franklin County Superior Court and the plaintiffs were awarded a judgement of $22,666. We have since filed a motion for judgement notwithstanding the verdict and for a new trial. The motion has not yet been ruled upon.

Bus Collision 300 Area, vs. General Electric Company,

On June 17, 1952, a bus collision occurred involving four government busses and a station wagon near the 300 Area. Four passengers subsequently filed suit against the General Electric Company and the driver of the bus. The four causes of action were settled out of court. A fifth action was started on September 18, 1953, by , also a passenger. His Complaint was originally for $28,750 plus costs, however, it was later amended to $62,000 plus costs. The trial began February 25 in the Franklin County Superior Court and has not been concluded as of this date.

Life Insurance

Code information which is known only to Home Office Life Underwriters Association has been furnished 88 insurance companies and investigation agencies during the month of February, 1954. 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

	January, 1954	
Claims reported to Department of Labor and Industries	Long Forms: 38	Short Forms: 271
	February, 1954	
	Long Forms: 21	Short Forms: 300

Total Since September 1946 - 19,268

Claims reported to Travelers Insurance Company	January, 1954	February, 1954
	12	*9

Total Since September, 1946 - 822

*Of the claims reported to Travelers Insurance Company during the month of February, 8 were property property damage claims and one was both property damage and bodily injury.

Employee and Public Relations
Employee Relations

TRAINING AND DEVELOPMENT

EXEMPT ORIENTATION was presented Monday 1, with 12 new non-supervisory exempt personnel attending. The Manager of Employee Relations Section, Employee and Public Relations Department, welcomed the group to the management team. The Manager of Technical Personnel Section, Employee and Public Relations Department, was guest speaker at a luncheon for the group at the Desert Inn. This presentation covers company organization, sources of information, salary plan, labor laws, and human relations in industry.

CONFERENCE LEADING was conducted Monday 1 and Monday 15, with 13 supervisors participating. These meetings are directed toward stimulating interest in learning the techniques of leading group discussions.

EFFECTIVE HUMAN RELATIONS seven groups met for their second meeting on Wednesday 3, Wednesday and Thursday 10-11, Wednesday and Thursday 17-18 and Thursday 25, with a total attendance of 90 supervisors. This 12-hour program (three meetings) deals primarily with actual human relations case studies. Cases are presented through various films, records, and written background, allowing group discussion of these and other on-the-job cases of the supervisors attending.

CUSTOMER RELATIONS was held Wednesday 3 for 16 non-professional Medical employees, Friday 5 for 11 non-exempt employees of Financial Department, and Tuesday, Wednesday, and Thursday 9-11 for 64 Technical Service non-exempt employees.

HOBSO II was presented Thursday 4, Tuesday and Wednesday 23-24, with an attendance of 27 supervisors. This program covers the effects of war-time economy, government controls and post-war economy.

PRINCIPLES AND METHODS OF SUPERVISION was presented to Groups 63 and 64 during two weeks of February 8-19, with 31 supervisors completing the course. PMS dinner meeting was held Thursday evening, February 11, at the Desert Inn, with 80 members and guests present. The General Manager was the principal speaker at the meeting.

STENOGRAPHIC-SECRETARIAL program was held Friday 12, 19, and 26, with a total attendance of 46 stenographic-secretarial personnel.

Special program "HOBSO I" was presented Thursday evening, February 25, with 8 guests present.

Major part of time of Training Representatives during the month when not presenting programs was spent in preparing individual job analyses.

Employee and Public Relations
Employee Relations

Mrs. Loretta Thomas, Technical Service Unit, Engineering Department, was interviewed Thursday afternoon, February 25, by the Supervisor of Training. Mrs. Thomas' requested interview was to discuss her interest in women's counselling work with Training and Development Unit.

The manager of Pleiss-Davis stores in Richland has requested Training to present HOBSO I for his employees sometime in April.

Training and Development operating expense budget for 1955-56 was reviewed with the Financial Department during the week of February 23.

Supervisor's Handbook Records:

Number issued during month	2
Number returned during month . . .	2
On hand during the month	169

Of the 169 on hand 58 are not usable because of missing pages. The remaining 111 are ready for issuance.

During the month, there were requests from various sections for 26 program attendance transcript forms and 13 requests for Business English references.

Employee and Public Relations Department

EMPLOYEE RELATIONS

EMPLOYEE COMMUNICATIONS

Employee Communications assisted in the development of and consolidated the Employee Relations Plan for improving the attitudes of HAPO employees. The plan was developed from results of the 1953 Employee Attitude Survey.

The employee attitude survey report was developed and distributed during the month. Copies were sent to nonexempt employees with pay checks, with advance copies to all exempt employees. The accompanying letter to all employees was prepared for the signature of the General Manager. The February 12 issue of the GE NEWS reviewed the report.

Two messages to all employees from the General Manager were prepared for his signature and published in separate GE NEWS issues during the month.

Two Management News Bulletins were written and issued during the month. One announced the transfer of Community, Medical and Safety functions to the Employee and Public Relations Department, the other reported the current status of Position Analysis forms and announced the basic schedule for tying Hanford in with the Company-wide Salary Plan.

The number of information meetings held by each Department during the second half of calendar year 1953 was obtained and compiled into a report for the signature of the Manager, Employee Relations. Total for this period was 2605.

Assistance given the safety education program consisted of: editing lifeline columns for the GE NEWS issues of February 5, 12, 19 and 26; publication of the "1953 Safety Report," which was distributed to all supervisors; preparation of a GE NEWS message on safety from the General Manager; Safety Program Committee meeting was attended and minutes prepared; safety topic for March, "That Blamed Wind!", was produced; safety topic for April, "Underhanded," was written and approved; 100 poster inserts were prepared announcing the January winner of the Area Injury Reduction Award Contest.

"1953 at Hanford", annual HAPO report to the A.E.C., was delivered to Central Printing for production. Issue date is March 15.

Copy for the 200 Areas radiation booklet is being reviewed by the customer; 17 out of 19 photographs have been taken.

Recruitment advertising placed at Employment's request consisted of one-column classified ad for Production Operators in the February 10, 11, 12 and 13 issue of the Walla Walla UNION-BULLETIN, Yakima HERALD and REPUBLIC and Spokane CHRONICLE and REVIEW (a total of 515 replies were received from these ads); one-column classified display ad for Public Health Nurses in the AMERICAN JOURNAL OF NURSING, AMERICAN JOURNAL OF PUBLIC HEALTH, and NURSING OUTLOOK.

Rough drafts of the three cost reduction booklets were prepared and revised at the request of Separations Section.

February issue of "Your Manufacturing Month" was prepared and produced.

Employee and Public Relations

EMPLOYEE COMMUNICATIONS

Assistance given the Health Program consisted of the preparation of the March health bulletin, "Storm Warning," and preparation of a letter to be sent to employees prior to their periodic physical examinations.

Distribution of three GE booklets (secured at no charge) was begun through the information rack service: "Math at GE," "Engineering Tomorrow," and "Neighbors From Way Back."

Poster distribution for the month included: 100 copies each of four Elliott Service Company posters; 90 copies each of two GE photo news posters; 100 copies of an AEC-GE security poster; 19 copies of a credit union poster; 100 copies of the Washington Birthday holiday notice; 60 copies of the GE Education Assistance Program poster; 10 copies of the Sciences Forum poster; and 66 copies each of two Suggestion System posters.

Twenty-four films were ordered from off-site sources for showings by plant organization

Thirty-seven projection engagements were met during the month with showings to approximately 900 employees. This included 14 showings of the GE film "Pipeline to the Clouds to approximately 370 people, and 23 showings of the health film, "Improving Your Posture" to about 540 employees. In addition, the "Pipeline" movie was loaned seven times and the health film 6 times to plant groups to show themselves.

Full-page GE NEWS feature was devoted to the activities of Area Accident Prevention Committees operating in various areas. Pictures included all members of each of the committees at work on various problems, and additional material furnished a detailed account of their activities since they were first formed.

A feature was published in the GE NEWS on Hanford's "Plastic Suited Man" showing by pictures how the odd suit is donned. Copy explained details of how it is made, and its usage.

Record number of blood donors during the February Red Cross blood drawing reflected to some degree the impact of additional blood program publicity appearing in GE NEWS issues preceding the drawing.

Suggestion System winners were publicized in two issues during the month. Front page coverage was given to woman employee who received a $275 award.

Two special GE NEWS features with high reader potential appeared in one issue; a personality portrait of a HAPO secretary who was a prisoner of the Japanese during the war, and a feature on a retired employee's round-the-world trip.

Double page photo feature was published in the GE NEWS on Technical personnel occupying two new completed laboratory area buildings.

Announcement of the start of the 1954 Red Cross Drive was made in a GE NEWS story which revealed that Red Cross membership cards and pins will be distributed to all employees in the Nucleonics Employee Good Neighbor Fund at the beginning of the drive.

The second in a series of GE NEWS photo features covering activities of the various HAPO Departments appeared in an issue of the GE NEWS during the month. The Manu-

EMPLOYEE COMMUNICATIONS

facturing Department was the subject. The work of each Section of this Department was depicted in a general way, a difficult task due to security restrictions.

Last-minute changes in the GE NEWS page make-up were made to accommodate the announcement of the appointment of G.D. Barr as Employee Relations Manager, and the transfer of H.E. Callahan to the Small Aircraft Engine Department of the Aircraft Gas Turbine Division in Lynn, Mass.

The Central United Protestant Church commended the Company on the publication of a series of syndicated GE NEWS articles on Alcoholism. Also, as a result of the series, the local Alcoholics Anonymous Association reported a number of new contacts.

Art work prepared by the Employee Communications commercial artist for the GE NEWS during the month included: two double-page photo news features, two small photo layout and photo retouching.

Visual layouts for six of a series of proposed GE NEWS messages on "Your Company—" were completed.

Layout and final art work for the March safety topic and for the health bulletin were completed. These included five illustrations.

Art work for the 1953 HAPO report to the AEC included completing final layouts and art work; and pasting up all copy for this 47-page classified report, thus simplifying activities of the Printer, and speeding final production.

The commercial artist also planned the placement of a series of eleven photos and three water color drawings to decorate the Employment Office; also drawing plans for frames, and initiating their production.

A large visualizer was produced to aid the Better Business Management group's presentation upon completion of its project.

Employee and Public Relations

PUBLIC RELATIONS

During the month of February, the News Bureau issued 37 news releases. The breakdown by category, distribution and content was as follows:

Subject		Distribution	
Pay & Benefits	4	Local	22
Employment Services	8	Daily	6
Good Will	5	Special	9
Technology & Research	5		
Safety, Fire, Security	2		
Administration & Legal	2	Content	
Recreation	3	Picture only	4
Richland-Hanford Protection	1	Short release	19
Education & Library	2	Long Release	9
Health, Medicine	2	Feature	5
Plant Services	1		
Organization Changes	1		
Richland	1		

This month saw the News Bureau start distribution of a new "Hanford Atomic Science Series". News releases in this series will be sent out periodically, and will contain information about unique instruments, processes, or research activities at Hanford, explained in layman's terms.

A large group of pictures was assembled and sent to AEC's local Public Information representative. He will then send these to Washington, D.C. and they will be forwarded to COLLIERS magazine for use in an article on activities at Hanford and other AEC sites.

A special write-up and a large group of pictures on the plant and public libraries was sent to Remington Rand at their request.

An extensive feature story covering the two employee attitude surveys was written for OCCUPATIONAL HAZARDS magazine at their request.

A feature story concerning the Hanford transportation system was prepared this month. It was requested by WESTERN INDUSTRY magazine and was sent to them, to two other journals, and also was distributed locally.

Extensive publicity was given to speeches made by the Manager of Engineering and the Manager of Design Section in California. Biographies, portraits, and advance copies of the speeches and the news releases concerning the speeches were sent to the San Francisco office; and advance copies of the news releases were sent to six other GE publicity outlets throughout the country. This was done so that the various GE offices could disseminate information about the talk in addition to the distribution made by the Hanford News Bureau.

A representative of the Schenectady office visited Richland to gather a large backlog of material concerning GE's operation at Hanford. He conferred at length with a member of Public Relations to write captions for a large number of heretofore

classified pictures he will send through the declassification procedure. In addition, he left requests for several groups of pictures and background stories to be prepared and mailed to him. Part of this material already has been mailed.

Nat Farbman, LIFE photographer, and Robert Schulman, LIFE magazine writer, visited Richland to take pictures and gather information for a story on our plastic suit, which has been publicized recently. The Manufacturing Department gave Public Relations every possible assistance in arranging for this national publicity activity. They provided two of the suits, equipment for operating and demonstrating them in the North Hall of the Richland Public Library, and an expert, Homer Moulthrop, who was interviewed by Schulman.

Six requests for information on atomic energy were answered this month by sending booklets, fact sheets, and other previously prepared material. In addition, two letters asking for further information on the "plastic man" were received and answered.

A paper about reactor control circuits by I.M.A. Garcia was sent to the GE REVIEW to be considered as the subject of an article. The REVIEW editor replied that, with extensive re-writing and editing, the paper would be quite suitable.

T. W. Gore's article, "Design of a Radiometallurgy Laboratory Building," was submitted to METAL PROGRESS.

A paper, "Heat Flow Problems with Temperature Dependent Thermal Conductivity", by P. M. Anselone, D. O. Banks, and R. Y. Dean was sent to the AMERICAN JOURNAL OF PHYSICS for their consideration at the suggestion of Mr. Anselone. The authors are willing to re-write the paper if the JOURNAL is interested in publishing it.

The article on heat conversion at Hanford, which was submitted in December, appeared in the February issue of HEATING, PIPING AND AIR CONDITIONING. One of the photos submitted also was published on the cover of the February issue.

