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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

54719

FOR

MARCH 1954

Classification Cancelled (Change [redacted] DECLASSIFIED
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By Authority of: 910-C6-4
DS Lewis 4-6-92
[illegible] 4-24-92
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JUN 03 1992

Compiled By
DEPARTMENT MANAGERS

April 23, 1954

RICHLAND, WASHINGTON

Operated for the Atomic Energy Commission
by the
General Electric Company
under
Contract # W-31-109-eng-52

[redacted]

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Pages 376	[redacted]

MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

54719

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By Authority of: RLO-CO-4

DS Lewis 4-6-92

By DJ Kirkby 4-24-92

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

MARCH 1954

GENERAL SUMMARY

Production Operations

In the Metal Preparation Section production of normal charge material for the month was 90 percent of forecast. Lower than forecasted production was due to the heavy utilization of manpower for the P-10 program. The overall canning yield was 78.2 percent for March.

The total reactor input production of plutonium during March was 93.5 percent of forecast. The reactor output production was 78 percent of forecast. P-10 production was . A total of 27 ruptures occurred during March including 21 normal uranium slug failures, five "J" pieces and one "C" piece.

The Redox production was 136.8 percent of forecast for the month and T Plant production was 128 percent for the month. Total plutonium production was 135.2 percent. TBP production was 143.5 percent of the monthly forecast. Parallel operations were virtually uninterrupted for the entire month with production being limited only by the availability of virgin feed. The UO_3 facility production was 124.5 percent of forecast. The overall commitments for 234-5 production were met.

Engineering Technology

Design of the Hot Semiworks Conversion, CA-513-D was advanced to 98 percent completion during the month. Detail design of the 300 Area Expansion, CA-514, was advanced to 84 percent completion during the month, even though the emphasis was on the 3X Program. Overall design on CG-558, Reactor Plant Modification for Increased Production was advanced to 11.7 percent completion.

Scope design of CG-575, Hanford 3X Program, P-10 Extraction Facilities, was advanced to 15 percent completion during March. Authorization for design on CG-574, Hanford 3-X Program, P-10 Irradiation, was received during the month and scope design was advanced to 66 percent completion. Overall design for CG-573, Hanford 3X Program - 300 Area is 84 percent complete.

Twenty-four informal, six class I, and two Class II radiation incidents were recorded.

Personnel and Services

There were no major injuries during the month. Three sub-major injuries were reported. Minor injuries increased slightly from 252 (adjusted figure) to 313.

The employee separation rate for March was .52 percent the same as it was for February.

The total number of housing applications pending is 253.

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STAFF

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

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HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
MARCH 31, 1954

	EXEMPT		OTHER		TOTAL	
	3-31-54	2-28-54	3-31-54	2-28-54	3-31-54	2-28-54
Engineering Department						
General	17	17	74	71	91	88
Design	176	176	127	125	303	301
Project	259	260	191	198	450	458
Technical Section						
General	6	6	2	2	8	8
Applied Research	120	121	55	53	175	174
Separations Technology	124	122	38	40	162	162
Pile Technology	102	101	63	62	165	163
Fuel Technology	71	70	68	68	139	138
Advance Technology	11	11	1	1	12	12
Manufacturing Department						
General	16	16	7	7	23	23
Reactor	258	255	1 063	1 052	1 321	1 307
Separations	295	292	1 228	1 208	1 523	1 500
Metal Preparation	98	98	445	447	543	545
Plant Auxiliary Operations Department						
General	1	1	1	1	2	2
Electrical Dist. & Telephone	30	31	139	138	169	169
Transportation	45	45	443	443	488	488
Purchasing & Stores	51	51	223	220	274	271
Plant Protection						
General	1	1	1	1	2	2
Patrol & Security	59	59	449	450	508	509
Safety & Fire	30	43	108	113	138	156
Office Services	20	20	284	287	304	307
Administration Main. Service	10	10	52	53	62	63
Operations Analysis	42	42	67	66	109	108
Financial Department						
General	4	4	5	4	9	8
Accounting	49	48	203	201	252	249
Payroll & Auditing	26	26	50	53	76	79
Employee & Public Relations Dept.						
Community General	-	3	1	2	1	5
Community Operations	68	69	167	163	235	232
Real Estate Services	23	24	162	165	185	189
Health & Safety	54	41	214	210	268	251
Management	6	6	2	1	8	7
Salary Administration	5	5	5	6	10	11
Employee Relations	22	22	41	39	63	61
Public Relations	4	4	21	21	25	25
Union Relations	8	8	8	8	16	16
Technical Personnel						
Staff	4	4	7	6	11	10
Others	-	-	47	58	47	58

	EXEMPT		OTHERS		TOTAL	
	3-31-54	2-28-54	3-31-54	2-28-54	3-31-54	2-28-54
Radiological Sciences Department						
General	4	4	3	3	7	7
Records & Standards	28	28	143	140	171	168
Biophysics	58	58	60	62	118	120
Biology	36	36	36	35	72	71
Engineering	6	6	1	1	7	7
Law	3	3	2	2	5	5
General	12	12	26	26	38	38
TOTAL	2 262	2 259	6 333	6 312	8 595	8 571

AREA PERSONNEL DISTRIBUTION

MARCH 31, 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	31	79	-	11	47	-	71	56	258	333	886
Other	17	31	2	45	24	-	35	27	194	244	619
Total	48	110	2	56	71	-	106	83	452	577	1 505
Manufacturing Department											
Exempt	80	57	50	71	8	-	5	273	98	25	667
Other	276	252	394	159	4	-	99	1 102	446	11	2 743
Total	356	309	444	230	12	-	104	1 375	544	36	3 410
Plant Auxiliary Operations											
Exempt	26	7	9	7	7	-	12	17	12	192	289
Other	56	55	100	55	67	11	81	168	125	1 049	1 767
Total	82	62	109	62	74	11	93	185	137	1 241	2 056
Financial Department											
Exempt	-	-	-	1	-	-	1	1	2	74	79
Other	-	-	3	1	-	-	2	1	1	250	258
Total	-	-	3	2	-	-	3	2	3	324	337
Employee & Public Relations											
Exempt	-	2	-	1	-	-	4	2	2	183	194
Other	5	10	6	4	5	-	2	7	21	615	675
Total	5	12	6	5	5	-	6	9	23	798	869
Radiological Sciences Department											
Exempt	1	-	38	-	-	-	2	18	60	13	132
Other	10	-	38	-	-	-	5	16	159	15	243
Total	11	-	76	-	-	-	7	34	219	28	375
General											
Exempt	-	-	-	-	-	-	-	1	2	12	15
Other	-	-	-	-	-	-	-	-	19	9	28
Total	-	-	-	-	-	-	-	1	21	21	43
Total Exempt	138	145	97	91	62	-	95	368	434	832	2 262
Total Other	364	348	543	264	100	11	224	1 321	965	2 193	6 333
GRAND TOTAL	502	493	640	355	162	11	319	1 689	1 399	3 025	8 595

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MANUFACTURING DEPARTMENT

MARCH 1954

METAL PREPARATION SECTION

The net production of acceptable slugs was 222 tons which was 90 percent of the official forecast for the month and 86 percent for the quarter. Lower than forecasted production was due to the heavy utilization of manpower for the P-10 work. A total of 194 tons was canned as eight-inch slugs and the remaining 28 tons as four-inch material with canning yields of 80.2 percent for the eight-inch and 71.2 percent for the four-inch. The overall canning yield was 78.2 percent as compared with 68.1 percent for February. The increased yield was due to quality improvement achieved principally by the changing from cast iron to silicon carbide crucibles and to a reduction in poor bond and marred surface rejects.

There was one autoclave failure during the month.

The canning of the regular uranium pieces was changed to the lead dip process on March 15, and this procedure gained approximately six percent in production due primarily to a reduction in the canning time cycle. The fourth uranium canning line was put into operation on March 29.

The canning of the enriched uranium aluminum alloy fuel pieces and the target slugs continued at a high rate with yields of 81.2 percent and 69.3 percent, respectively. A total of 10,936 fuel pieces and 13,704 target pieces were canned during March.

REACTOR SECTION

The total reactor input plutonium production was 93.5 percent of the official forecast for the month and 102 percent for the quarter. The overall reactor operating efficiency for the month was 75.7 percent. The low operating efficiency was due principally to the completion of the venturi work at B, the failure of the discharge elevator at F, and outages at all reactors associated with 27 ruptured slugs, one of which resulted in excessive downtime at B Area when during tube removal several slugs became lodged in pigtails.

The established maximum operating levels (excluding enrichment burnout) were increased a total of 169 MW during March as follows: B - 85, C - 17 (Pu and J-N), DR - 40 MW (Pu and J-N), F - 10 MW, D - 10 MW, and H - 7 MW (Pu and J-Q). At the B reactor, the increase was attributed to the increased cooling flow (7,500 gpm) permitted by the installation of venturis and double orifices; at DR reactor to increased J-N tube power in the center of the reactor following the discharge of the remaining uranium tubes within the J-N loading pattern; at F reactor to improved flattening flexibility attained by the replacement of thorium with P-10 for flattening; at D reactor to improved flattening and at H reactor to temporary authorization to increase graphite temperature by 30° C.

The program of changing goal concentrations for the irradiation of uranium continued essentially as planned in February with the four-inch metal to be discharged

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REACTOR SECTION (Continued)

at previous goal concentration, a portion of the eight-inch metal being discharged at one-third the previous goal concentration and the balance of eight-inch metal to be discharged at some concentration approaching 120 percent of the former goal concentration as determined by the ruptured slug rate and feed material requirements for the Separations Plants. The approximate tonnages discharged according to the above concentrations were: high - 39, low - 142, and previous goal - 56.

A total of 27 ruptures occurred during March including 21 normal uranium slugs, five "J" pieces, and one "C" piece. Of the uranium slugs eight were four-inch material and 13 were eight-inch material. The total outage time required for the removal of these ruptures was 640 hours. At the B reactor a total of 202 hours was charged to the discharge of a stuck rupture and the subsequent removal of metal pieces that had become lodged in the rear pigtails during tube removal. The incident occurred on March 8, and the reactor resumed operations on March 16. Due to the rupture experience at the C reactor during February an additional 66 tubes of Simonds rolled slugs charged in September 1953 were discharged during March. The eleven failures occurring at C reactor in March were predominantly in tubes which were approximately at 600 MWD/T concentration.

The P-10 program continued, with the production being
At the DR reactor a total of 445 J-N (20 pair) tubes were charged, and 333 J-N tubes were discharged . At the C reactor a total of 70 J-N tubes were charged as the initial increment of the C reactor P-10 loading program.

Thirteen J-Q (thorium) tubes were charged at the H reactor on March 15 on a test basis to investigate the feasibility of large scale thorium irradiation and to obtain information on the corrosion factors.

A chemical analysis of the graphite from water tube channel 1776 in F reactor confirmed the presence of boron in amounts up to 600 ppm as a result of the rod leak reported in February. The unbalancing effect of this poison has been compensated by appropriate flattening changes which have permitted resumption of normal power level.

On March 19, a 29-hour outage of the F reactor was scheduled to repair leaks in the effluent water line between the reactor and the retention basin.

Two process tube leaks, one at the H reactor and one at the B reactor, occurred during the month. Both leaks were attributed to slug failures.

During an outage on March 28 at F reactor to investigate a suspected rupture, failure of the synchronizing shaft between the two discharge elevator drive motors caused one end to drop approximately five feet. A total of 38 hours was required to complete the repairs.

During March, twenty-four reactor scrams occurred. Sixteen were attributable to the normal panellit system difficulties, three to film buildup, three to water re-

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REACTOR SECTION (Continued)

circulation test tube 0961-H, and two to water quality experiment tube 2570-D. Total outage time for all scrams was 39.5 hours.

SEPARATIONS SECTION

The Redox production was 136.8 percent of the official forecast for the month and 91.4 percent for the quarter. T Plant production was 128 percent for the month and 153 percent for the quarter. Total plutonium production was 135.2 percent for the month and 101.8 percent for the quarter.

The Redox Plant discontinued operations on March 4 to replace the H-2 centrifuge which had failed on February 21. Installation of the new unit was completed on March 6. Operation was resumed on the same day and continued at a 7 ton per day rate until March 15 when near-flooding conditions in the columns resulted in a three hour shutdown for equipment flushing. After startup the rate was established at 7.5 tons per day and maintained until March 28. On March 24 an electrical failure of the 60 ton crane main hoist resulted in suspension of the charging operation. The extraction batteries were operated until the metal feed solution was exhausted on March 28. The plant continued down for the remainder of the month for crane decontamination and electrical maintenance.

Evaluation of total refluxing in the oxidizer tower of the stack gases continued throughout the month. To date, the results show no appreciable improvement in the ruthenium emission problem over non-reflux type runs. The test will continue in order to obtain additional data.

The TBP Plant production was 143.5 percent of the monthly forecast and 157.6 percent of the quarter forecast. Parallel operations were virtually uninterrupted for the entire month with the production being limited only by the availability of virgin feed. The average daily operating rate was 7.2 tons. The A Line operated throughout the month at rates varying from 3 to 4.5 tons while the B Line operated at rates from 4 to 8.5 tons per day. Heated extractant (RCX) was introduced into the RC column on March 9 and a significant reduction in waste losses was effected without any deleterious effect on decontamination. Also, the extractant flow rate was reduced to 60 percent of flowsheet resulting in a more highly concentrated RC column UNH product and materially reducing the load on the primary concentrator at the UO_3 Plant. On a capacity test basis, using the heated extractant, the B Line achieved an instantaneous rate of 8.5 tons on March 29.

The UO_3 facility production was 124.5 percent of the forecast. An average rate of 12 tons per day was achieved for the month. The EB-1 evaporator failed on March 8 and a total of 19 tubes were sealed. Quarterly output was 113 percent of forecast.

The T Plant processed a total of 66 virgin runs and 21 rework runs during the month.

The 234-5 commitment of shapes and buttons was attained. The required nitrate production for shipment was also produced.

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SEPARATIONS SECTION (Continued)

The waste evaporators operated throughout the month with column reductions of 31.9 percent at B and 26.1 percent at T. The feed for both evaporators was TBP waste.

Metal removal from the waste storage tanks continued at the TX and BX farms. In addition, small volumes of material were removed from near-empty tanks in the C and U farms. There were no Nagle pump failures during March.

Essentially all of P-10 feed during the month was "N" material and product purity averaged . After processing all available feed material, the Metal Extraction Line was shut down on March 21 for extensive preventive maintenance. Operations were resumed on March 26 when feed material again became available, and operations continued uninterrupted for the balance of the month.

GENERAL

Personnel

Total on Roll March 1, 1954	3377
Accessions	56*
Separations	23*
Total on Roll March 31, 1954	3410

*Does not include intra-department transfers.

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

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MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY
FOR
MONTH OF MARCH, 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
D. E. Crouter,	Reactor Section	"Use of Helium Gas to Reduce Reactivity Transients on Minimum Start-Ups"
H. A. Moulthrop, J. G. Attanas,	Separations Section	"Application of plastic bags and sheeting for operation and maintenance across a contamination barrier"

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

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HW-31267 [redacted]

MONTHLY OPERATING REPORT

MARCH 1954

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10.

11.

~~Section 9 verified by SF Accountability Section.~~

Section 11 - Technical and calculated values provided by SF Accountability Section.