The following papers were approved for publication this month:

"The Absorption of Polychromatic X-Rays as a Function of Atomic Number and Source Voltage", by M. C. Lambert, for publication in ANALYTICAL CHEMISTRY.

"The Less Familiar Elements in the Atomic Energy Program," by A. H. Bushey, for publication in ANALYTICAL CHEMISTRY.

"Chemical Analysis by X-Ray Photometry" by M. M. Lambert, for publication in ANALYTICAL CHEMISTRY.

"A Card Numbering System for CPC Calculation," by W. C. McGee, for publication in the International Business Machines Bulletin, TECHNICAL NEWSLETTER.

"Biochemical Mutants vs Radiation and Dose," by F. P. Hungate, for publication in the HANDBOOK OF BIOLOGICAL DATA.

Employee and Public Relations

"Double Crystal X-Ray Spectrometer for Study of Irradiated Materials," by W. V. Cummings, D. C. Knulitz, and M. J. Sanderson, for publication in the REVIEW OF SCIENTIFIC INSTRUMENTS.

Abstract of "Scintillation Type Radiation Detectors," by R. E. Connally, to be presented to the Naval Research Reserve Company on February 22 in Richland.

"Ion Exchange Resins and their Uses," by R. H. Purcell for presentation before the 6507th U. S. Army Reserve Research and Development Unit on May 3 in Richland.

"A New Telephone System for Hanford Works," by L. H. Reagan, for presentation before a meeting of the Richland Section of the AIEE on February 15.

"Atomic Electric Power and the Hydroelectric Systems," a paper by H. R. Hughes, was sent to the General Manager and the Manager of Engineering to determine the possibilities of releasing it at this time. It was determined that the paper should not be considered for release until final word has been received on the dual-purpose reactor.

A recently formed Richland chapter of the Radiation Engineers' Society has requested that Public Relations inform them of any papers or speeches that might make suitable programs for the Society.

Arrangements were completed for J. M. Heffner and W. W. McIntosh to write an article on the activities of Minor Construction at Hanford. This story was requested by WESTERN INDUSTRY.

R. E.Burns, of Technical Section, has agreed to write an article about self concentration of fission wastes for NUCLEONICS.

Stories and pictures describing Hanford's aquatic biology progra were sent to a free-lance writer in England, in response to a request from him for information about dredges used in aquatic biology work.

A request from Schenectady for approval to publish photographs and information about Hanford from the the January issue of the GE REVIEW in the Italian GE REVIEW was referred to the AEC. Schenectady was notified that it would be necessary to check photos and copy with AEC Public Information at Washington, D. C., before they can be used in a foreign publication.

C. Groot, Engineering Department, presented a paper, "Theoretical Corrosion Studies," to a group of corrosion specialists at Washington State College on February 4.

The Manager of Public Relations spoke to the men's group of the Pasco Congregational Church on February 8 on the general subject of operations at Hanford. He also showed GE's "A is for Atom" film.

The Superintendent of Hant Engineering spoke to the Stanford Chapter of the AIChE on February 26. His topic was "Nuclear Engineering--A New Frontier."

Employee and Public Relations

The Manager of Manufacturing Processes and Radiation Monitoring will address assemblies, consisting of students and faculty, at Whitworth and Whitman Colleges during March. He will discuss the work done at Hanford and how it fits into the nation's atomic energy program; he will also show the film, "A is for Atom" to the Whitman group.

Arrangements were completed for G. D. Barr to speak to the Central Valley Social Studies Council at Ellensburg on March 6. His topic will be, "Basic Qualities Industry Wants in New Employees." He will show the film, "A is for Atom."

The Manager of Design Section will substitute for the General Manager as the featured speaker for the National Association of Power Engineers at San Francisco.

Information about GE educational aids and other general information about atomic energy was supplied to a junior high school teacher in Bellingham in answer to a request.

A member of the Kennewick School Board reported that the Board had given a vote of confidence to use of GE educational aids in the Kennewick School System and have asked the Kennewick Superintendent of Schools to use any of the materials that will fit into the school program.

In answer to a request from the librarian of the Benton City High School, arrangements were made for a representative of Employment to discuss employment possibilities at Hanford with the Benton City High School senior class.

The January issue of the GE REVIEW, which contained a review of engineering accomplishments at Hanford during 1953, was sent to some 400 community leaders of the tri-city area with a tip-on signed by the General Manager.

The Community Newsletter for February was written and distributed to community leaders in Pasco, Kennewick, and Richland.

Officials of the Inland Empire Science Fair, to be held April 7 and 8 at Spokane, have asked General Electric for a general exhibit. HAPO will supply the type of exhibit requested, and space also has been alloted for an educational aids exhibit.

Approval of the AEC and GE was forwarded to an advertising agency that had requested permission to use a photo of a steel trap at Hanford in an Armstrong Trap House Organ.

"Here's Hanford," the feature-length motion picture produced in color for Employee Relations, was completed and delivered to Employee Relations. This film, intended for use in the new employee orientation program, also can be used for showings to public groups. A complete publicity and presentation program for the film was proposed and submitted to the Manager, Employee Relations for approval. Wide circulation of the film at HAPO and in this region is anticipated.

Employee and Public Relations

A very thorough story of the construction of an atomic moderator was recorded on 16mm motion picture film. This footage will play an important part in the Construction Progress Motion Picture being produced for HAPO and the Atomic Energy Commission.

A preliminary outline was prepared on using increments of previously produced HAPO motion pictures in a composite film to portray HAPO achievements in the atomic energy field. Uses of the film include national television programs and showings to the public at large. Arrangements were made with the Non-Technical Review Board to look at all locally produced motion pictures to screen the classification of each sequence. Following this review, a precise outline will be prepared of all unclassified footage for public release as proposed in the outline.

From all indications, "Getting the Job Done," the motion picture produced for Minor Construction is meeting its original objectives, which were: (1) orienting new workmen as to procedures to be followed in radiation zone work; and, (2) informing the men of the role played by Minor Construction in the execution of the various projects. Minor Construction Management has reported that the bulk of their employee orientation program for new workmen is now carried out through use of the locally produced film, "Getting the Job Done." They report the picture content is readily understood by the men and the subject matter is being easily grasped. They find that it is only necessary to provide fill-in material during the lecture -- the picture does the main job. They are pleased at the way the film stimulates questions on the part of the audience. They say the men can be seen checking over their SWP gear for tears and rips, keeping their work area spotless, using only company-provided tools and heeding other advice pointed up in the film.

Radiological Sciences Administration Manager informed Public Relations that they are definitely prepared to confer with the Audio-Visual Unit on the possibility of going into production on four two-reel motion pictures covering biology subjects in their area of activity.

Tape recordings were made on-site of construction sound effects for possible incorporation on the sound track of the current Expansion Program motion picture. A half-hour of diversified effects were put on tape. Recording was done at the construction site and included actual sounds made during fabrication of the moderator as well as general construction equipment noises at various exterior locations.

Two members of this Section began the job of cataloging the master and workprint film on the current Expansion Program this month. This step is necessary so that the correct scenes can be found with the minimum of effort on the master reels after the workprint has been rough-edited into sequences for both Engineering Department and the Atomic Energy Commission.

Production of 16mm footage on the Construction Progress Motion Picture this month included aerial photography of the Purex Program. A new Photography Unit employee, who previously had served as a motion picture consultant and made studies of the recording of footage on the current construction work, was assigned as cameraman for all audio-visual photographic work.

Employee and Public Relations

Three Hanford SCIENCE FORUM radio programs, on which two regional high school students and a HAPO scientist appeared as guest panelists, were written, produced and broadcast this month. Extensive publicity was circulated for each program through HAPO News Bureau and GE NEWS. Questions continued to arrive from listeners in increasing quantities and numbered about ten or so a week. Attractive posters with portraits of the science panel, moderator and radio engineers, together with franked postcards for sending in questions were prepared and placed in Area badge houses and in offices of the radio station. Dr. L. K. Bustad, of Radiological Sciences, and Dr. Donaldson of the University of Washington have been invited to appear on SCIENCE FORUM as guest panelists.

Four programs in the current Public Health Radio Series, "For Better Living," which featured four Richland doctors and three Columbia High School students, also were written, produced and broadcast this month.

Ten, 15-second promotional spot announcements for Hanford SCIENCE FORUM radio programs were written and transcribed. These will be released for broadcast in the two-hour period preceding each SCIENCE FORUM broadcast on Tuesday evenings during thenext ten weeks.

The Fuel Technology Unit asked for an received assistance in producing typewritten transcriptions of special research experimentations and research studies during the month.

Mr. T. H. Bennett, Principal of the Kennewick Senior High School, was contacted regarding the appearance of a prominent science student as guest panelist on Hanford SCIENCE FORUM. He received the idea very favorably and arrangements were made with M. G. Clark, Senior Science Instructor, for the appearance of the student at the recording to be made on March 1, 1954. The Columbia High School student guest panelist was publicized in the General Electric NEWS and the "Sandstorm," the Columbia High School newspaper. The science instructor at Columbia High School was also provided with an eight-by-ten and a five-by-seven print which he plans to submit for publication in the school annual.

A study is being conducted to determine the feasability of producing one HANFORD SCIENCE FORUM release per month for use by television stations.

An atomic energy educational demonstration was presented to the 4th grade students of Mrs. W. R. Wager at Jason Lee School on February 16 by A. J. Scott of Radiation Monitoring Unit. The project included the use of four portable Geiger-Mueller instruments with earphones and four pieces of lead shielding material. Radioactive sources were provided by luminous dial timepieces.

A total of 185 photography assignments were covered during the month of February, and a total of 7,529 prints were produced. Of the total prints, 4,029 were "A" and "B" badge prints. A total of 3,500 were area and news work.

Motion picture film exposed during the month totalled 7,350 feet 16mm (b&w) for 100-K Construction project, and 1,100 feet, 16mm (b&w) for A.E.C. project.

Employee and Public Relations

Projection equipment loans during the month were: 3¼" x 4" Lantern Slide Projector and screen, five times; two big screens, two times; 35mm Sound Slide Projector and screen, two times.

Reprints of photographs classified up to "Secret" were produced for a Public Relations Services Division representative from Schenectady. A total of 641 selected 8" x 10" prints were produced in a two day period.

In an attempt to reduce the cost of photographic work at HAPO and to better utilize personnel and facilities of the Photography Unit, every opportunity is taken to send reprint work off the Plant to Commercial photographic facilities on a bid basis. Each request scrutinized in February that was eligible for off Plant production became disqualified by time element or required dates. It is found that requests for photographic work and reprinting of existing negatives seldom allow over one week for completion. An attempt to overcome this obstacle of short deadlines is being made. In those instances where it is felt more planning could allow later deadlines the customer will be contacted and informed of our goal and his assistance solicited.

A group of thirty-three color 35mm slides were produced for Community Operations Department, Recreation and Civic Section. These slides covered the activities of the Recreation and Civic Section's community program.

The full time of one motion picture photographer for half of the month and the full time of two photographers for the last half of the month was required for the construction motion picture film for the Atomic Energy Commission and the General Electric Company. Approximately 10,000 feet of 16mm black and white motion picture film was exposed. The full time of two photographers is now being utilized to film the stacking portion of the construction movie. As soon as the stacking portion is finished, one photographer will be relieved of his duties as motion picture photographer and will return to the 300 Area Technical Laboratory of the Photography Unit to resume his still photography for the Technical Section.

<u>See attached Statistical Report for Photography Unit.</u>

PHOTOGRAPHY UNIT MONTH OF FEBRUARY 1954	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	N E G.	35mm Color Slides	3¼ X 4" (B&W) Slides	3¼ X 4" Color Slides	4" X 5" Color Slides	16mm M.P. Film
COMMUNITY OPERATIONS & REAL ESTATE DEPT.									33				
Parks & Recreation		80	321		10			119					
Police					14			11					
Public Library													
EMPLOYEE & PUBLIC RELATIONS	640		2					128					
Employment		71	2	10	848			58					
News Bureau		10		4	65			42					
Special Programs				2	117			21					
Audio Visual					3			2					
Training		26	21	107	103			144					
G. E. News													
ENGINEERING DEPT.			175			14		15		7			
Applied Research					3	11		6					
Design			10	114	3	187		42					
Fuels Technology						2							
Technical Information					32	220	2	32					
Project Eng.			336		46	101		19					
Pile Technology					24			13					
Process Eng.						6							
Separations Project													
MEDICAL					2			2	12				
MANUFACTURING								3					
Administration				4	5			10					
Metal Preparation Sec.						64						30	
Radiation Monitoring													
Power & Maintenance						2							

CONTINUED

PHOTOGRAPHY UNIT
MONTH OF FEBRUARY 1954

	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	N E G.	35mm Color Slides	3¼" X 4" (B&W)	3¼" X 4" Color Slides	4" X 5" Color Slides	16mm M.P. Film
RADIOLOGICAL SCIENCES DEPT.										9			
Radiological Eng.		500				9		50			30		
Records & Standards			121			8							
Biophysics													
Biology													
PLANT AUXILIARY OPERATIONS					3	36		4		6			
Electrical Distribution								4		4			
Telephone Unit					40			41					
Security	1,351	1,928	7	12	8			3					
Reproduction													
MISCELLANEOUS					16			13					
A.E.C. Safety								12					
A.E.C. Security	110				14	14							
A.E.C. Operations					9			4					
Kaiser Eng.													
TOTALS	2,101	2,615	474	271	1,392	674	2	798	45	26	30	30	K-26

	December	January	February
Total Assignments	264	192	185
Total Negatives	1,403	997	798
Total Prints	12,151	6,906	7,529

Employee and Public Relations

SALARY ADMINISTRATION

1. The normal administrative work of the Section, and the continued study of organization structure proceeded according to schedule. Audits in the field involving conformance with position descriptions and organization structure, and the review and evaluation of position descriptions were curtailed in favor of work described below.