V. D. Donihee

V. D. Donihee

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April 9, 1954

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
MARCH, 1954

I. RESPONSIBILITY

There were no changes in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

	March	February	Year To Date
Acceptable Pieces Canned (4")(Tons)Gross	28	23	67
Acceptable Pieces Canned (4")(Tons)Net	28	22	65
Canning Yield (4")(%)	71.2	64.6	67.1
Acceptable Pieces Canned (8")(Tons)Gross	194	139	523
Acceptable Pieces Canned (8")(Tons)Net	194	137	519
Canning Yield (8")(%)	80.2	68.8	74.1
Total Acceptable Pieces Canned (Tons)Gross	222	162	590
Total Acceptable Pieces Canned (Tons)Net	222	159	584
Acceptable Pieces Canned (4" and 8") (% of forecast)	90	79	87
Autoclave Frequency (4")(No./M)	.00	.00	.00
Autoclave Frequency (8")(No./M)	.02	.00	.02

[redacted]

1. Statistics (Continued)

	March	February	Year To Date
J-3 Slugs Canned (pieces)	10936	8487	21166
N Slugs Canned (pieces)	13704	6432	20136
Chemical 10-66 Canned (pieces)	0	321	446
Special Request (man hours)	363	486	1639
305 Routine Tests (man hours)	868	171	1183
305 Special Tests (man hours)	1481	1745	4823
Average Steam Generated (M lbs/hr)	41.7	46.4	
Maximum Steam Generated (M lbs/hr)	61.0	61.0	
Total Steam Generated (M lbs)	31100	31200	
Coal Consumed (Tons)	1904	2005	
Sanitary Water from 3000 Area (million gals)	44.5	39.6	
Total Water from 3000 Area Average Rate (gpm)	997	982	
Chlorine Residual (ppm)	.38	.45	

2. Activities

The net production of acceptable slugs was 222 tons of which 87 percent were eight-inch. There was an improvement over the previous month of six percent and eleven percent in the canning yields for four-inch and eight-inch slugs respectively. The improvement in the yields for eight-inch slugs is largely a result of reduction in the poor bond and marred surface type rejects.

The production facilities were converted to the lead dip process on March 15.

The fourth canning line was put into operation on March 29 and it is planned that all lines will operate without relief.

The 305 Test Reactor returned to a one-shift operation on March 29 after completion of the accelerated graphite testing program.

There was one eight-inch autoclave failure which is believed to have been caused by a defective can.

A high incidence of black spots embedded in the weld beads of regular production caused a sharp increase in the poor bond rejects. The cause was traced to coated cast iron crucibles in the canning furnaces. After replacing these with silicon-carbide crucibles, the reject rate returned to normal.

Equipment for determining the uranium content of fuel slugs has been developed by the Chemistry Unit of the Engineering Department and turned

2. Activities (Continued)

over to the Process Sub-Section for operation. This equipment is described as a gamma scintillation counter and consists of a gamma ray photometer which detects and measures the intensity of gamma rays passing through the slug. The amount of radiation detected by the photometer is measured and recorded on a high speed strip chart. The preliminary results from this equipment indicate the results are reproducible and the instrument is stable. The initial testing began on March 22, 1954.

3. Special Operations

A total of 10,936 enriched uranium-aluminum alloy fuel slugs were canned with a canning yield of 81.2 percent, and 13,704 lithium alloy target slugs were canned with a canning yield of 69.3 percent. The P-10 facilities operated on a three-shift per day basis.

Some difficulties were encountered in fuel slug canning because of close tolerances between the revised slug diameter and the new thick wall can. These difficulties were largely overcome by heating the can just prior to inserting the slug; however, more desirable methods of correcting this difficulty are being investigated.

Three hundred ninety-one extruded fuel slugs are being canned by the hot press method under a continuation of PT-313-105-35M. The test was almost complete at month end and preliminary results indicate that some difficulties were experienced from poor bonds.

4. Schedule Variance

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

B. Equipment Experience

1. Operating Continuity

The canning line operating efficiencies remained at a high level of 93 percent for the month.

2. Inspection, Maintenance and Replacements

A second production welder was modified and installed in 303-J building for welding target slugs for the P-10 program.

The electronic circuits of the two ultrasonic testing machines were overhauled and strengthened and each was equipped with a new ball type track which should improve its dependability.

2. Inspection, Maintenance and Replacements (Continued)

The slug pickle line has been relocated and can now be used for processing component parts.

During the month one furnace in the 313 building failed and two others were rebuilt to be put in standby condition.

C. Improvement Experience

1. Production Tests

PF-313-105-38M "Irradiation of Several Thousand Uranium Powder Metal Compact Slugs" (HW-29771) Rough Draft.
Approximately 4085 of the four-inch powder metal slugs have been received from the Sylvania Electric Products Company. These slugs have been ultrasonically tested for grain size and eighteen have been rejected. These slugs will be canned by the lead dip process.

2. Process Tests and Revisions

A modification of the fuel slug shipping boxes reduces the unpacking time by 75 percent, or 36 manhours per 50 boxes.

3. Inventions and Discoveries

Personnel in the Metal Preparation Section engaged in work which might 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

Although total direct labor cost will remain relatively unchanged, the unit cost is expected to decrease about .01 per unit because of higher production and improved efficiency.

2. Material Variance

Improved yield and the conversion to the lead dip process during the latter part of the month are expected to decrease material costs by 2 to 3 cents per unit.

3. Other Costs

Maintenance costs will increase slightly; however, the overall indirect unit cost to slugs will decrease as a result of increased production.

E. Plant Expansion

1. Project Status

Project CA-514 - "Expansion of 300 Area Production Facilities." Design for the overall project is 88% complete, and construction 33% complete. A revised project proposal in the amount of $5,085,000 was approved by the Atomic Energy Commission on March 18, 1954. Total project costs incurred to date amount to approximately $1,701,000.

The renovation of the existing 313 building is about 31% complete. Temporary ventilation facilities were installed for the new offices in the west section of the building and for component parts preparation. Roof curbs were poured and structural steel is being erected for permanent heating and ventilating equipment for office section. Renovation of existing offices is in progress.

Phase II construction on the 313 building addition is about 30% complete. The structural steel framing for the canning furnace and autoclave pits was completed. Steel floor plates are in place and are being fastened down. Roofing of the building is over 50% complete. All of this work is being accomplished by sub-contractors under the Sound Construction Company.

Minor Construction is continuing on overhead service and process piping. The pouring of the concrete slab on the mezzanine floor was completed and the laying of acid brick in the process trenches is about 75% complete. Work is progressing on the sub-floor piping for the process solution make-up facilities in 303-F building and the tank form for caustic, acid and methanol storage.

Construction was started on the parking lot expansion and truck turnout by the L. W. Vail Company of Pasco on March 4, and the addition to the 3701-L Gate House by the S. A. Moore Construction Company of Umatilla on March 11. At month end, the parking lot and truck turnout was approximately 40% complete and the Gate House addition 10% complete.

Project CG-573 - "Hanford 3X Program - 300 Area." Scoping of the 3X facilities is 90% complete, design 85% and construction 55%. Total cost plus commitments to date amount to approximately $452,000. The addition to the 313 building is about 70% complete. Pits were excavated and the concrete poured for presses and the light fixtures have been installed. Air conditioning equipment is being prepared for installation.

The architectural phase of the east and west addition to 303-J building was completed. In addition, the installation of fire alarm system, toilet facilities, underground laterals and pits for presses were completed. The installation of overhead service piping is about 10% complete.

1. Project Status (Continued)

The 313 facilities are scheduled to be ready for use not later than May 15, 1954 and the 303-J facilities by June 1, 1954.

2. Plant Engineering

An economic analysis was made to determine the feasibility of converting autoclaves for water autoclave testing. The results indicated the savings to be realized from eliminating the reprocessing of rejects for stains would only about off-set installation costs, considering that the autoclaves would be relocated and modified for water autoclave testing in 313 building on or about July 1, 1954 as part of the expansion program.

Preliminary design was completed on a mechanical slug stripper for P-10 canning rejects. The device utilizes pipe cutter wheels for longitudinal slotting of the canwall as the slug is forced through a guide ring. A pneumatically operated cylinder actuates other cutter wheels to cut the canwall for removal of the cap.

The two ball-type comparators developed for the ultrasonic transformation testing of slugs were subjected to final tests and made ready for operation. One unit has been installed for production use and it is planned to place the second unit in service in the near future.

Final drawings of the centralized canning control piping and electrical connections were completed for incorporation in the expansion program. In addition, detail drawings were completed for bubble testing equipment to be provided under Project CG-573.

F. Significant Reports Issued

1. Routine

Number	Title	Author	Date
HW-30979	Monthly Report, Process Sub-Section, Metal Preparation Section, February, 1954	EW O'Rourke	3-1-54
HW-31092	General Analytical Control Program I Analytical Results Mallinckrodt Chemical Works	PR Anderson	3-10-54
HW-31093	General Analytical Control Program I Analytical Results National Lead Company of Ohio	PR Anderson	3-10-54
HW-31140	Metal Preparation Section Evaluation of FMPC Uranium Slugs	SM Gill	3-10-54
HW-31173	Quarterly Report of Uranium Accountability for Metal Preparation Processes	JE Ruffin & GF Yost	3-18-54

2. Non-Routine

Number	Title	Author	Date
HW-29933	Method of Hydrogen Analysis of Lithium-Aluminum Target Material	WG Hudson	3-8-54
HW-31064	Preliminary J Slug Loss Determination in Single Dip AlSi Test Canning	WG Hudson	3-8-54
HW-31148	Maximum Dimensions of Canned "J" Pieces	TD Naylor	3-16-54

III. PERSONNEL

A. Organization

No change.

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	4	4	0
Operations	221	221	0
Power & Maintenance	258	256	- 2
Process	39	40	1
Plant Engineering	24	23	- 1
Section Total	546	544	- 2

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 mrad per week during the month.

E. Personnel Activities

1. Visits and Visitors

S. M. Gill visited the National Lead Company of Ohio at Fernald, Ohio to discuss uranium slug manufacturing problems.

R. A. Quadt of the Alcoa Aluminum Company; R. E. L. Stanford of the Fernald Atomic Operations Office of the AEC; E. J. Boyle and J. M. Herndon of the AEC Operations Office at Oak Ridge visited HAPO during the month.

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April 9, 1954

MANUFACTURING DEPARTMENT
REACTOR SECTION
MARCH, 1954

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Operating Experience

The total reactor input plutonium production during March was 93.5 percent of forecast, and was 7.1 percent greater than the February production. Production was approximately 10 to 15 percent below recent experience, because of a low time operated efficiency, 75.7 percent. Completion of the venturi outage at B Reactor and the outages associated with 27 ruptured slugs were principally responsible for the low efficiency.

Reactor plutonium output production during March was only 78.2 percent of forecast. The anticipated output tonnage was exceeded by 33 percent because of the discharge of a large amount of low concentration material. The forecast megawatt day output production was not achieved, because the low concentration material was requested and a limit was placed on the tonnage discharged by Separations Section capacity.

The P-10 program at DR Reactor was continued with the charging of an additional 445 J-N tubes during March as part of the second P-10 irradiation cycle. Seventy additional J-N tubes were charged at C Reactor during March, representing the initial charging for the J-N load planned at this reactor. Sixty J-N tubes were previously charged at C Reactor in February on a test basis to study P-10 irradiation at high tube powers.

A. Operating Experience (Continued)

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Thirteen J-Q (thorium) tubes were charged at H Reactor in March on a production test basis to investigate the feasibility of large-scale thorium irradiation.

Increases in established maximum operating levels (exclusive of enrichment burnout) during March were 85 megawatts at B Reactor, 17 at C Reactor, 10 at D Reactor, 40 at DR Reactor, 10 at F Reactor, and 7 at H Reactor, a total of 169 megawatts. These increases were attributed to the following causes: B Reactor, to the increased cooling flow permitted by the installation of venturis and double orifices; C and D Reactors, to improved flattening; DR Reactor, to increased J-N tube powers in the center of the reactor following the discharge of the remaining uranium tubes within the J-N loading pattern; F Reactor, to the improved flattening flexibility attained by the replacement of all thorium with P-10 material for flattening; and H Reactor, to a 30° C further relaxation of graphite temperature limits, in addition to that permitted by PT-105-530-E (Full Pile Burnout Experiment), as authorized by the Pile Technology Sub-Section.

A total of 27 slugs failed at all reactors during March, including 21 uranium slugs, five J slugs and one C slug. Rupture distribution is tabulated below by reactor and type:

	B	C	D	DR	F	H	Total
Regular material 8-inch	-	11	1	-	-	1	13
Regular material 4-inch	3	-	3	-	2	-	8
J material	-	-	-	5	-	-	5
C material	-	-	-	-	-	1	1
Totals	3	11	4	5	2	2	27

The rupture frequency for regular metal in March was equal to the most severe experience to date, 21 ruptures during December, 1951. Contrary to experience in February when 10 of 11 failures at C Reactor occurred in high concentration tubes, the 11 failures at C Reactor in March occurred predominantly in tubes which were approximately at the previous normal concentration. Total time required for the removal of these ruptured slugs was 640.1 hours. In two instances, rupture removal time was extended as a result of secondary complications, 158.0 hours at B Reactor because of the lodging of irradiated slugs on the rear face, and 30.2 hours at F Reactor because of mal-functioning of the discharge elevator. Both incidents are described in detail in the "Activities" section of the report.

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A. Operating Experience (Continued)

The B Reactor venturi outage, in progress at the end of February, was concluded on March 5. Details are described in the "Activities" section.

1. Statistics

	B	C	D	DR	F	H	Total or Average
Reactor Time Operated Efficiency (%)	46.6*	82.3	89.7	75.7	78.7	81.1	75.7
Reactor Outage Time (Hrs.)							
Plutonium Production	395.0	130.8	76.0	34.5	143.0	121.5	900.8
Special Irradiations and Tests	2.0	1.0	0.7	146.1	15.4	19.2	184.4
Total	397.0	131.8	76.7	180.6	158.4	140.7	1085.2
Reactor Unscheduled Outage Time (Hrs.)	291.8	131.8	38.4	119.9	158.4	74.7	815.0
Metal Discharged (Tons)	5.2	34.3	55.3	37.3	27.0	78.7	238
Water Quality (ppm Iron)							
Raw Water - Average	0.26	0.23	0.24	0.26	0.07**	0.09**	-
Raw Water - Maximum	1.59	1.67	1.39	2.01	0.24**	0.31**	-
Process Water - Average	0.014	0.006	0.005	0.004	0.005	0.008	-
Process Water - Maximum	0.025	0.015	0.015	0.014	0.018	0.017	-
Water Pumped (MM gals.)							
Bldg. 190 to reactor	1334	3187	1951	1671	1671	2059	11873
Bldg. 182 to 200 Areas	-	-	50	-	308	-	358
Bldg. 181	5223		4281		2321	2403	14228
Steam Generated (MM lbs.)	121		216		124	105	566
Coal Consumed (Tons)	7581		12952		7112	6324	33969

*The low time operated efficiency at B Reactor resulted principally from the venturi outage, 105.2 hours of which were in March, and rupture removal outage time of 258.2 hours.

**F and H Area analyses obtained through use of the permanganate method of iron analysis, whereas the boil down method is employed at other areas. The accuracy of these two methods is under investigation.