2. R.C. Grant left for an extended trip to the East on February 19, in order to collect salary information from other components of the Company, and to reconcile Hanford salary levels with others.

3. A Position Analysis form was devised and distributed to all exempt employees. At month's end, over 95% of the forms had been completed and returned to our files.

4. A Position Description form was devised and distributed to selected supervisors who began to write position descriptions for all exempt positions, based upon the position analyses.

5. A Position Evaluation Guide was devised jointly with Department Managers, and was released to selected managers to be used in ranking positions.

6. An audit of salary administration records and practices was begun by HOO-AEC auditors. That part of the audit pertaining to the National Comparative Salary Survey was completed. Work was begun to collect position descriptions, comparison sheets, and salary record cards for about 100 positions selected by the auditors.

7. Approvals of the HOO-AEC to discontinue the National Salary Survey this year, and to abandon the existing Professional Salary Plan concurrent with adoption of the Company-wide plan, were received.

Union Relations

UNION RELATIONS - OPERATIONS PERSONNEL

The Community Line Maintenance group provides week-end "on-call" supervisory coverage by rotating the assignment among the line superintendent, line foreman, electrical engineer, and shop foreman. The linemen contend that the latter two were not qualified to supervise linemen by the terms of the Washington State Safety Code.

The Company maintained that these persons were entirely competent and qualified, that HAPO safety standards exceed those required by the State, that HAPO safety standards for working line crews exceed those required by public utilities in the State, that a line foreman or superintendent is present when a high voltage or primary line is repaired, and that our safety record is proof of the high standards set by the Company.

At the request of the union, Kenneth Scalf, Department of Labor and Industries, contacted R. H. Hopkins to check on the Company's compliance with the State Safety Rules. He was politely informed of the problem surrounding Federal or State jurisdiction on the project. When our position was clearly defined, the grievance was discussed. The result was that Mr. Scalf agreed that the Company was in full compliance with the State Safety Rules and even exceeded the intent of the Rules and he so informed the lineman steward.

On February 16, radiation monitoring Inspectors presented their proposals on items requiring resolution prior to their becoming a party to the existing Agreement. The proposals included seniority, classifications and wage rates, job duties and responsibilities, and restrictions on work performed by supervisors. The original demands were quite inflated but no undue difficulty in arriving at a satisfactory settlement was anticipated. Further meetings are scheduled for March 1 and 3.

Appointment of Albert C. Beeson has been confirmed by the Senate as the fifth member of the National Labor Relations Board. He will complete the term of Paul L. Styles, resigned. The vote was by the narrow margin of 45 to 42. Eisenhower appointees are now in the majority on the Board.

We have learned that IUE has amended its petition before the National Labor Relations Board restricting the request for a Company-wide election to UE and IUE bargaining units. It is felt that the revised petition slightly increases IUE chances of favorable consideration from the Board but the odds remain preponderantly in favor of a dismissal. Meanwhile a similar case involving Western Electric, which has been followed very closely, was administratively dismissed by the Regional Director, National Labor Relations Board. The petitioning party now has recourse to an appeal which will necessitate a Board hearing.

By Management News Bulletin of January 23, 1954, we requested comments from all supervisors regarding desirable revisions that would make our union contracts more operable instruments. Seven replies were received.

Employee and Public Relations

OPERATIONS PERSONNEL

AEC internal auditors spent two weeks checking this Section's procedures, practices, records, and survey material.

The Hanford Atomic Metal Trades Council, via a recent news letter to all bargaining unit employees, clarified its position regarding an HAMTC "proposal" on sale of Richland houses mentioned in a local newspaper. The letter pointed out that "such 'proposal' is actually a preliminary listing of points for discussion as compiled by the HAMTC Housing Committee and does not in any way represent HAMTC's official position in the matter."

The letter goes on to say that the HAMTC is studying the disposal issue "but no action with regard to an official stand has been taken and none will be taken until the matter has been thoroughly reviewed and discussed by the HAMTC delegates representing the membership of the affiliate local unions."

The Richland Maintenance Company has reached an Agreement with the Building Service Employees International Union, a copy of which has been forwarded to the Commission by the Community Real Estate Section with recommendations for approval of certain money items. Included is a provision granting ". . . full compensation for six (6) holidays each year." It is our understanding that the intent of the parties was to pay employees for those holidays which fell within their regular working schedule. We have been assured that clarification of this point will be made between the Richland Maintenance Company and the union.

The February 11, 1954 copy of E&PCR UNION NEWSPAPER DIGEST reported an interesting article on Hanford in the AFL News-Reporter of February 5, 1954. The newspaper article comments on an AMA Journal article which said that 90% of the residents of Richland are "covered by prepaid hospital and medical-surgical insurance and the death rate is 2.2 per 1,000 population. 'Here is private enterprise in free operation. . .Here is the answer to socialized medicine.'" (said the AMA Journal).

The AFL News-Reporter then claims that the comprehensive health program for Richland residents was won by union negotiation. It further claims that most of the workers on the project are represented by the HAMTC. The AFL says that the Richland program is what they have been urging for years.

Grievance Statistics:

A total of 34 grievances were received and four Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

Employee and Public Relations

Grievance Statistics: (Contd.)

All Departments

	HAMTC	HGU	Total Unit	Total Nonunit
Received this month	29	3	32	2
Received this year	52	5	57	4
Step I				
Pending January 31	1	0	1	6
Settled this month*	23	3	26	2
Settled this year	41	3	44	3
Pending February 28	2	0	2	3
Step II				
Pending January 31	24	2	26	0
Settled this month**	6	2	8	0
Settled this year	14	3	27	0
Pending February 28	25	0	25	3
Arbitration				
Pending January 31	2	0	2	
Settled this month	0	0	0	
Settled this year	0	0	0	
Pending February 28**	1	0	0	

*Grievances brought to Step II prior to December 1, 1953, but never processed by the Union are, for the purpose of this report, considered settled at Step I.

**Grievances which the Union formally indicated their intention to submit to arbitration but have taken no further action since December 1, 1953, are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

Grievance Statistics (Contd.):

By Departments

	Received		Settled Step I*		Settled Step II**	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Manufacturing						
Reactor - Unit	9	20	9	20	3	3
- Nonunit	1	1	0	0	0	0
Separations - Unit	5	9	5	8	2	3
- Nonunit	0	1	0	1	0	0
Metal Preparation - Unit	12	14	7	9	3	3
Plant Auxiliary Operations						
Transportation - Unit	0	1	0	1	1	4
Plant Protection - Unit	3	6	3	3	2	4
Community Operations and Real Estate - Unit	1	5	2	3	0	0
Radiological Sciences - Unit	2	2	0	0	0	0
Engineering - Nonunit	1	2	2	2	0	0

By Subjects

	Manufacturing		Plant Aux. Operations		Com. Opr. & Real Estate		Radiological Sciences		Engineering	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Unit										
Jurisdiction	13	19	1	2	1	3	2	2		
Health-Safety-Sanitation	5	6	1	1	0	1	0	0		
Overtime Rates	1	1	0	0	0	0	0	0		
Sick Leave	1	2	0	0	0	1	0	0		
Seniority	1	3	0	1	0	0	0	0		
Wage Rate	0	2	0	0	0	0	0	0		
Miscellaneous	5	10	1	3	0	0	0	0		
Nonunit										
Health-Safety-Sanitation	0	0							1	1
Wage Rates	1	1							0	0
Work Assignment	0	1							0	0
Miscellaneous	0	0							0	1

*Grievances brought to Step II prior to December 1, 1953, but never processed by the Union are, for the purpose of this report, considered settled at Step I.

**Grievances which the Union formally indicated their intention to submit to arbitration but have taken no further action since December 1, 1953, are, for the purpose of this report, considered settled at Step II.

CONSTRUCTION LIAISON

A special two-man panel composed of Arthur Ross, acting as chairman, and T. W. Holland heard the Carpenter-Millwright dispute in San Francisco on February 3 and 4. Ross instructed the parties that no recommendation could be expected for two weeks but that the Panel retains jurisdiction and work will be expected to continue without a strike. He also indicated that an interim recommendation might be forthcoming. According to reports, isolation pay was not a subject of discussion although the employers' brief, which was sent to Ross last week, did treat the subject in some detail. Those present at the hearing predicted that the isolation pay question will be considered as part of the Building Trades Council's negotiations and will be so recommended by the Panel. A recommendation for settlement of the wage issue is expected to conform to the recent AGC Agreement for eastern Washington.

Efforts are being made by McReynolds (Minor Construction) to secure a no-strike pledge from the Building Trades unions in so far as Minor Construction work is concerned. The lever, of course, is the volume of work Minor Construction stands to lose unless GE has reasonable assurance that work affecting production facilities will not be interrupted. It is felt that the Building Trades have an appreciable respect for the work being performed by Minor Construction and will cooperate to an unusual degree to assure its continuity.

Negotiations have been resumed on the subject of isolation pay. The Building Trades Council has requested that the issue be arbitrated or the Panel be asked to take jurisdiction. The request for arbitration has been refused but apparently serious consideration is being given to the Panel. There are no strikes or threats of strike at this time and thoughts of Panel intervention seem to be premature. We are continuing to exert all pressure available to us to bolster the resistance to the issue.

Agreement has been reached in Spokane AGC negotiations with the Carpenters and Millwrights. The Agreement provides for wage increases from $2.60 to $2.65 effective January 1, 1954, and an additional raise to $2.75 effective July 16, 1954. It is a two-year agreement with wages subject to reopening on January 1, 1955, for adjustment according to the change in the Consumer Price Index between June, 1953 and June, 1954. This may very likely result in a cut in wages to the union.

WAGE RATES

Questionnaires for the 1954 Northwest Area Wage Survey were mailed to participating companies for completion. A deadline of April 1, 1954, has been set for the completion and distribution of this study. Visits to plants in Portland, Hoquiam, Shelton, Seattle, Everett, and Spokane areas resulted in the addition of nine concerns to the Northwest Area Wage Survey and a request from another firm for participation in the 1955 study.

A formal agreement was received from the Hanford Atomic Metal Trades Council on the revised classification titles and progression schedules for bargaining unit reproduction and printing jobs. A request was submitted to the Atomic Energy Commission for reimbursement authorization, and Reimbursement Authorization No. 219 covering the requested approval was received.

WAGE RATES

Reimbursement Authorization No. 218 was received from the Atomic Energy Commission for the establishment of a revised hiring rate program for Technical and Business Graduates. Under this program the starting rates for Technical Graduates may be based on a basic weekly rate plus "adders" for educational degrees, military service, related job experience before and after graduation, and participation in General Electric Company programs. The program for Technical Graduates will be administered in accordance with the foregoing; however, it has been determined that Business Graduates will be hired on the basic rate with "adders" only for educational degrees. The six-month automatic increase given Technical and Business Graduates is eliminated under the new plan, and an increase shall be granted at the end of one year of satisfactory service.

The Company took exception to the following two jurisdictional agreements submitted by the Hanford Atomic Metal Trades Council: (1) Agreement between the Electrical Workers and the Plumbers and Steamfitters on the fabrication and installation of conduit and electric raceways (cell jumpers) and the setting and handling of panel boards, and (2) Agreement between the Painters and the Carpenters on the installation of resilient floor coverings.

An arrangement was made with the Electrical Workers to remove the Richland electric meter reading job from the jurisdiction of the electrical craft. The job is now classified as a non-bargaining unit job.

Employees classified as "Instrument Worker" were placed in a separate seniority group in accordance with an agreement between the Company and the Hanford Atomic Metal Trades Council.

The final step in the plantwide review of individual jobs in the semi-technical Engineering Assistant classifications was concluded with the approving of reclassification papers, which resulted in reclassifications and rate increases for sixty-seven (67) Engineering Assistants. The change was effective on February 15, 1954.

A similar plantwide review of all Laboratory Assistant jobs is in progress.

A review of all nonexempt jobs in the General Accounting Unit was completed. This completed a general review of all nonexempt jobs in the Financial Department.

The annual review of preferential rates was completed and results forwarded to the respective department managers in an effort to eliminate as many of these rates as possible.

Representatives of the Sandia Corporation of Albuquerque, New Mexico spent an entire day with the Wage Rates group discussing wage problems and making a wage survey.

The Wage Rates Unit participated in a survey of personnel practices conducted by the Carbide and Carbon Chemical Company at Oak Ridge. Results of the survey are expected to be made available to HAPO.

WAGE RATES

Two hundred nineteen (219) automatic increases and five (5) merit increases were processed during February. Requisitions for two hundred sixty-seven (267) prospective employees and additions to the payroll for forty-nine (49) new employees were approved. Review for proper classification, rate, etc., was made for twenty-one (21) reactivations, one hundred thirty (130) reclassifications, fifty-three (53) temporary reclassifications, forty-two (42) transfers, and three (3) transfers from the exempt roll.

Employee and Public Relations
Technical Personnel Section

TECHNICAL RECRUITING

Since requirements for technical personnel can vary considerably within a short time, we are maintaining close contact with the departments to keep abreast of their needs. Our endeavor is to have contacts available, or to know where to look for suitable candidates on short notice in the categories that may be needed.

As regards the 1954 PhD's in science and engineering, we have reviewed at Schenectady several hundred applications, of which 180 have been reviewed further at Richland with representatives of the interested departments. From this number, 75 have been selected to receive invitations to visit Richland, and past experience indicates that perhaps 45 will actually visit us. From this number we should realize approximately 15 actual hires during the coming months.

For the college recruiting of BS-MS candidates, our present hiring authorization is 20 to 30. Approval to use Schenectady's rate structure was received on February 17. Based on recruiting visits already completed at 7 schools, 36 offers have been made. Our total schedule of visits at 22 schools will be completed during March and should permit a maximum of about 95 offers to well qualified graduates. This should yield 30-35 acceptances. Assuming that further hiring may be authorized, we are arranging with a number of universities for some access to returning veterans, from whom we might get a few additional good men. If necessary, we can also look to the Test Course in Schenectady as the source for a few more.