2. Activities

During March, the program of changing goal concentrations for irradiated uranium, as requested by the AEC, continued as described in the February report, with four-inch uranium held to the previous goal concentration, with a portion of the eight-inch uranium discharged at one-third the previous goal concentration and the balance of the eight-inch uranium held to approximately 121 percent of the previous goal. During March, approximately 60 percent (142 tons) of the uranium was discharged at the low concentration, 24 percent (56 tons) at the previous goal concentration, and 16 percent (39 tons) at the high concentration.

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2. Activities (Continued)

No additional broken eight-inch regular slugs have been found during inspection of discharged metal. It is generally agreed that the breakage of nine slugs at H Reactor during January occurred partially as a result of physical conditions associated with the unusually large discharge during January which caused slugs to fall on other metal piled up in the chutes to higher than normal levels. Combined with the unusual physical conditions of discharge is the possibility of some metallurgical change of the uranium during irradiation which resulted in increased susceptibleness to breakage. This latter possibility continues to be investigated in the Radio-Metallurgical Laboratory.

The B Reactor venturi outage, which began on February 24, was completed on March 5. Work items listed in last month's report were completed satisfactorily. The installation of venturis and double orifices resulted in a process water flow increase of approximately 7,500 gpm with a decrease in pump discharge pressure of approximately 15 psi to 410 psi. As noted above, an 85 megawatt increase in the B Reactor established operating level was attributed to the venturi and double orifice program.

On March 8, B Reactor was shut down for the routine removal of a stuck four-inch ruptured slug in tube 3666-B. During the pushing of the tube and charge, a five-foot length of the tube became caught in the rear face pigtails as the result of using improper shielding over the pigtails. Removal of the tube section was effected but two metal pieces remained lodged on the rear face. One piece, which rested on the thermocouple duct, was removed by shaking the duct. The remaining piece, lodged behind the flange of tube 0466-B, was removed with the aid of the rear elevator cab. Total outage time attributed to the removal was 202 hours.

During an outage on March 28 at F Reactor to investigate a suspected rupture, failure of the synchronizing shaft between the two discharge elevator drive motors caused one end of the elevator to drop approximately five feet and jam. Elevator repairs, including installation of a new synchronizing shaft, were completed on March 30. Rupture removal time was extended approximately 30 hours because of this trouble.

Loss of reactivity at F Reactor, as described in the February report, was determined to have resulted from the combined effects of water and soluble boron from No. 8 horizontal rod carried into the graphite. Both resulted from simultaneous leaks in the rod and rod thimble. The combined effect was determined to be 300 ± 50 inhours. Subsequent to the removal of 300 gallons of water, a reactivity loss of 110 ± 20 inhours remained, attributed to the boron. The presence of boron has been confirmed by chemical analyses of channel graphite which indicated as high as 600 ppm boron present. The flattening unbalancing effect of the boron has been compensated by flattening changes which have permitted resumption of normal power levels.

2. Activities (Continued)

During March, 445 J-N tubes were charged and 333 J-N tubes were discharged at DR Reactor. The net total of J-N tubes in the reactor at month end was 1115 tubes, 613 tubes for the second P-10 irradiation cycle and 502 tubes remaining from the first cycle. Seventy J-N tubes were charged at C Reactor, for a total of 130 J-N tubes, as the initial charge for the P-10 program at C Reactor. The original 60 tubes were charged in February on a production test basis to study exposures at high tube powers.

The following tabulation indicates activities during March associated with special irradiations other than the P-10 program noted above and the J-Q Program as noted in the "Operating Experience" and "Improvement Experience" sections.

	Tubes Charged	Tubes Discharged	Casks Shipped
Chemical 10-66	16	2	-
Chemical 72-60	-	-	5
Production Tests	20	24	6
Total	36	26	11

B. Equipment Experience

During March, 27 reactor scrams occurred. Of these, 16 were attributable to normal panellit system difficulties including six while changing gauges, five due to faulty gauges, four from high or low pressure trips and one while calibrating a gauge. Three Beckman scrams occurred at DR Reactor, two due to improper by-passing, and one of undetermined cause. Three scrams occurred at F Reactor as a result of film build-up in process tubes which occurred during a period of low water quality caused by the loss of activated silica feed because of gelation problems. Loss of reactivity from the three scrams caused the reactor to shut down for approximately 30 hours. Three scrams at H Reactor were caused by low flows on recirculation tube 0961-H. Two scrams at D Reactor occurred as a result of water quality tube 2570-D. One was a high pressure panellit trip, caused by film build-up in the tube, and the other a low pressure trip resulting from inadvertent shutting off of the pump supplying water to this tube. Total outage time charged to these scrams was 38.5 hours.

The extensive horizontal rod work at B Reactor described in the February report was successfully completed during the venturi outage. In addition, rod No. 6-B was found to be leaking and was removed from service. Rod 7-D, which had been found to be leaking in February, was removed and buried. Pressure testing of the thimble indicated a severe gas leak, and the thimble was sealed pending later rod and thimble replacement. Rod No. 7-H, found to be leaking in February, continued out of service pending replacement with the new, oval type rod which does not require a thimble, and permits a gas seal

B. Equipment Experience (Continued)

at the reactor face. Rod No. A-H was removed from service to permit installation of a new type thermocouple rod. Rod No. 8-F continued out of service. A half-rod of the new oval type will be installed when available.

F Reactor was shut down for a 29-hour outage in March to repair the effluent line between Building 105-F and the 107-F Basin as necessitated by additional leaks which developed where repairs were made during February.

Repairs to the baffles of the 107-C west retention tank were completed in March. The north section of the 107-D basin was removed from service to repair an expansion joint leak at ground level in the outside wall.

The Ball 3X hopper door solenoids were exchanged for the low voltage type at DR Reactor on March 17 completing the Ball 3X electrical modification program at all reactors with a few minor exceptions.

Two process tube leaks, one at H Reactor and one at B Reactor, occurred in March. The H Reactor leak occurred in tube 3284-H and was detected after testing 24 tubes subsequent to analyses of dew cell readings. Approximately 125 gallons of water were collected as a result of the leak. The tube leak at B Reactor was caused by a short regular rupture in tube 3860-B. The recirculation system was operated for approximately one day to aid in the removal of water. At month end, approximately 240 gallons of water had been removed as a result of the leak.

Tests have indicated that the difficulties experienced with the ball thrust bearings of process pump speed increasers in Building 190-C may be attributed to shaft currents which cause may accelerate deterioration of the bearings. Insulation of the outer race from the lateral-bearing mounting appeared to be the most practical solution. Units No. 2, 3, and 12 were insulated in March. Prior to insulation of the mounting, thrust bearings had been replaced on units No. 3 and 8 in March.

C. Improvement Experience

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

PT-105-506-E (Recirculation Studies)
Extensive modification of piping and instrumentation for recirculation tube 0961-H to permit higher water pressure was made in March. Subsequent operation caused three scrams as a result of defective safety instrumentation, and more adequate instrumentation is being designed. The system remained in operation the balance of the month after modification. March outage time for this test was 15.4 hours, 0.4 hour due to scrams and 15.0 hours of shutdown time for modification.

C. Improvement Experience (Continued)

PT-105-517-E Supp. A (100 Areas Filter Plant Tests)
At month end, satisfactory results were being obtained at flow rates of 7,000 gpm per filter-settling basin unit or 6.1 gpm per sq. ft.

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)
PT-105-567-A (Preliminary Irradiation of J-Q Column)
H Reactor operation continued to be governed by the first four of the above tests. Graphite temperature was limiting because of the fifth test, which authorized charging in March a block of 13 control tubes, each loaded with 19 J-Q (thorium) pairs, and which resulted in graphite heating requiring 40 percent helium to maintain 500° C graphite temperatures. Further relaxation of the graphite limit to 530° C was finally required to permit the previous power level to be retained. One tube of C material was discharged because of a slug failure. The tube was recharged, and the total number of C tubes in H Reactor remains 53.

PT-105-549-E (Exposure Increase in High Power Tubes at C Pile)
This production test was terminated with the discharge of material which had reached a concentration of approximately 133 percent of the previous goal. Sixty-four tubes of Simonds rolled material were discharged due to the apparent high rupture frequency of this material at higher concentration.

PT-105-562-A (Slug Evaluation at Increased Irradiation Levels for Tritium Production)
The 60 tubes charged in the central zone of C Reactor in February for the evaluation of this test have been irradiated for approximately one month with no difficulties. Charging of the C Reactor P-10 load began in March with an initial 70 J-N tubes charged in the fringe zones where tube powers approximate those of the central zone at DR Reactor.

DT-105-564-A (Temperature Monitor Prototype Test)
Twelve K Reactor type rear pigtails and associated resistance elements were installed at H Reactor to test the prototype performance.

C. Improvement Experience (Continued)

Equipment for "fast" discharge of ruptured slugs functioned satisfactorily during March. Of 23 attempted fast discharges, the ruptures were stuck in 17 cases. Recovery was not achieved in the other six cases because of decisions to remain shutdown or through failure to return other equipment to operating status in sufficient time.

In order to facilitate reactivity control at DR Reactor, where changing the P-10 loading has complicated startup predictions and process tube charging, a new procedure for the withdrawal of vertical and horizontal rods during cold startup was initiated following the March 17 outage. Vertical rod withdrawal is limited to groups of three rods, with no two rods adjacent, and followed by a check for criticality after each group is withdrawn. The previous method allowed withdrawal of all vertical rods as rapidly as mechanically possible. The revised procedure also involves a slower method of horizontal rod withdrawal. Issuance of Process Standards to incorporate this new procedure at all reactors is being considered.

Two revised Process Standards - Reactor were approved during the month. These were standards titled "Process Tube Outlet Water Temperature Limits - Corrosion" and "Make-Up of Uranium and Uranium Alloy Tube Charges." The first standard revises the outlet water temperature corrosion limit application to the average of the ten highest process tube temperatures rather than the highest individual tube temperature. In addition, the standard permits limited relaxation of the corrosion limit for short periods to aid in scram recoveries. The second standard permits substitution of cheaper tubular aluminum dummies for perforated dummies in the rear dummy charge of process tubes, and limited displacement of uranium tube charges which restrict power level.

The report of invention indicated below was submitted during March:

Inventor	Invention
D. E. Crouter	Use of Helium Gas to Reduce Reactivity Transients on Minimum Startups.

D. Events Influencing Costs

Water filtration chemical costs increased approximately $14,000 or 68.6 percent in March as compared to February as the combined result of the longer month and the increased turbidity of raw water accompanying the spring run-off.

Other major items affecting costs during March included the work involved in the removal of irradiated pieces from the rear face of B Reactor, a continued large amount of horizontal rod work, continued inspections and replacement of parts related to the Building 190-C process pumps, and the completion of the B Reactor venturi program.

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D. Events Influencing Costs (Continued)

Substitution of tubular aluminum dummies for the standard perforated dummy in a portion of the process tube rear dummy pattern is expected to result in significant savings as a result of lower fabrication costs. An estimated savings of approximately $19,000 is anticipated on the current order for 88,000 dummies for the K Reactors. Future savings are estimated at approximately $7,000 annually based upon current forecasts.

Reactor plutonium input production increased approximately seven percent in March as compared with February. However, Reactor Section plutonium irradiation unit cost is expected to remain about the same as in February because of the increased costs associated with the longer month and additional maintenance required by operational difficulties.

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 March 22, 1954.

CA-431 (100-C Plant)
Construction work was stopped March 5 on all major completion items with the exception of the 107-C retention tank baffle repairs and procurement of replacement horizontal rods. This action was taken since the estimated cost of the work remaining exceeded that authorized. A letter requesting authorization of an additional $228,000 has been directed to the AEC.

CA-512 (100-K Facilities)
The stacking of graphite at KW Reactor was completed on the day shift March 1. Diffusion length tests, using a polonium-beryllium source, indicated satisfactory uniformity and purity. The No. 3 primary-secondary pump set in Building 190-KW was tested. Both pumps functioned satisfactorily at approximate design flow and pressure. This was the initial test of any of the pump sets.

CG-558 (Reactor Plant Modification for Increased Production)
The Project Proposal (HW-30205) for Project CG-558 has been approved by the A & B Committee and sent to the AEC. The estimated cost is $26,800,000 with $9,500,000 currently being requested for detailed design and material procurement. Scope design of the project was approximately 57 percent complete at month end. During March an additional $200 000 was authorized to provide for the procurement of horizontal rods bringing the total authorized funds to $400,000.

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1. Project Status (Continued)

RDS-D-10) (Reactor and Water Plant Design Development)
RDS-D-11) The scope of the studies being conducted on RDS-D-10 and RDS-D-11 (Reactor and Water Plant Design Development) have been broadened to include (a) thorium and homogenously enriched uranium, dual face, single purpose reactors, (b) production of tritium in single purpose reactors, and (c) power producing reactors.

AR-53-M-22R (190-DR Pump Replacement)
Acceptance testing of the completed facility was carried out on March 24, and the equipment is now in use at Bldg. 190-DR. The new pump was installed as a replacement for a similar pump which had been removed for installation in Bldg. 190-D during 1953 to provide increased pumping capacity.

2. Plant Engineering

A number of engineering and development studies were active in the Section during March. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in Documents HW-31274 and HW-31272 which are scheduled for release in April. Several items of interest are reported below:

Follow-up work on coal utilization standards was continued. An outline for a supplement to the original report on this subject is currently being formulated.

The study of the 100-F effluent line stresses due to high temperature conditions was completed, and a recommendation report written.

The noise level study was actively continued during March upon return of the sound level meter. Representative readings have been taken in all strategic locations except the 184 Buildings, and a preliminary report will be issued early in April indicating findings.

An investigation of methods to expedite the Building 105-B effluent system venting was started. Progress to date has been limited to downcomer and cushion chamber inspections, and study of the combined B and C Reactor effluent systems. Recommendations await further study and investigation. Additional details of the problem are described in the "Radiation Experience" section.

F. Significant Reports

1. Routine

Monthly operating reports issued for February were:

HW-31006-A	Reactor Section	JH Warren	3-10-54
HW-31099	Operations Sub-Section	RO Mehann	3-1-54

1. Routine (Continued)

HW-31003	Process Sub-Section	OC Schroeder	3-1-54
HW-30962	Plant Engineering Sub-Section	FAR Stainken	3-1-54
HW-31024	Radiation Monitoring Sub-Section	PC Jerome	3-3-54
--	Maintenance Sub-Section	HE Weyerts	3-3-54
--	Power Sub-Section	JC McLaughlin	3-3-54

Other routine reports issued during March included:

HW-31306	"Monthly Progress Report, Reactor Section Expansion, March, 1954"	HF Wells	3-25-54
--	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	FAR Stainken	3-22-54
HW-30966	"Reactivity Balance and Associated Data - Period January and February, 1954"	AP Vinther	3-1-54

2. Non-Routine

HW-31206	"F Reactor Recrificing Analysis"	RB Hamilton	3-22-54
HW-31339	"Process Water Pressure Decay Tests"	RL Turner	3-9-54
HW-31217	"Trip Report - Visit to Arco, Idaho Installation"	RJ Bursey	3-23-54
HW-31239	"Six Month's Post Acceptance Report-100-C Plant, Project CA-431 A and B"	FAR Stainken	3-25-54
--	"Reactor Section Manual of Standard Costs"		3-1-54
--	"Weed Control - 100 Areas"	GB Jex	3-25-54
--	"Trip Report - Inland Empire Water Works School"	WR Conley	3-15-54
--	"Water Supply at Hanford"	WR Conley	3-15-54

III. PERSONNEL

A. Organization

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

Effective March 1, a change was made in the Operations Sub-Section organization by establishing an Operating Supervisor, reporting directly to the Sub-Section Superintendent, to supervise the supplemental crews and coordinate unusual maintenance. Previously, the supplemental crews had reported to the area organizations.