In the spring recruiting, 60% of the college visits have been conducted by 10 recruiters from the various departments, the other 40% of the visits being made by 3 members of this office.

Consistent with approval received earlier from management, A.E.C. reimbursement authorization has just now been received for the hiring of 10 engineering juniors, who will be selected for summer work from a number of colleges and universities. This represents a continuation of our past practice which has been valuable in university relations and specifically in our recruiting of graduates.

ROTATIONAL TRAINING PROGRAM

From 58 at the end of January, trainees are now down to 51. Additional placements already negotiated but not completed will bring us down to 42 early in March. Suitable placement of most of this remainder by June is foreseen.

Employee and Public Relations
Technical Personnel Section

EDUCATION -- SCHOOL OF NUCLEAR ENGINEERING

Records for the fall semester, completed at the end of January, have been summarized and reported to the participating universities. Of 229 students who paid the full tuition, 171 (75%) completed the fall courses successfully. For the second semester we have 250 registrations divided about equally between graduate and college-level subjects. The instrument courses, formerly conducted on paid time, have attracted very satisfactory enrollments and are now conducted out-of-hours and with tuition fees. A total of 14 graduate and 9 college-level courses are being conducted, as listed in the attached tabulation.

We are keeping in touch with the State College Extension Division and the local schools to avoid duplication of effort and to be aware of any use we might make of their facilities.

COUNSELING AND INTERNAL TRANSFERS

During February, turnover of technical personnel totaled 5 including 1 retirement and 1 intra-Company transfer which is below the number for February, 1953. The number of employees coming to us for counseling is also substantially lower.

UNIVERSITY RELATIONS

During the coming months we will be conducting an active program of talks and visits at selected universities to influence acceptances of our offers and to improve our position in a market which is very competitive due to the paucity of new graduates.

Employee and Public Relations
Technical Personnel Section

EDUCATION - SCHOOL OF NUCLEAR ENGINEERING (Attachment)

GRADUATE

COURSE	INSTRUCTOR
Advanced Mathematics	P. M. Anselone
Vector Analysis	R. Y. Dean
Modern Physics II	R. S. Paul
Theoretical Physics II	G. W. Stuart
Pile Physics I	J. R. Triplett
Physical Chemistry II	L. L. Burger
Chemistry of Less Familar Elements	A. S. Wilson
Electrochemistry	E. C. Pitzer
Methods of Instrumental Analysis	G. J. Alkire
Heat Transmission	R. M. Fryar
Chemical Engineering Kinetics	A. M. Platt
Problems of Pile Design	G. M. Roy
Servomechanisms	R. A. Harvey
Heat-Power Cycles	R. M. Fryar

COLLEGE - LEVEL

Integral Calculus	H. C. Mayer
Analytic Geometry	C. A. Pursel
General Chemistry	R. E. Burns
Automatic Control	C. O. Clemetson
Instrument Electronics	J. W, Green
Elements of Physical Metallurgy	J. W. Riches
Business Law II	L. Lomen
Effective Presentation	W. W. Chamberlain
Elementary Statistics	F. Tingey

COMMUNITY OPERATIONS AND
REAL ESTATE DEPARTMENT
MONTHLY REPORT SUMMARY
FEBRUARY, 1954

ORGANIZATION AND PERSONNEL	SUFFIX	BEG. OF MONTH	END OF MONTH
Number of employees on rolls:			
General Administration	310	5	5
Community Operations Section			
Administration	340	2	2
Engineering	341	9	9
Public Works General & Util.	342	27	26
Public Works Labor Crews	343	38	38
Recreation & Civic Affairs	344	5.5	6.5
Library	345	11	12
Fire	346	66	67
Police	347	50	49
Electrical	348	21	20
Sub-Totals		229.5	229.5
Community Real Estate Section			
Administration	350	3	2
Housing Rental	351	23	24
Maintenance	353	150	149
Commercial Property	357	12	12
Sub-Totals		188	187
GRAND TOTALS		422.5	421.5

There was a reduction of one employee in the Department during the month of February, 1954.

GENERAL

The FY 1954 Street Improvement Project Proposal providing for widening George Washington Way, from Symons to McMurray, to four lanes and re-paving the entire width, and surfacing of that section of George Washington Way between existing paving and curb from McMurray to Catskill, was approved by A.E.C. on February 19, 1954, and design is now in progress.

Miss Helen Church joined the library staff as Catalog-Order Librarian on February 3. Miss Church is a graduate of the University of Denver School of Librarianship and has had two years experience at the Central Washington College of Education Library at Ellensburg, Washington and has just returned from two years with the U. S. Army Library service in Germany.

Captain Ray Hatfield instructed twenty Girl Scouts in first aid at the home of Mrs. F. C. Black on February 4. Assistant Chief Quane is instructing a bi-monthly first aid class of sixteen Camp Fire Girls at the Central Fire Station.

Dormitory M-7 was vacated and placed in stand-by condition. A total of five dormitories have now been closed.

Total housing applications pending - 253.

HARoot/jak
3/10/54

COMMUNITY OPERATIONS SECTION
MONTHLY REPORT
SUMMARY
FEBRUARY 1954

ORGANIZATION & PERSONNEL:

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Non-Exempt	Exempt	Non-Exempt
ADMINISTRATION	1	1	1	1
ELECTRICAL	5	16	5	15
PUBLIC WORKS	12	53	11	53
RECREATION & CIVIC AFFAIRS	3	2 1/2	3	3 1/2
LIBRARY	3	8	4	8
POLICE	17	33	17	32
FIRE	66	0	67	0
ENGINEERING	6	3	6	3
	113	116 1/2	114	115 1/2

The FY 1954 Street Improvement Project Proposal, providing for widening George Washington Way, from Symons to McMurray, to four lanes and repaving the entire width, and surfacing of that section of George Washington Way between existing paving and curb from McMurray to Catskill, was approved by A.E.C. on February 19, 1954, and design is now in progress.

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Captain Ray Hatfield instructed 20 Girl Scouts in first aid at the home of Mrs. F. C. Black on February 4th and Assistant Chief Quane is instructing a bi-monthly first aid class of 16 Campfire Girls at the Central Fire Station.

COMMUNITY OPERATIONS SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
FEBRUARY 1956

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees beginning of month	5	16
Transfers in	0	0
Transfers out	0	1
Terminations	0	0
Total end of month	5	15

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set and transferred	4
Anchors set and guys installed	0
Street lights repaired and steel mast arms installed	2
Street lights relamped - Mercury Vapor	2
Street lights relamped - 6000L and 4000L, 1100 Area	97
Street lights relamped - 6000L and 4000L, 700 Area	15
Flood lights relamped, 1100 Area	9
Flood lights relamped, 700 Area	3
Stack lights relamped, 700 Area	0
Primary line footage added	0
Primary line footage removed	0
Transformer KVA added	0
Transformer KVA removed	0
Net transformer KVA installed	0
New services installed - residential	0
New services installed - commercial	2
Temporary services installed and removed	1
Scheduled outages - primary	3
Scheduled outages - secondary	1
Unscheduled outages - primary	1
Unscheduled outages - secondary	4
Standby and escort	0
High voltage tree trimming	41
Low voltage tree trimming	23

TRAFFIC SIGNALS

Relamping	167
Operational failures	2
Installations	1
Removals	0

RICHLAND ELECTRICAL UNIT

Routine maintenance checks	21
Routine check R. R. signal at Van Giesen	4
Total signals in operation - automatic	17
Total signals in operation - manual	3
Total signals in operation - flasher	1

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	2
Electrical motors checked and serviced - water	44
Electrical motors checked and serviced - sewage	61

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	4
Outside circuit checks	6
Inside faults repaired	0
Outside faults repaired	3
New circuits placed in operation	0
New boxes placed in operation	0

SUBSTATIONS

Main feeder and tie breaker checks - BBLS1	4
" " " " " " - BBlS2	4
Secondary and pad located stations - Checked jumpers, cutouts, grounds and general condition	16

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Radio interference checks	7
Voltage and load checks	3
Meters tested - customers' requests	2
New meters shop tested	6
Faulty meters replaced	6
Damaged meters and covers	0
Residential read-ins	172
Residential read-outs	130
Residential disconnects	0
Residential reconnects	0
Meters resealed	2
Meters changed out due to excessive load (Residential)	38

Note: Consumption and revenue reports, under IBM operations, are not available until 18th of following month.

Consumption and revenue:

	No. of Meters	KWH	Revenue
Schedule 1 - Residential	7048	7,614,892	$72,420.84
Schedule 2 - Commercial			

RICHLAND ELECTRICAL UNIT

		No. of Meters	KWH	Revenue
Class 1 -	(In Lease)	61	707,498	6,543.11
Class 2 -	(Metered Basis)	224	820,815	9,350.38
Class 3	(Plant Adm.) Comm. Rate	22	1,443,394	9,200.13
	700 Area		415,800	2,582.40
	Kadlec Hospital		53,460	444.30
	Public Health		2,407	25.55
	1131 Bus Lot		160,800	1,013.40
	Central Stores		89,280	763.84
	Stores Excess & Salv. Yard		120,900	836.70
	Safety & Fire (1 & 2)		619	11.79
	Transp. Classification Yard		1,290	16.65
	G. E. Photo Lab.		6,140	62.55
	1125 Whse. Area		10,000	82.50
	AEC Airport		28,600	240.00
	Medical Dental Building		8,400	88.50
	Patrol Headquarters Bldg.		11,120	112.90
	Telephone Unit		360	6.65
	G. E. Housing (Vacant Houses)		25,634	173.17
	Medical Dept.		------	------
	Men's Dorms - South		24,060	212.30
	Men's Dorms - North		17,520	167.60
	1116 Building		4,320	45.91
	Billed at .005 Rate:			
	Army Dike #1 and #2		20,160	100.80
	Public Library		8,320	41.60
	Central Fire		7,680	38.40
	Sewage Lift Station (Perkins)		-------	------
	Community Adm.		421,994	2,109.97
	Traffic Lights		4,530	22.65
		Total	10,586,599	$97,514.46

COMMENTS

Connected permanent service to Davis Furniture warehouse.
Connected temporary service to Parcell service station site at Duportail and Hartford.

Installed Sodium Vapor light at hazardous intersection at Williams and Thayer.
Installed Mercury Vapor light in parking lot in rear of Desert Inn to remedy general poor lighting.

Rearranged street light circuit #600, presently overloaded, to transfer 5 KW of load to #1000 circuit which was underloaded. Area affected is north of Symons and west of Wright.

Cleared ground in 703 Building fire alarm system.

RICHLAND ELECTRICAL UNIT

Overhauled, cleaned and repaired six fire alarm registers.

Installed time clock in master traffic controller at Goethals and McKenzie, for automatic control.
Installed flasher traffic signal at George Washington Way and McMurray Road.
Adjusted west vehicle actuating pedal switch at George Washington Way and Van Giesen pending replacement by manufacturer.

Replaced one rotted primary pole in rear of old nursery site.
Replaced three rotted primary poles in feeder line in rear of Safeway existing store.

Completed metering of No. 2 Fire Station.
Completed replacing 38 overloaded 15-amp meters with 50-amp meters.

Installed overhead guys and removed guys and stub interfering with car parking in American Legion parking lot.

Unscheduled outages:

Transformer fuse was blown at 2207 Humphries - no apparent cause. Off at 11:23 A.M. - on at 11:50 A.M.
Outage at 1509 Hains was caused by tenant service tree trimming crew hitting line with falling limbs. Off at 10:00 A.M. - on at 10:40 A.M.
Television crew short-circuited secondaries to transformer at 1107 Gillespie. Off at 5:20 - on at 6:50 P.M. Delay caused by television crew failing to observe and report damage. The television company manager was called following morning and asked to arrange to alert crews to exercise more care - 2-10-54. (Call Out).
Blown lateral fuse to switch 14X128 near Humphries and Wright - 1:15 A.M. to 2:45 A.M. - 2-13-54. No apparent cause. (Call-Out).
Outage to transformer west side of C.C. Anderson store. Off at 3:26 P.M. - on at 4:02 P.M. - 2-16-54. No apparent cause.

Scheduled outages:

Scheduled outage on Women's Dorms to complete line rebuild in rear of old nursery site and removing old section of line. 12:45 P.M. to 2:17 P.M. - 2-9-54.

Scheduled outage to transformer stations on Parkway and rear of Village Theatre for thirty minutes - 2-17-54 - to remove unused primary wire running over transformer stations.

Scheduled outage to 744 Building to rearrange transformer connections and connect Bio Assay Building on same station. 2-10-54. 2:00 P.M. to 3:30 P.M.

Call-Outs:

One man from 6:00 to 6:30 P.M. on 2-3-54, to investigate arcing in meter base at Linn Motors. Meter was pulled and reinstalled to stop arcing. Base was repaired by Linn Motors following day.

RICHLAND ELECTRICAL UNIT

Call-out to restore service to #1200 street lighting circuit on 2-21-54, from 8:00 P.M. to 10:00 P.M. Unable to find trouble after extensive patrol to assure no wires down, as lines in rear of houses could not be reached with spot lights. Second call-out following holiday located and repaired broken jumper in rear of houses on Cedar Street from 8:30 to 10:30 - 2-22-54.

Call-out to repair clarifier #3 at Sewer Treatment Plant. One man from 9:00 A.M. to 12:00 Noon.

COMMUNITY OPERATIONS SECTION
PUBLIC WORKS UNIT
MONTHLY REPORT
FEBRUARY 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	12	53
Transfers Out	1	1
fers In	0	1
New Employees	0	0
Terminations	0	0
Total End of Month	11	53

SANITATION

Total weight of waste material collected and disposed of during February was 1161 tons. February 22 was observed as a holiday and collections normally due on this day were collected on the following day. Commercial collections were made on Saturday, February 20, to provide necessary service over the three day week end.

ROADS AND STREETS

The FY 1954 Street Improvement Project Proposal, providing for widening George Washington Way, from Symons to McMurray, to four lanes and repaving the entire width, and surfacing of that section of George Washington Way between existing paving and curb from McMurray to Catskill, was approved by AEC on February 19, 1954, and design is now in progress.

Ice control work performed during the month utilized 115 cubic yards of sand and 1000 pounds of salt, and accounted for 42 man-hours overtime. Approximately 400 cubic yards of sand remain in the stock pile and will be held for ice control purposes next year.

Eighteen new street marker signs were installed.

Sand spread on icy streets during the winter is being picked up as rapidly as possible through use of the Elgin Street Broom. This sweeper had a new conveyer belt installed and other overhaul work done during the early part of the month.

Community Operations Secti...
Public Works Unit

Routine seasonal repair and maintenance of streets, street signs, drainage systems, municipal parking lots and sidewalks was continued as required.

PARKS AND PUBLIC GROUNDS

Grading and seeding of bare spots on parks lawns was completed and fertilizing of all parks lawn grass is now in process.

Discing and rilling of shelterbelt areas is now under way in preparation for the irrigation season.

General clean up and weed removal work was continued in open areas throughout the community.

Routine maintenance of parks properties, shelterbelts and public areas was continued.

DOMESTIC WATER

Average daily water consumption for February was 6,648,900 gallons. Peak consumption during the month was 7,816,200 gallons on February 16.

A pumping test of the Wellsian Way well field (without the benefit of recharge water) was made to determine the effect of McNary pool on the underground water supply in this area, and the necessity for continued recharging through percolation. The well pumps were operated at their normal rate and the water table remained static for about ten days, at which time it dropped off to the point that the wells were pumping excessive amounts of sand and air. The pumping rates were cut back to hold the water over the level of the bottom pump bowls, but at the end of five more days the water table had again lowered to the level where some of the pumps were pumping air. Test pumping was then discontinued and recovery of the level of the water table has been very slow. Conclusions reached are that McNary pool will not replenish the underground water supply at the Wellsian well field, and that continued recharging will be necessary during peak water consumption periods.

On February 15, 3000 F well was put into service pumping into the 3000 area grid system at 1350 gpm and the pump drew down quite rapidly and commenced pumping air. The well was then surged and pumped for three days and at present is producing about 1500 gpm.

The fire hydrant inspection and repair program is approximately 98% complete and will be finished as repair parts are received. Several hydrants were found to have drain holes plugged with roots. Three water main leaks were repaired during the month.

Community Operations Section
Public Works Unit

DOMESTIC WATER

	Well Production Million Gallons	Average Daily Production	Total Consumption Million Gallons	Av. Daily Consump.
Richland	89.9100	3.2110	91.9448	3.2836
North Richland	53.6500	1.9160	54.6774	1.9527
Columbia Field	42.6128	1.5219		
300 Area			39.5756	1.4134
TOTAL	186.1728	6.6489	186.1978	6.6498

SEWERAGE SYSTEM

The communitor at #1 Sewage Treatment Plant was completely overhauled and new cutters and blades were installed.

A section of sewer main in the 200 block on Atkins Avenue was excavated to investigate the cause of several stoppages occuring at this location. The main was found to be in good condition except for some leaking pipe joints which were repaired.

The annuel sewer flushing and cleaning program is about 75% complete.

SEWAGE

	Total Flow Million Gallons	Average Daily Flow Million Gallons
Plant No. 1	29.630	1.058
Plant No. 2	60.498	2.161
Total	90.128	3.219

IRRIGATION SYSTEMS

Maintenance and cleaning of the main canal from Horn Rapids Dam to the penstock and the 3000 area percolation basin have been completed. Repairs to the wooden flume near the AEC airport have also been completed.

Work is progressing on overhaul of the pumps at irrigation pumping stations and repair of the irrigation distribution systems and risers.

COMMUNITY OPERATIONS SECTION
RECREATION AND CIVIC AFFAIRS UNIT
MONTHLY REPORT
FEBRUARY 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Beginning of Month	3	2-1/2
New Hires	0	1
Terminations	0	0
Transfers - IN	0	0
- OUT	0	0
	3	3-1/2

SCHOOLS

The following is a tabulation of full-time paid School District #400 personnel as of February 28, 1954:-

Administration	7
Principals and Supervisors	14
Clerical	25
Teachers	306
Health Audiometer	0
Cooks	45
Bus Driver	1
Maintenance	21
Operations	44
	463

CLUBS AND ORGANIZATIONS

As of February 28, 1954, the employees of the listed organizations, exclusive of those included in the Real Estate, Commercial and Other Properties Unit Report, include:-

Youth Council	1
Boy Scouts	1
Campfire Girls	1
Hi Spot Club	2
Girl Scouts	2
Justice of the Peace	1
Y.W.C.A.	2
Chamber of Commerce	1
	11

RECREATION AND CIVIC AFFAIRS UNIT February, 1954

The number and types of organizations presently served by the Recreation and Civic Affairs Unit include:-

Business & Professional Organizations		23
Churches and Church Organizations		27
Civic Organizations		19
Schools		10
Fraternal Organizations		25
Political Organizations		5
Recreations and Social Clubs	- Alumni	3
	- Arts, Music, Theater	11
	- Bridge	5
	- Dance	3
	- Garden	3
	- Hobby	9
	- Social	11
	-Sports	19
Veteran and Military Organizations		14
Welfare Groups		7
Youth - Boy Scouts		20
- Girl Scouts		49
- Campfire Girls		36
- Miscellaneous		15
		314

RECREATION

The regular monthly meeting of the Parks and Recreation Board was held on February 4, 1954. The Board was advised that seventeen adults, had indicated a desire to participate in volley ball and badminton activities, in response to publicity thru local newspapers. The Board recommended that not enough interest was shown to justify additional nights at Spalding Gym, and that the following plan be carried out on Monday evenings. - (1) Basketball Free Play, 7:00 P.M. - 8:30 P.M., (2) Badminton, 8:30 P.M. - 10:00 P.M.

The Board also recommended that the Bus Depot operator be allocated enough land to serve the expansion of his present operation.

The next regular meeting of the Board is scheduled for March 3, 1954.

The Richland Womens Club, in conjunction with the A.E.C. Civil Defense co-ordinates, sponsored a Civil Defense Workshop in the Community House on February 26th, and 27th. A total of 360 persons were in attendance during the two day workshop.

RECREATION AND CIVIC AFFAIRS UNIT February, 1954

Attendance Statistics - February, 1954

	No. of Sessions	Youth	Adults	Spectators	Sub-Total
A. Community House					
I. Rec. Unit Supervised Programs					
Games Room Activities	23	1009	370		1379
Crafts	7	79	5		84
Tumbling	3	88	13		101
Ballroom Dancing	3	53	6		59
Archery	-	-	-		-
Movies	4	412	32		444
Photography	4	7	3		10
Square Dancing Elementary	4	495	34		529
Square Dancing Jr.& Sr.Hi.	4	47	5		52
Dramatics	-	-	-		-
Adult Table Tennis League	4	-	103		103
Physical Activities - (Spalding)	3	-	76		76
II. Affiliated Programs					
Hi Spot Club (Teen Age)	7	2061	31		2092
Rec-A-Teers (Young Adults)	4	-	102		102
Fencing	3	3	37		40
Jr. Stamp Club	2	23	3		26
Int'l Folk Dancers	7	18	81		99
G.E. Women's Club	2	-	24		24
Rich. Rod & Gun Club	1	9	55		64
Y.W.C.A. Supper Club	3	-	124		124
Junior Symphony	1	21	7		28
III. Rec. Unit Special Events					
None					
IV. Non-Unit Special Events					
Civil Defense Work Shop	2	-	386		386
V. Other Comm. House Bookings	18	21	661		682
Sub-Totals	109	4346	2158		6504
B. Parks and Playgrounds					
I. Rec.Unit Supervised Programs					
Tumbling	-	-	-		-
Story Hour	-	-	-		-
Band Concerts	-	-	-		-

RECREATION AND CIVIC AFFAIRS UNIT — February, 1954

(Parks & Playgrounds Continued)	No. of Sessions	Youth	Adults	Spectators	Sub-Total
Dramatics	-	-	-		-
General Play-Riverside	-	-	-		-
General Play-Columbia-School Attendance	14	980	30		1010
Juvenile Fishing	-	-	-		-
Triple-O-League	-	-	-		-
Play-For-Fun League	-	-	-		-
II. Affiliated Programs					
Lake Shore Baseball	-	-	-		-
Rich. Softball Assn.	-	-	-		-
American Legion Baseball	-	-	-		-
Little League Play (Jeff.)	-	--	-		-
III. Rec. Unit Special Events					
None					
IV. Non-Unit Special Events					
Civil Defense	1	-	200		200
V. Baseball & Softball Bookings					
None					
VI. Estimated Use of Non-Supervised Playgrounds					
None					
Sub-Totals	15	980	230		1210

SUMMARY OF STATISTICS

	No. of Sessions	Youth	Adults	Spectators	Sub-Total
Community House	109	4346	2158		6504
Parks and Playgrounds	15	980	230		1210
Total February Attend.	124	5326	2388		7714

Grand Total for February - 7,714
Cal. Year Total-To-Date- 17,550

COMMUNITY OPERATIONS SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
February 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees - Beginning of Month	3	8
Transfers In	0	0
Transfers Out	0	0
New Hires	1	0
Terminations	0	0
End of Month	4	8

GENERAL

Circulation

Books	19,275
Magazines	521
Pamphlets	93
Records	1,201
Interlibrary Loan	48
Grand Total	21,138

Current Book Stock

Books added this month	497
Books withdrawn this month	38
Grand Total	28,145

Registration

Adult	197
Juvenile	55
Total	252
Total Registered Borrowers	15,485
Children's Story Hour Attendance	297
Meetings in North Hall	25

Miss Helen Church joined the library staff as Catalog-Order Librarian on February 3rd. Miss Church is a graduate of the University of Denver School of Librarianship and has had two years experience at the Central Washington College of Education Library at Ellensburg, Washington and has just returned from two years with the U. S. Army library service in Germany.

A new World Politics Discussion Group was started on February 15th with eleven participants. The discussion leaders for the group are Mr. Gordon Cochrane and Mrs. James Lutton.

Miss Doris Roberts, Librarian, and Mr. James Berkey, who will lead an American Heritage Discussion Group for the library next fall, attended an American Heritage leader training session in Ellensburg, February 27th. The meeting was conducted by Mr. Leonard Friedman, field representative of the American Library Association American Heritage Project Headquarters, Chicago, Illinois.

The film "Little Grey Neck" was shown at the special children's Valentine's Day story hour on February 6th. The use of the films with holiday story hours is made possible by the sponsorship of the children's special activities program by the Richland chapter of the American Association of University Women.

COMMUNITY OPERATIONS SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
FEBRUARY 1954

ORGANIZATION	Exempt	Non-Exempt
Employees - Beginning of Month	17	33
Transfers In	0	0
Transfers Out	0	1
New Hires	0	0
Terminations	0	0
Total - End of Month	17	32

GENERAL

The Police parking lot just north of Headquarters Building was altered to make room for parking of vehicles belonging to persons having temporary business at Police Headquarters. The space extending from the Emergency Motor House to the north end of the lot, to be utilized for this purpose, is now a thirty minute parking zone. The space extending from the Emergency Motor House to the south end of the lot is restricted to police vehicles only.

Revisions were also made to the office space allotments in 770-B Building, resulting in our releasing one office space to other groups.

One group of Boy Scouts were escorted on a tour of Police Headquarters this month.

Chief H. W. Strock and Capt. W. A. Ziegler attended the Washington State Law Enforcement Coordinating Committee meeting held in the Senate Chambers at Olympia on Friday, February 26..

New materials received during the month included a quantity of summer caps for use with our current police uniform.

Comstock has been made a secondary arterial. All traffic will stop for it with the exception of George Washington Way, Goethals and Duane.

A new mechanism has been installed in the traffic light at McKenzie and Goethals to permit the light to operate automatically at given periods on a stop and go cycle.

TRAFFIC	1954 Jan.	1954 Feb.	1953 Jan.	1953 Feb.	1954 Total To Date	1953 Total Same Period
Reportable accidents	32	25	21	21	57	42
Property damage accidents	29	22	19	20	41	39
Injury accidents	3	3	1	1	6	2
Total persons injured	3	3	1	1	6	2
Fatal accidents	0	0	1	0	0	1
Accidents-Daylight hours	20	16	13	13	36	26
-Darkness	12	9	8	8	21	16
Accidents-Business district	8	7	8	11	15	19
Residential "	20	13	7	5	33	12
Other "	4	5	6	5	9	11
Accidents investigated	16	11	9	14	27	23
Criminal complaints filed	9	6	7	11	15	18
Violations contributing to accidents:						
Negligent driving	3	7	2	1	10	3
Fail.to yield r.o.w.	4	7	12	10	11	22
Following too closely	8	4	3	4	12	7
Drunk driving	0	0	0	0	0	0
Pedestrian violation	0	0	0	0	0	0
Inattention to driving	0	2	0	0	2	0
Reckless driving	0	1	0	1	1	1
Speeding	0	1	0	2	1	2
Unsafe speed	16	3	0	0	19	0
Improper backing	0	0	2	1	0	3
Disregarding stop sign	0	0	2	0	0	2
Hit and run	0	0	0	0	0	0
Improper passing	0	0	0	1	0	1
Improper turn	1	0	0	0	1	0
Failure to signal	0	0	0	0	0	0
Wide right turn	0	0	0	0	0	0
Wrong side of road	0	0	0	0	0	0
Defective equipment	0	0	0	0	0	0
North Richland:						
Reportable accidents	10	7	6	9	17	15
Property damage accidents	9	6	5	9	15	14
Injury accidents	1	1	1	0	2	1

Richland	1954 January	1954 February	1954 January Ave.Per Accident	1954 February Ave.Per Accident	1953 January Ave.Per Accident	1953 February Ave.Per Accident
Accident property damage	$5,385.85	$5,566.48	$168.31	$222.66	$170.76	$257.14

TRAINING

There was no Range activity during the month of February.