B. Force Summary

	Beginning of Month	End of Month	Net Change
Section General	3	3	0
Operations	267	273	6
Maintenance	485	487	2
Plant Engineering	32	32	0

B. Force Summary (Continued)

	Beginning of Month	End of Month	Net Change
Power	416	422	6
Process	42	41	- 1
Radiation Monitoring	62	62	0
Section Total	1307	1320	13

Changes during March consisted of one retirement, six deactivations, three reactivations, three transfers out and 20 transfers into the Section.

C. Safety Experience

There was one Sub-Major Injury in the Reactor Section during March. In addition, one Sub-Major Injury not reported last month is herewith summarized. Sub-Major Injury No. 252 occurred at Building 105-B on February 26 when a Mechanical Unit employee fell approximately 12 feet to the 0' lateral pad in the discharge area while descending from the "D" elevator to the 10' landing. The employee sustained a chip fracture and dislocated right middle finger, with pain in the right forearm, elbow, hip, and knee. Sub-Major Injury No. 253 occurred at Building 115-D on March 9 when an Operations Sub-Section employee sustained a fracture of the right foot by twisting his ankle as he stepped down on a wooden pipe cover from a pump motor on which he had been standing while accomplishing necessary valving related to the unloading of a railroad car of gas.

There were no Near-Serious Accidents in the Reactor Section during March.

D. Radiation Experience

One Class II Radiation Incident and one Class I Radiation Incident occurred in the Reactor Section during March. In addition, one potential Radiation Incident remains to be investigated. The Class II Incident, No. 70, occurred at B Reactor when a radiation inspector received an exposure of approximately 250 mrads while making the initial survey for location of a slug lodged in the rear face nozzles. Total exposure for the seven day period was approximately 345 mrads. The Class I Incident, No. 348, occurred at C Reactor when an Instrument Unit trainee became contaminated while working in the gas tunnel.

The potential Radiation Incident which remains to be investigated at month end concerns a general spread of contamination extending from the east Building 107-C basin toward the main 100-B Area gate house. The contamination level ranged from a maximum of 6,000 c/m at the area around the main gate house to approximately 50 mrads/hr near the

D. Radiation Experience (Continued)

basin, and resulted apparently from wind-blown radioactive particulate matter from the empty east basin. Warning signs have been placed about the perimeter of the area since clean-up of the contamination is not considered practical.

The increased flow permitted by the venturi installation at B Reactor has magnified the chronic effluent vapor contamination problem in Building 105-B, particularly the cushion chamber corridor. The problem was initially complicated by the incorporation of the junction box for the tie-in with the C Reactor effluent lines, and has been further increased by the added flow permitted by the venturi installation. Removal of a suspected baffle in the effluent line will be investigated during the next outage. Meanwhile, some relief for the situation has been achieved by directing the flow to a Building 107-C basin through one of the C Reactor effluent lines which provide less resistance to the effluent flow.

E. Personnel Activities

At month end, 12 employees are receiving on-the-job training for engineering or supervisory assignments in the Section; 7 of these are on assignment under the rotational training program.

Six additional KAPL employees assigned to the SIR Project completed a three-week training period in the Operations Sub-Section on March 2, 1954.

Principal items of interest during March in connection with employee communications were the seventh in the current series of non-exempt employee information meetings and a meeting for Maintenance Sub-Section supervisors and Plant Engineering Sub-Section personnel at which R. J. Gandy and T. L. Lindgren of the Purchasing and Stores Section discussed the problems of their Section.

R. J. Bursey of the Plant Engineering Sub-Section visited Arco on March 3 through March 5 to discuss J Slug shipping requirements for the P-10 Program with AEC and other personnel at that location.

J. C. McLaughlin, Superintendent, Power Sub-Section, attended the National Power Conference in Chicago on March 24 through March 26.

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April 9, 1954

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
MARCH, 1954

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	March		February	
	Normal	Acid Wash	Normal	Acid Wash
Charges started in Canyon Bldgs.	55	2	55	0
Charges completed in Conc. Bldgs.	66	0	51	0
Special charges - Conc. Bldgs.	21		20	
Charges completed-Isolation Bldg.	359	0	153	0
Average Waste Losses, %	2.18		2.47	
Special charges - Isolation Bldg.	49		48	
Material balance, %	96.93		100.37	
Yield through Process, %	94.75		97.9	
Average cooling time (days)	96		89	
Minimum cooling time (days)	82		75	

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1. Statistics (Continued)

b. Redox Operations

	March	February
Equivalent charges started	246	119.0
Charges completed	252	119.0
Tons Uranium delivered to storage	185.6	85.3
Average Production Rate per operating day, Tons	7.26	6.6
Average Daily Operating Rate for the month, Tons	5.99	3.1
Average yield, %		
Uranium	100.7	100.35
Plutonium	101.8	101.43
Total Waste Loss, %		
Uranium	0.81	0.29
Plutonium	0.69	0.40
Average cooling time, days	85	94
Minimum cooling time, days	71	77
Percent down time	17.6	54.1

c. 234-5 Operations

	March	February
Batches completed through Task II	314	168
Runs completed through Task III	205	105
Reduction yield, RM	97.8	96.8
Waste Disposal, units	8.68	3.5

d. UO_3 Operations

	March	February	To Date
Uranium drummed, Tons	373	234	5344
Uranium shipped, Tons	360	259	5288
Average cooling time, days (Redox)	93	96	
Minimum cooling time, days (Redox)	89	90	
Waste loss, %	0.13	0.29	

e. TBP Operations

	March	February	To Date
Tons received from Metal Removal	226	172	3123
Tons shipped to UO_3 Plant	222	166	2989
Average Production Rate per operating day, Tons	7.43	7.43	

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1. Statistics (Continued)

e. TBP Operations (Continued)

	March	February
Average Daily Operating Rate for the month, Tons	7.18	5.92
Average yield, %	96.81	98.64
Total Waste Loss, %	1.65	1.48
Ratio Waste Volume returned to Volume removed	1.00	1.03
Percent Down Time	3.39	38.82

f. P-10 Operations

	March	February
Charges started		
Vacuum tanks filled		
Product Purity, %		
Average yield, %		
Product Loss to stack, liters	0.3	4.2

g. Power

	200 East	200 West
Raw water pumped, gpm	1 268	6 751
Filtered water pumped, gpm	394	1 015
Steam generated, lbs/hr	54 632	194 689
Maximum steam generated, lbs/hr	74 000	266 000
Total steam generated, M lbs.	40·646	144 849
Coal consumed, tons (est.)	2 352	8 561

h. Waste Storage

	Equivalent Tons U	
	March	February
Metal Waste reserve storage capacity-T Plant	710	738
1st Cycle reserve storage capacity-T Plant	76	107
Metal Waste reserve storage capacity-B Plant	145	145
1st Cycle reserve storage capacity-B Plant	4	4
Redox Waste reserve storage capacity	296	419

2. Activities

a. Redox Processing

The Redox Plant was shut-down on March 4 to replace the H-2 centrifuge which failed on February 21. Installation of the unit