ACTIVITIES AND SERVICES	January 1954		February 1954	
	Richland	North Richland	Richland	North Richland
Bank escorts and details	4	5	3	6
Bicycles impounded	3	1	0	2
Bicycle violations, other	1	1	0	0
Bicycles registered	38	0	31	0
Children lost or found	5	4	13	3
Complaints investigated (no enforcement action)	31	7	26	4
Deaths reported	0	0	0	0
Dog, cat, loose stock complaints	0	0	1	0
Dogs, cats, reported lost or found	12	0	7	0
Doors, windows found open in facilities	45	6	29	8
Emergency messages delivered	15	77	24	73
Fires investigated	8	4	5	1
Guns registered	11	0	10	0
Law enforcement agencies assisted	6	0	9	0
Letters of inquiry	67	0	75	0
Miscellaneous escorts	6	0	1	2
Persons injured by dogs	1	0	0	0
Plant departments assisted	64	2	15	1
Prisoners processed through Jail	15	11	27*	12
Private individuals assisted	19	0	8	1
Property lost or found	32	1	14	3
Records inquiries	82	0	148	0
Reports processed through Records	220	121	304	467
Street lights out reported to Electrical	103	20	107	22
Traffic safety meetings (February attendance-810)	29	0	17	0
Total	817	260	874	605

NOTE: *Three prisoners handled for Security Patrol for February.

MONTHLY RE[illegible]T
RICHLAND POLICE DEPARTMENT
(RICHLAND - NO. RICHLAND)
FEBRUARY 1954

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							1**	-
5. Burg.-Break. & Entry	3	-	1	1**	-	-	-	1**
6. Larceny Over $50.00	-	1	-	-	-	1	-	-
Under $50.00	9	6	1	1	-	10**	-	-
7. Auto Theft	2	9	-	-	2	11	1	1
TOTAL PART I CASES	14	16	2	2	2			
PART II								
8. Other Assaults	1	1	-	-	-	-	-	1
9. Forgery & Counterfeit	1	-	-	-	-	-	-	-
10. Embezzlement & Fraud	2	1	-	-	-	-	2	-
11. Stolen Prop:Buy:Rec.	-	-	-	-	-	-	-	-
12. Weapons: Carry: Poss.	-	-	-	-	-	-	-	-
13. Prostitution	-	-	-	-	-	-	-	-
14. Sex Offenses	-	-	-	-	-	-	-	-
15. Offenses Ag. Fam. & Child	1	-	-	-	-	-	1	-
16. Narcotics	-	-	-	-	-	-	-	-
17. Liquor Laws	-	-	-	-	-	-	-	-
18. Drunkenness	9	3	-	-	-	-	9	3
19. Disorderly Conduct	-	-	-	-	-	-	-	-
20. Vagrancy	-	1	-	-	-	-	-	1
21. Gambling	-	-	-	-	-	-	-	-
22. Driving While Intoxicated	5	2	-	-	-	-	5	2
23. Viol. Rd. & Dr. Laws:								
Fail. to Stop & Identify	3	-	-	-	-	-	1	-
Speeding	20	16	-	-	-	-	20	16
Stop Sign	14	8	-	-	-	-	14	8

OFFENSES	KNOWN Rich.	KNOWN No. Rich.	UNFOUNDED Rich.	UNFOUNDED No. Rich.	CLEARED OTHER* Rich.	CLEARED OTHER* No. Rich.	CLEARED ARREST Rich.	CLEARED ARREST No. Rich.
PART II								
Reckless Driving	1	2	-	-	-	-	1	2
Right of Way	1	2	-	-	-	-	1	2
Negligent Driving	9	5	-	-	-	1	9	4
Defective Equipment	3	1	-	-	2	-	1	1
Illegal Passing	1	-	-	-	-	-	1	-
24. Parking	31	302	-	-	-	80	31	222
25. All Other Traffic Viol.	91	87	-	-	2	-	89	87
26. All Other Offenses:								
Malicious Mischief	1	-	-	-	1	-	-	-
Vandalism	10	3	-	-	5	1	-	-
Bike Violations	-	2	-	-	-	2	-	-
Family Disturbance	3	-	-	-	3	-	-	-
Public Nuisance	2	1	-	-	-	-	2	1
Investigation	2	2	-	1	2	1	-	-
Prowler	1	3	-	1	-	-	-	-
Arson	-	1	-	-	-	-	-	1
Illegal Shooting	-	1	-	-	-	1	-	-
Viol. of Dog Ordinance	1	-	-	-	-	-	1	-
Pickup for Outside Agency	1	-	-	-	-	-	1	-
27. Suspicion	1	-	-	-	-	-	-	-
TOTAL PART II	215	444	-	2	15	86	189	351
PART III								
28. Missing Persons	2	4	-	-	2	4	-	-
Lost Persons	12	3	-	-	12	3	-	-
Lost Animals	5	3	-	-	2	1	-	-
Lost Property	17	2	-	-	7	1	-	-
29. Found Persons	-	-	-	-	-	-	-	-
Found Animals	3	-	-	-	-	-	-	-
Found Property	13	-	-	-	11	-	-	-
TOTAL PART III	52	12	-	-	34	9	-	-

OFFENSES	KNOWN Rich.	KNOWN No. Rich.	UNFOUNDED Rich.	UNFOUNDED No. Rich.	CLEARED OTHER* Rich.	CLEARED OTHER* No. Rich.	CLEARED ARREST Rich.	CLEARED ARREST No. Rich.
PART IV								
30. Fat.M.V.Tr. Acc.	-	-						
31. Pers.Inj.M.V.Tra.Acc.	3	1						
32. Prop.Dam.M.V.Acc.	22	6						
33. Other Traffic Acc.								
34. Public Accident)								
35. Home Accidents)	No Accurate Statistics Kept							
36. Occupational Acc.)								
37. Firearms Accidents								
38. Dog Bites								
39. Suicides								
40. Suicide Attempts								
41. Sud. Death & Bod. Found								
42. Sick Cared For								
43. Mental Cases	1							
TOTAL PART IV	26	7						
COMPOSITE TOTALS								
PART I,II, III,IV CASES	307	479	2	4	51	106	190	352

*Cases listed under "Cleared Other" are those cleared by various means other than arrest, such as: order from prosecutor, juvenile probation officer or other situations in which a mutual agreement is obtained. They are definitely "cleared" cases and differ from the arrest column only in that there was no arrest. **One burglary unfounded and one burglary cleared arrest for previous month. **One grand larceny cleared arrest for previous year. ** One auto theft cleared other for previous month.

Property reported stolen	Richland	$1,432.19
Property reported stolen	No. Rich.	$5,799.00
Property recovered	Richland	$1,508.19
Property recovered	No. Rich.	$5,840.00

RICHLAND POLICE DEPARTMENT
(COMMUNITY OF RICHLAND)

Number of offenses known to police per 25,000 inhabitants in cities of 25,000 persons:

Wash.Ore. & Calif. Six Months (Jan.-June 1953)	One Month Average	1953 Jan. - June	1954 January	1954 February
Murder	.383	.064	-	-
Robbery	11.925	1.988	-	-
Agg. Assault	9.95	1.659	-	-
Burglary	73.55	12.259	19	6
Larceny	210.53	35.089	116	15
Auto Theft	39.23	6.538	4	3

Number of offenses known to police per 25,000 inhabitants regardless of whether offenses occurred in cities or rural dist.

State of Washington Six Months (Jan.-June 1953)	One Month Average	1953 Jan. - June	1954 January	1954 February
Murder	.371	.062	-	-
Robbery	8.43	1.403	-	-
Agg. Assault	2.03	.338	-	-
Burglary	62.28	10.38	19	6
Larceny	188.38	31.397	116	15
Auto Theft	34.0	5.667	4	3

The percentage of offenses committed by persons under the age of 25 years is shown:

	Richland 1953 Jan. - June	Richland 1954 January	1954 February
Robbery	-	-	-
Burglary	28%	17%	33%
Larceny	16%	20%	-
Auto Theft	17%	33%	-

Note: Comparative statistics for juvenile offenses are not available in current issues of the Uniform Crime Report published by the Federal Bureau of Investigation.

RICHLAND POLICE ARTMENT
(COMMUNITY OF NORTH RICHLAND)

Number of offenses known to police per 10,000 inhabitants in cities of 10,000 persons:

Wash.Ore. & Calif. Six Months (Jan.-June 1953)		One Month Average	1953 Jan. - June	1954 January	1954 February
Murder	.153	.026	-	-	-
Robbery	4.77	.795	-	-	-
Agg. Assault	3.98	.663	1	-	-
Burglary	29.42	4.903	4	1	-
Larceny	84.21	14.035	52	3	7
Auto Theft	15.69	2.615	5	3	9

Number of offenses known to police per 10,000 inhabitants regardless of whether offenses occurred in cities or rural dist.

State of Washington Six Months (Jan.-June 1953)		One Month Average	1953 Jan. - June	1954 January	1954 February
Murder	.153	.026	-	-	-
Robbery	3.37	.562	-	-	-
Agg. Assault	.81	.135	1	-	-
Burglary	24.91	4.152	4-	1	-
Larceny	75.35	12.588	52	3	7
Auto Theft	13.60	2.267	5	3	9

The percentage of offenses committed by persons under the age of 25 years is shown:

	No. Richland 1953 Jan. - June	No. Richland 1954 January	1954 February
Robbery	-	-	-
Burglary	-	-	-
Larceny	12%	50%	14%
Auto Theft	9%	-	-

Note: Comparative statistics for juvenile offenses are not available in current issues of the Uniform Crime Report published by the Federal Bureau of Investigation.

MONTHLY REPORT	RICHLAND POLICE DEPARTMENT		JUVENILES INVOLVED				FEBRUARY
OFFENSE	NO. CASES	JUVENILES	SEX	4	5	14	16
RICHLAND							
Vandaliam	1	1	M		1		
	1	1	F			1	
False Fire Alarm	1	1	M	1			
TOTALS	3	3		1	1	1	
NORTH RICHLAND							
Illegal Shooting	1	2	M				2
Nuisance	1	1	M				1
TOTALS	2	3					3

RICHLAND CE DEPARTMENT
RICHLAND JUSTICE COURT CASES
FEBRUARY 1954

VIOLATION	NO OF CASES	NO OF CONV.	NO OF FORF.	CASES CONT.	CASES DISM.	WARR. ISS.	SENT JAIL	SENT SUSP.	LIC. REV.	CASES ORIG. PREV. MON.	CASES INCL. OTHER VIOL.	BAIL FORF.	FINES	FINES SUSP.
												$	$	$
DEFECTIVE EQUIPMENT	1			1										
DISREGARD EXISTING ROAD CONDITIONS	1		1							1		25.00		
DRUNK DRIVING	2	2							2				105.00	
F.T. DIM HEADLIGHTS	1		1									7.50		
F.T.S. & I.	1				1									
F.T.Y.R.O.W.	2	2								1			17.50	10.00
FOLLOWING TOO CLOSE	1			1										
ILLEGAL PARKING	27	7	16	3	1							56.00	24.00	3.50
ILLEGAL PASSING	2	1			1					1			5.00	
INVALID DRIVERS LICENSE	32	13	9	9	1					1		39.00	66.00	32.50
INVALID LICENSE PLATES	62	17	30	11	4					1		262.50	145.00	35.00
NEGLIGENT DRIVING	14	9	2	1	2		1	1		1		50.00	107.50	40.00
NO REGISTRATION	1			1										
RECKLESS DRIVING	3	3							3				152.50	
SPEEDING	21	8	7	3	3					2		70.00	70.00	7.50
STOP SIGN	14	3	8	2	1					1		77.50	22.50	
LARCENY BY CHECK	2				2									
NON-SUPPORT	1				1									
OBSTRUCTED VISION	1	1								1			3.50	
PUBLIC INTOXICATION	10	1	9									142.50	7.50	
PUBLIC NUISANCE	2	1	1				1					15.00		
RESISTING ARREST	1	1											7.50	
THIRD DEGREE ASSAULT	6	6					5	2		4				
USING FICTITIOUS DRIVERS LICENSE	1	1											10.00	
TOTAL	209	76	84	32	17		7	3	5	14		$745.00	$743.50	$128.50

TWO DRUNK DRIVING CASES AMENDED TO NEGLIGENT DRIVING.
ONE DRUNK DRIVING CASE AMENDED TO RECKLESS DRIVING.

RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
FEBRUARY 1954

VIOLATION	NO OF CASES	NO OF CONV.	NO OF FORF.	CASES CONT.	CASES DISM.	WARR. ISS.	SENT JAIL	SENT. SUSP.	LIC. REV.	CASES ORIG. PREV. MON.	CASES INCL. OTHER VIOL.	BAIL FORF.	FINES	FINES SUSP.
DEFECTIVE EQUIPMENT	3	2		1								$	$ 8.50	$ 5.00
DRUNK DRIVING	2	1		1									102.50	
DRVG WHILE LIC. REV.	1	1					1							
F.T.Y.R.O.W.	2	2											20.00	
ILLEGAL PARKING	211	17	128	65	1					5		452.00	59.50	28.00
ILLEGAL PASSING	1	1											7.50	
INVALID DRIVERS LIC.	40	12	10	7	11							47.50	55.00	27.50
INVALID LIC. PLATES	73	18	23	14	18							219.50	117.50	15.00
NEGLIGENT DRIVING	7	5	2							1		75.00	120.00	
NO REGISTRATION	1			1										
PERMIT UNLIC. OPER. TO DRIVE	1	1											15.00	10.00
PROJECTING LOAD NOT FLAGGED	1	1											5.00	
RECKLESS DRIVING	4	4							4				197.50	30.00
SPEEDING	11	7	3	1								30.00	62.50	15.00
STOP SIGN	7	2	3	1	1					1		27.50	10.00	
PUBLIC INTOXICATION	5	2	3									37.50	25.00	
PUBLIC NUISANCE	1	1											12.50	5.00
THIRD DEGREE ASSAULT	1	1					1	1						
VAGRANCY	1	1											12.50	5.00
TOTAL	373	79	172	91	31		2	1	4	7		$889.00	$830.50	$140.50

TWO DRUNK DRIVING CASES AMENDED TO RECKLESS DRIVING.

POLICE DEPARTMENT - TRAFFIC CONTROL STATISTICS
FEBRUARY - 1954

MOTOR VEHICLE ACCIDENTS REPORTABLE:

	Total Number		Fatalities		Major Injuries		Minor Injuries	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
Richland	32	25	0	0	0	0	3	3
North Richland	10	7	0	0	0	0	1	1

ACCIDENT CAUSES:

	Negligent Driving		Failure to Yield Right of Way		Reckless & Drunken		Other Causes	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
Richland	3	7	4	7	0	1	25	10
North Richland	2	1	2	1	0	0	6	4

PLANT WARNING TRAFFIC TICKETS ISSUED:

	Speeding		Stop Sign		Parking		Imp. License		Def. Equipment		Other V.		Totals	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
Richland	0	0	0	0	6	0	0	0	0	2	0	2	6	4
No Richland	0	0	0	0	8	80	0	0	0	1	0	0	8	81

TRAFFIC CHARGES AND COURT CITATION TRAFFIC TICKETS ISSUED:

	Speeding		Stop Sign		Drunken Dr.		Reckless Dr.		Right of Way		Neg. Drv.		Parking V.		Other V.		Totals	
	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.	Jan.	Feb.
Richland	23	19	20	13	4	5	0	2	9	1	13	11	16	27	28	98	113	176
No Richland	6	11	9	6	2	4	2	2	3	2	7	6	43	206	20	121	92	352

THERE WAS NO TRAFFIC VOLUME COUNT DURING THE MONTH OF FEBRUARY

NOTE: TRAFFIC CONTROL STATISTICS SHOW ORIGINAL CHARGES ONLY

COMMUNITY OPERATIONS SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT
FEBRUARY 1954

Organization and Personnel	Exempt	Non-Exempt
Employees - Beginning of Month	66	0
Transfers In	0	0
Transfers Out	0	0
Terminations	0	0
New Hires	1	0
End of Month	67	0

Fire Protection		Richland	North Richland
Fire Loss (Estimated):	Government	$0.00	$15.00
	Personal	0.00	200.00
	February Total	0.00	$215.00
	Year's Total	$332.50	$3,636.00
Response To Fire Alarms		22	25
Investigation of Minor Fires and Incidents		0	5
Ambulance Responses		28	
Inside Schools or Drills		35	14
Outside Drills		17	4
Safety Meetings		7	5
Security Meetings		3	2
Fire Alarm Boxes Tested		196	112
AEC Airport Standbys		3	

Captain Ray Hatfield instructed 20 Girl Scouts in first aid at the home of Mrs. F. C. Black on February 4th and Assistant Chief Quane is instructing a bi-monthly first aid class of 16 Campfire Girls at the Central Fire Station.

The Administrative Captain and Fire Marshal completed the 20-hour PMS training course.

Fire Department's tank truck was dispatched to Enterprise on February 23rd to assist Enterprise volunteer firemen control a grass fire that threatened several residences.

Fire Prevention

Seventeen North Richland and 40 Richland building inspections in February resulted in 10 hazard reports. A hundred thirty three fire extinguishers were inspected, 6 installed, 11 removed and 7 refilled. Twenty one fire hose standpipes were also inspected.

The schedule for regularly testing auxiliary fire alarm systems in all public schools was started during February, the Assistant Fire Marshal aiding school employees and observing results.

Assistance was given Community Engineering on the acceptance inspection of the Newberry mercantile building. The Newberry Company manager agreed to install second floor standpipe fire hose and change exit lights.

Assistant Fire Marshal investigated a hot wall switch in the 703 Building and arranged for switch replacement.

Conferences were held with the store manager, Public Works and Real Estate representatives on the hazardous trash conditions existing at the rear of the Safeway Store.

February newspaper and radio releases were arranged under the sponsorship of the Richland Safety Council.

Assistant Fire Marshal took part in making a traffic safety tape recording for radio use.

Conferences were held with the State Electrical Inspector on the 1951 Densow Drug lighting fixture fire.

The Assistant Fire Marshal addressed 100 Real Estate Maintenance employees on fire prevention.

Fire Marshal cooperated with AEC Engineers, architect and construction contractor on an acceptance inspection of the Jason Lee School addition. One fire door failed an operational test.

Fire Marshal consulted with Community Engineering on the auxiliary alarm and heat detector system for the proposed Catholic school.

The Assistant Fire Marshal addressed four groups of the Civil Defense Workshop February 27th on the subject of home fire prevention and home fire fighting.

The Richland fire prevention activity scrap book was completed and turned over to the Chamber of Commerce for submission to the National Fire Waste Contest headquarters in Washington, D. C..

COMMUNITY OPERATIONS SECTION
ENGINEERING UNIT
MONTHLY REPORT
FEBRUARY 1954

PERSONNEL	Exempt	Non-Exempt	Total
Employees - Beginning of Month	6	3	9
Employees - End of Month	6	3	9

BUILDING PERMITS ISSUED IN FEBRUARY:

1. Uptown Thrifty Drug, Inc. - Alteration
2. J. R. Parcell - Service Station, Hartford and Duportail
3. L. G. Cook Building Addition, Stevens Drive

NEW MUNICIPAL CONSTRUCTION STARTED IN FEBRUARY:

None

NEW PRIVATE CONSTRUCTION STARTED IN FEBRUARY:

1. J. R. Parcell - Service Station, Hartford and Duportail
2. L. G. Cook - Building Addition, Stevens Drive

ENGINEERING JOBS COMPLETED DURING FEBRUARY:

ESR I 90314 - Revised Legal Description, All Saints Episcopal Church

ESR I 90494 - Estimate of Cost, Metering Commercial Buildings for Water.

ESR I 90514 - Legal Description, Carnation Company

ESR I 90564 - Legal Description, Automatic Laundry Company

STATUS OF ENGINEERING UNIT JOBS TO BE COMPLETED:

PROJECTS:

25.7 Kadlec Hospital Grounds Improvements - See ESR I 90634

K-753 Flow Control Valve, Sewage Treatment Wet Well - Adjustments still being made.

K-811 Extend Sewer to New Commercial Building, Hartford & Duportail - 90% complete. Awaiting seeding weather to replant lawn.

L-728 Installation Fire Insulated Fire Alarm Wire - To be completed as locations furnished by Fire Department.

L-888 Air Conditioning, Community House - See ESR 90644

S-722 (IR-167) - Erosion Control & Development, FY 1953, Part I - Project Prepared for approval.

S-869 (IR-165) - Parking Facilities, Kadlec Hospital - Design 90% complete.

ENGINEERING UNIT (Cont.)

ENGINEERING SERVICE REQUESTS:

I 90014 Free Methodist Church - 99% complete. No progress this month.

I 90024 First Baptist Church(Richmond and Raliegh Streets) - 89% complete. Work progressing very slowly.

I 90034 Assemby of God Church - 78% complete. Work progressing very slowly.

I 90044 Alteration Permits - An open active file. 1 sign permit, 1 alteration permit, and two new building permits issued.

I 90054 Engineer Liaison, Richland Water - Following construction and providing liaison as requested.

I 90064 Television Antennae - An open active file. No permits issued this month.

I 90094 Plans, Specs., Inspections, Grace Bacon Roller Rink - 98% complete. Construction progressing. Open for business.

I 90104 Plans, Specs., Inspections, Newberry Store - 99% complete. Open for business. Inspection exceptions being cleared.

I 90114 Plans, Specs., Inspections, Latter Day Saints Storehouse - 98% complete. Work progressing slowly.

I 90124 Plans, Specs., Inspections, American Legion - 99% complete. All exceptions not cleared.

I 90154 Plans, Specs., Inspections, Parcell Service Station, Duportail and Hartford - Plans approved. Construction started 2-22-54.

I 90164 Plans, Specs., Inspections, Veterinary Hospital - Open for business. 99% complete.

I 90174 Plans, Specs., Inspections, Diana Langevin Building - Construction 99% complete. Final inspection to be made.

I 90184 Plans, Specs., Inspections, Safeway Store - 39% complete. Work resumed February 23, 1954 after strike settled.

I 90194 Landscape Design for 300 Area - Project being prepared by Plant Engineering.

I 90204 Plans, Specs., Inspections, EH Kidwell Service Station - Plans not received.

I 90224 Inspection & Liaison, Spokane Housing - 98% complete. Exceptions being cleared by contractor.

I 90234 Inspection & Liaison, Bauer-Day Housing - 98% complete. Exceptions being cleared by contractor.

ENGINEERING UNIT (Cont.)

I 90244 Plans, Specs., Inspections, Church of Nazarene Addition - 63% complete. Work progressing slowly.

I 90254 Plans, Specs., Inspections, Seattle First National Bank Addition - 99% complete. Final inspection to be made.

I 90264 Plans, Specs., Inspections, Richland Heights Baptist Church, Thayer and Duportail - Construction plans not yet received.

I 90274 Inspection, McMurray Road - No change in status. Spring start-up pending.

I 90284 Removal of Irrigation System (Estimates) - Report being prepared by Atomic Energy Commission.

I 90294 Replace Water Line #5 Well to Lee Blvd. Reservoirs - Scoping and proposal 100% complete.

I 90304 Street Construction, FY 1954 (Project Proposal) - 95% complete.

I 90324 Design, Engineering, Inspection, Walks, Drives at Columbia Playfield - Design 95% complete.

I 90334 Plans, Specs., Inspections, Richland Baptist Church (G.W.W.) - Construction 20% complete. Resumed construction February 22, 1954 after strike settlement.

I 90344 Installation of Bar Screens at Sewage Lift Station - Scoping and proposal 100% complete.

I 90354 Water System Study for Irrigation System Disposal - Report being prepared by AEC.

I 90364 Legal Description, Desert Inn (Vance Prop. Inc.) - 95% complete.

I 90374 Plans, Specs., Inspections, LG Cook Construction & Maintenance Bldg. - 99% complete. Final Inspection to be made.

I 90384 Field work and drawings to resurface easement north of Public Health Building - 75% complete.

I 90394 Installation of Cyclone Fence at Tennis Courts, Riverside Park - Scoping and proposal 100% complete.

I 90474 Part II, Erosion Control & Development Public Areas, FY 1953 - Project being prepared.

I 90484 Revised Legal Description, Automatic Laundry Co. (formerly Richland Realty) - 95% complete.

I 90504 Plans, Specs., Inspections, Pleiss-Davis Addition - 99% complete. Final Inspection to be made.

Engineering Unit (Cont.)

I 90524 Comfort Station, Riverside Park - Project proposal status.

I 90544 Sidewalk Survey - 90% complete.

I 90594 "As Builts" General, Part II - Work progressing steadily.

I 90604 Inspection 24" Sanitary Sewer, Swift Boulevard, and Inspection Gribble Street Improvements - Bids opened 2-25-54.

I 90614 Legal Description, Parking Lot, Baptist Church (GWW) - 80% complete.

I 90624 Title III Services, Storm Drain, Geo. Wash. Way - Bids opened February 25, 1954.

I 90634 Kadlec Hospital Grounds Improvements - Final design in progress.

I 90644 Air Conditioning, Community House - Scoping and project proposal 100% complete.

I 90654 Legal Description, Central UP Church - 10% complete.

I 90664 Traffic Light, Symons and Jadwin - ESR number secured for use in preparing project proposal.

I 90674 Utility Lines, Plots, Church - 3% complete.

I 90684 Plans, Specs., Inspections, LG Cook Building Addition - Plans approved February 23, 1954. Construction not started. Building permit prepared.

COMMUNITY REAL ESTATE SECTION

FEBRUARY 1954

ORGANIZATION AND PERSONNEL:

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Nonexempt	Exempt	Nonexempt
Real Estate Administration 350	2	1	1	1
Housing & Maintenance Unit 351	5	19	5	19
353	12	137	11	138
Commercial Property Unit 357	6	6	6	6
	25	163	23	164

Decrease in number of employees 1

HOUSING AND MAINTENANCE UNIT

February, 1954

ORGANIZATION AND PERSONNEL

Number of employees on the payroll:

Beginning of month:	17 exempt	
	156 nonexempt	
	173	173
End of month:	16 exempt	
	157 nonexempt	
	173	173

RICHLAND HOUSING

:. ..NG UTILIZATION AS OF MONTH ENDING FEBRUARY 1954

:USES OCCUPIED BY FAMILY GROUPS

	Conv	A&J	T	Pre cut	Ranch	Pre fab	Dorm Apt	A&J Apt	2BR Apt	4th Hsg	Tract	TOTAL
.E. Employees	2228	254	10	383	826	1168	10	52	61	197	35	5224
ommercial Facilities	92	17		30	66	49		5	2	9	2	272
EC	77	28		24	62	18		6	5	15	3	238
ther Gov't.	6	2			4	1					1	14
ost Office	5				2	9				1	3	20
chools	57			6	10	55			1	1		130
ommunity Act.	9			1	6	4					1	21
edical Fac.	3	20			3	1				3		30
harles T. Main	3			2	5	7				2		19
aiser Engineer	6	8			6							20
. A. Jones	2	2		2		1						7
law Knox		2			2							4
. S. Lord	1				2					1		4
itro Corp.	1				1							2
ernita Orchards											5	5
inor Contractors					1							1
ommonwealth Inc.						1						1
Certified	5			1	3	9		1			1	20
TOTAL	2495	333	10	449	999	1323	10	64	69	229	51	6032
Assign.-Lease written	1											1
Assign.Lease not written	1				1	4			1	1	1	9
Avail. for Assign.	3			1		14						18
TOTAL	2500	333	10	450	1000	1341	10	64	70	230	52	6060

	Begin Month	Moved In	Moved Out	End of Month	Diff.
Conventional Type	2496	5	6	2495	-1
A & J Type	333			333	-
"T"	10			10	-
Precut	450		1	449	-1
Ranch	997	5	3	999	+2
Prefab	1322	15	14	1323	+1
Dorm Apt	10			10	-
A & J Apts.	63	2	1	64	+1
2BR Apts	70		1	69	-1
Fourth Housing	229	1	1	229	-
Tracts	51			51	-
	6031	28	27	6032	+1

February 1954

DORMITORY REPORT

Dormitories:

	Beds Available	Vacant Beds	Occupied Beds
Men	477	54	423
Women	381*	33	348
Total	858*	87	771*

*This includes 2 beds used for Dorm Offices

Waiting List

	Single Rooms	Double Rooms
Men	4	0
Women	9	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	

HOUSING
CANCELLATION AND ALLOCATIONS

STRAIGHT CANCELLATIONS		ALLOCATIONS	
Voluntary terminations	3	Houses allocated to new tenants	21
R. O. F.	0	Exchanged Houses	0
Discharge	0	Moves(within the village)	8
Transfers	1	Turnovers (Divorce or Death)	0
Retirements	0	Total leases signed	29
Move off project	9	Total cancellations	26
Divorce	0	Houses assigned "As Is"	17
Death	0	Houses sent to renovation	10
Move to Wherry House	1	Wherry House move to G. E house	0
Dropped from roll	1	Applications pending	253
Not eligible	3		
Total	18		

TENANT RELATIONS PROGRESS REPORT

	Orders incomplete as of January 30, 1954	Orders issued 1-30 to 2-26	Total orders Incomplete as of February 26, 1954
Service orders	871	2039	627
Work orders	922	415	921
Service charges		167	

Principal work order loads

	Incomplete as of January 30, 1954	Incomplete as of February 26, 1954
Laundry tub replacement	26	26
Bathroom renovations (tub, tile, lino.)	96	59
Tileboard bathroom	10	4
Kitchen floor linoleum	25	69
Kitchen cabinet linoleum	152	94
Shower stall	16	10

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65 alteration permits were issued, as compared to 67 issued during January.

Install automatic washer	8	Install automatic dryer	18
Basement excavation	4	Install fence	12
Install back door	1	Install shower in bathtub	1
Install clothes closet	1	Install TV antenna	6
Install porch lite	1	Install basement partition	2
Remove broom closet	2	Reduce size of coal bin	2
Sand & refinish floors	3	Install water softener	1
Install exhaust fan	1	Install coal stoker	1
Construct tool shed	1		

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674 inspections were made, as compared to 712 made in January.

Alteration permits	79	Basement	4
Bath mirror	1	Bathroom	3
Ceilings	1	Doors	17
Fill	9	Floorboards	7
House	24	Laundry trays	14
Linoleum	89	Paint	160
Porch & steps	3	Recall of range & refer	5
Roof	2	Shower stall	6
Sidewalks	6	Sinks	3
Toilet seat	22	Trees	3
Walls	5	Windows	6
Yard	3	Miscellaneous	26
Dormitory	62	Renovations	40
Cancellations	41	Shows	33

MONTHLY PROGRESS REPORT
INTERIOR REDECORATING REPORT
FISCAL YEAR - 1954

M A N P O W E R

Foreman	Painters	Orders on Hand		Carpenters	Tr.Drivers
		Rep.	Not		
Tappan	20	38	17	1	1
Lukins	19	120	11	1	1
Armstrong	21	17	17	1	1
Total	60	175	45	3	3

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	154	28	141	13
B	364	47	337	27
C	0	0	0	0
D	4	0	4	0
E	41	8	41	0
F	108	11	99	9
G	3	0	3	0
H	79	17	72	7
K	0	0	0	0
L	4	2	4	0
M	2	0	2	0
Q	6	0	6	0
R	2	0	2	0
S	2	0	2	0
T	6	0	5	1
U	5	1	5	0
V	26	3	23	3
Y	192	9	174	18
Z	5	0	5	0
1BP	43	5	23	20
2BP	147	36	76	71
3BP	136	19	49	87
Tract	9	3	7	2
1 BR Apt.	9	1	5	4
W-13 Apt.	3	0	2	1
Total	1349	190	1087	262

Est. MH B. F.	44,540
This Mo. Est. MH	9,200
Total Est.	53,740

Actual MH B. F.	43,330
This Mo. Actual MH	8,865
Total Actual MH	52,195

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PLUMBING SHOP

JOB DESCRIPTION	NO. COMPLETED
Replacements - Major fixtures:	
Bathtubs	38
Shower stalls	13
Electric water heaters	24
Laundry tubs	13
Plumbing work orders	28
Plumbing for floor tile replacements	34
Cleared major sewer stoppages caused by tree roots	40
Plumbing for sink top replacements	50
Steam work orders	14

Steam inspection once a week on dormitories, apartments and Government owned commercial buildings.

Removed pop relief valves for yearly inspection from P.R.V. stations in dormitories, apartments and commercial buildings.

SERVICE ORDER CREW

The following is a status report on service orders:

A.	On hand at the beginning of the month	783
B.	Received during the month	1820
C.	Completed during the month	2132
D.	On hand at the end of the month	471

E. A total of 307 hours were spent on work orders.

F. Back log of service orders by craft:

Plumbing	239
Electrical	161
Carpentry	71
Total	471

NOTE: This report is up to and including the 26th of February.

RENOVATION & LABOR CREW

JOB DESCRIPTION	NO. COMPLETED
Renovation orders processed	18
Trash pickup	43
Trees removed	19
Sewers dug, backfilled and seeded	46
Front steps filled with blacktop	6
Sidewalks repaired	2
Minor carpenter repairs to housing units	28
Minor carpenter repairs to dormitories	3
Sprayed all of dormitories W-5, W-6, and W-7 for silverfish.	
Dormitory rooms redecorated	2
Occupied dormitories serviced with linen and janitorial supplies.	

MECHANICAL SHOP

JOB DESCRIPTION	NO. COMPLETED
A. Millwright Crew:	
Furnace service orders	300
Routine furnace inspections	285
Weep tubes for prefabs	2500

General:

All dormitory coolers have had the old pads removed. Pad holders have been cleaned and inspected, and all those in need of repair are in the shop.

Routine servicing and lubrication of precut furnaces is in progress, and is about 35% complete.

B. Sheetmetal Crew:	
Shower stalls replaced	17
Replacement of gutters	37
Installing flashing on coal hatches	9
Replacing of flashings on prefabs	23

CARPENTRY

JOB DESCRIPTION	NO. COMPLETED
Install bathtubs	38
Replace bath wall tile	32
Repair bath wall tile	1
Replace bath floor linoleum	33
Repair bath floor linoleum	3
Replace kitchen floor linoleum	12
Repair kitchen floor linoleum	9
Replace steps & landing linoleum	3
Replace bedroom floor linoleum	3
Repair bedroom floor linoleum	1
Replace living room floor linoleum	1
Repair living room floor linoleum	4
Replace metal stripper	2
Replace kitchen sink top linoleum	50
Repair kitchen sink top linoleum	35
Replace work bench linoleum	6
Replace kitchen sinks	3

CARPENTRY - continued

JOB DESCRIPTION	NO. COMPLETED
Repair windows - Shop	11
Make new windows - Shop	2
Drill weepholes	30
Sash balances	1
Repair window screens - Shop	2
Make new window screens - Shop	3
Repair roof - houses	4
Repair porches	4
Repair siding	1
Repair exterior doors - Shop	8
Repair interior doors - Shop	1
Jack & Shim	19
Repair wall	7
Repair ceiling	1
Repair basement stairs	1
Repair floor boards	1
Repair flooring - Richland Bakery (Complete)	32.0 M.H.
Time spent - Office Equipment	7.5 M.H.
Time spent - Shop Equipment	27.5 M.H.
Repair for plumbers	15.0 M.H.
Repair for painters	17.0 M.H.
Repair for service orders	8.5 M.H.
Cabinet doors repaired - Shop	82
Cabinet doors replace - Shop (Made New)	16
Cabinet drawers repaired - Shop	87
Cabinet drawers replaced - Shop (Made new)	2
Cabinet shelves replaced	2
Chempoint - routine	70
Chempoint - work orders	106
Paint touch-ups completed	63
Interior carpentry repair to all types of houses (4 year cycle)	166
Screen doors repaired - Shop	103
Mock-up - C-58357	10.0 M.H. (Complete)

COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION
February, 1954

PERSONNEL - COMMERCIAL PROPERTY UNIT:

	February
Beginning of Month	12
End of Month	12
Net Change	0

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	Commercial		Noncommercial		Total	
	Richland	North Richland	Richland	North Richland	Richland	North Richland
January	1,558	188	120	1	1,678	189
February	1,567	184	120	1	1,687	185
Net Change	+9	-4	0	0	+9	-4

SUMMARY OR ROUTINE ITEMS PROCESSED:

	Commercial		Noncommercial		Total		
	Richland	North Richland	Richland	North Richland	Richland	North Richland	Total
Work Orders	42	14	2	0	44	14	58
Back Charges	4	0	0	0	4	0	4
FY Work Orders	386	156	8	0	394	156	550
FY Back Charges	21	1	0	0	21	1	22

CONTRACT AND NEGOTIATIONS:

A. Commercial:

1. Lease :

W. D. Gray - a lease covering the government-owned building #86 located in the Downtown Business District.

2. Supplemental Agreements:

a. Kennell-Ellis Studios — to provide for payment of electricity on the basis of meter readings and establishes an allowance to Lessee on account of such payment.

b. Frank Berry's Sporting Goods — to provide for a longer term, adjusted payments and certain other provisions.

c. Riverside Stables -- to provide for rebuilding by the operator in event of fire or other casualty.

3. Assignment:

Roger and Diane Gervais assigned their sublease agreement with Hugh S. Cannon and Corinne Joseph which covers the operation of Roger's Beauty Salon and Mildred Hazel Gibson who is to continue the operation of the salon.

B. Noncommercial:

1. Supplemental Agreement:

Richland Labor Temple Association, Inc. -- to provide for subleasing of space for commercial use.

GENERAL:

A. Commercial:

1. Richland Television Cable Corporation opened a business office in the Forsyth Building in the Downtown Business District.

2. Mrs. Virginia Laurence opened a public telephone service business in the Richland Development Co., Inc. Building in the Uptown Business District.

3. J. J. Newberry Co. opened for business in the Richland Realty, Inc. Building in the Uptown Business District.

4. J. R. Parcell commenced construction on his service station building at Duportail and Hartford Streets.

5. Yellow Top Cab subleased space in the H. W. Weber Storage and Warehouse Building located at 260 Wellsian Way for the operation of a taxi business.

6. Columbia Basin News subleased additional space from Stanley N. Randolph in connection with the operation of their newspaper office.

7. Twelve operation brochures, to be used primarily for use in a pending appraisal of certain real estate and for use in renegotiation proceedings, were prepared.

B. Noncommercial:

1. Church of Jesus Christ of Latter Day Saints requested an appraisal of the leased premises with a view towards purchase of the property.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland:

Super Service Stations
Drive-In Restaurant
Nursery - Shrubs and Trees

COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION

February, 1954

SUMMARY OF OCCUPANCY AND EXPANSION STATUS

A. COMMERCIAL:	JANUARY			FEBRUARY		
	Richland	North Richland	Total	Richland	North Richland	Total
1. Number of Government-owned Buildings	40	8	48	40	8	48
a. Number of Prime Lessee Businesses	38	9	47	38	9	47
b. Number of Sublessee Businesses	17	0	17	17	0	17
c. Total Businesses in Government-owned Buildings	55	9	64	55	9	64
2. Doctors and Dentists in Private Practice	27	0	27	27	0	27
3. Number of Privately-owned Buildings	65	7	72	66	7	73
a. Number of Prime Lessee Businesses	41	6	47	41	6	47
b. Number of Businesses operated by Sublessees	103	1	104	107	1	108
c. Total Businesses in Privately-owned Buildings	144	7	151	148	7	155
4. Privately-owned Buildings under Construction	6	0	6	7	0	7
5. Total Number of Businesses in Operation	199	16	215	203	16	219

SUMMARY OF OCCUPANCY AND EXPANSION STATUS

B. NONCOMMERCIAL:

	JANUARY			FEBRUARY		
	Richland	North Richland	Total	Richland	North Richland	Total
1. Government-owned Buildings						
a. Churches	4			4		
b. Clubs and Organizations	5			5		
c. Government Agencies	2			2		
Total	11			11		
2. Privately-owned Buildings						
a. Completed and in use	10	1	11	10	1	11
b. Under Construction	6		6	6		6
Total	16	1	17	16	1	17
3. Pasture Land Permits	1		98	0		98