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2. Activities

a. Redox Processing (Continued)

was completed on March 6 and start-up effected at a 2.5 tons per day rate. The feed rate was increased to 7 tons per day on March 7 and operations continued uninterrupted until March 15 when near-flooding conditions were experienced in the 1A and 1S columns and dictated a three hour shut-down for flushes. Rates were increased to 7.5 tons per day on March 17, and this rate was maintained until March 28 except for shut-downs of short duration on March 21 due to failure of the organic supply pump and on March 22 for column flushes. Electrical failure of the 60 ton crane main hoist forced suspension of charging operations on March 24, and resulted in complete shutdown of the extraction batteries by March 29 due to a lack of metal solution feed. The plant continued down for the remainder of the month for crane decontamination and maintenance.

b. TBP Processing

In the TBP Plant, operations were virtually uninterrupted for the entire month with production being limited only by the availability of feed from the Tank Farms. Introduction of heated extractant to the RC column on March 9 resulted in a significant reduction in waste losses with no deleterious effect on column decontamination performance. This process change has also enabled the extractant flow rate to be reduced to 60% of flowsheet. An RC column UNH product of a higher concentration is thereby produced and the load on the primary UNH concentrator in the UO_3 Plant is reduced.

c. UO_3 Processing

Operations were essentially normal in the UO_3 Plant except for an increase in the calcination furnace radiation levels. This is attributed to the processing of higher activity feed material from the TBP Plant and presents a rather serious threat to economical production operations unless corrective measures can be taken.

d. Waste Metal Removal

Pump and sluice nozzle failures in the Tank Farms seriously curtailed metal removal production during the latter half of the month and forced the TBP Plant to operate at lowered rates due to a lack of feed. Metal removal rates were improving at month end as the failed units were replaced and sluicing and blending operations were being performed in U, BX, and TX Farms.

e. T Plant Processing

Production through T Plant continued at a high level as the result of a feed material backlog accumulated in February when the Redox

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2. Activities

e. T Plant Processing (Continued)

Plant did not meet scheduled production. The T Plant Concentration Building established a new production record as 87 runs were processed.

f. Isolation and Metal Fabrication Processing

March production in the Isolation Building established a new record as 359 runs were processed. It was necessary to work three overtime days to provide sufficient recycle cans to assure continuity of operations in the Separations Plants.

Material processed in the Metal Fabrication Building RMA Line exceeded the previous record by approximately 12%. The production commitment for unfabricated buttons was attained, and 105% of the commitment for final shapes (Model 110) was attained.

g. P-10 Processing

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3. Special Operations

a. Waste Evaporators

March 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	495 000	336 875	158 125	31.9
242-T	382 250	282 563	99 687	26.1

Feed for both evaporators was current TBP wastes.

b. Pu Recovery, 234-5

The equivalent of 15 bottles of product was processed in Metal Recovery (Hood 40), the equivalent of 11 bottles was processed in Powder Recovery (Hood 41), and the equivalent of 28 bottles of material was transferred to the Concentration and Isolation Buildings for reprocessing.

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B. Equipment Experience

1. Operating Continuity

Redox down time totalled 131 hours and was primarily due to the need for replacing the H-2 centrifuge, and a feed shortage caused by failure of the 60 ton crane main hoist which forced dissolver charging operations to be suspended on March 24.

Total down time for the TBP Plant totalled 30 hours for A Line and 20 hours for B Line. These outages were for line flushes and tie-in of the RC column extractant heat exchanger.

2. Inspection, Maintenance, and Replacement

a. H-2 Centrifuge - Redox

Replacement of the centrifuge which failed on February 21 was accomplished without incident during a two day shut-down starting on March 4.

b. 60 Ton Crane - Redox

The main hoist on the 60 ton crane failed electrically on March 24. Maintenance forces were unsuccessful in attempting temporary repairs under difficult conditions and short time limits. The plant was shut-down on March 29 for a scheduled eight days with four allotted for crane decontamination and four for maintenance work.

c. 291-S Steam Turbine Fan - Redox

Excessive vibration in the 291-S emergency steam fan was detected on March 14 and the unit was removed from service for one week to replace failed bearings and accomplish a general overhaul.

d. Slurry Accumulator Pump Failure - 241-BXR

A broken bearing and leaking pump seal caused the 001 tank sluicing unit to be removed from service on March 12. The unit was replaced and operations were resumed on March 20.

e. EB-1 UNH Concentrator - UO_3

Hydrostatic testing of the EB-1 concentrator tube bundle disclosed 19 tubes to be leaking. Blanking these tubes increased the total blanked to 38 of the 751 tubes in the bundle. The capacity of the unit has not been impaired.

f. Filter Bag Replacements, X-11 Filter - UO_3

Improvements in the fume vent system have increased filter bag life approximately three fold. The four filter bags replaced in the

[redacted] DEC[illegible]

2. Inspection, Maintenance, and Replacement

f. Filter Bag Replacements, X-11 Filter - UO_3 (Continued)

secondary air filter (X-11) had nine weeks service, where the former maximum life had been about three weeks.

g. Furnace Element Failure, Task IV - 234-5

Tests initiated in Furnace No. 2 to increase operating efficiency and reduce the overall time cycle through use of a fast heat and purge type, low vacuum casting (elimination of high vacuum equipment) were discontinued temporarily when the furnace element burned out. An inspection of the element showed that the leads had parted. Since the same trouble occurred during previous attempts to test purge type casting, consideration is being given to modification of the heating element.

h. Preventive Maintenance - P-10

The metal extraction line was shut-down from March 21 - 26 during which time extensive maintenance was performed including Toepler pump overhaul, valve replacements, extraction furnace brick replacement, and installation of new lucite panels on the metal line hood.

C. Improvement Experience

1. Process Tests and Revisions

a. Test processing of 231 Building Recycle - Redox

The processing of 215 MWD per ton material at T Plant will require the 600 MWD per ton recycle from 231 Building to be processed at Redox. Following successful laboratory processing of various types of recycle material, plant tests were commenced with the processing of two successive metal feed batches, each containing three cans of "killed" oxalate recycle. The decontamination from ruthenium and the scavenging obtained in preparing these feed batches was normal, and there were no difficulties encountered in processing this material through the solvent extraction and concentration facilities. The tests disclosed no process obstacles to the handling of "killed" oxalate recycle (approximately 57% of the volume of recycle to be processed). Further testing of recycle solutions has been held in abeyance pending installation of more suitable recycle addition facilities at Redox, currently scheduled for completion about April 7.

b. Heating RC Column Extractant - TBP

Heating of the RC Column extractant to 55 ± 5° C, as originally proposed by the Technical Section, was started on March 9. A stepwise reduction in RCX flow rate has since been made to 60% of normal

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1. Process Tests and Revisions (Continued)

b. Heating RC Column Extractant - TBP (Continued)

flowsheet requirements. A significant reduction in RC column waste losses resulted (from 0.6% to $<$ 0.01% of RAF uranium), and the uranium product concentration was increased. The process change produced no deleterious effect on column decontamination performance.

c. Increase in RA Column Feed Point Acidity - TBP

Process changes in March have increased the RA Column feed point acid molarity by about 0.8 M and have resulted in an increase in decontamination such that no product rework has been required since the inception of the test. Although the process revision results in an increase in direct chemical costs approximating $150/ton U, it is expected that this will be more than offset by the overall chemical savings resulting from the steady state operation achieved in the extraction batteries and the pronounced reduction in rework. Actual nitric acid consumption per ton of uranium processed in March was the second lowest since June, 1953 whereas production was the third highest since plant start-up.

d. Reactivity Process Test - UO_3

The production of one carload of UO_3 incorporating 0.09 wt. percent (U basis) sulfamic acid as an additive for improvement of product reactivity was instigated in March. Approximately 30% of the calcination pots containing the additive experienced severe product caking. The sulfamic acid concentration was reduced to 0.08 wt. percent, but caking persisted and the test was suspended after a total of seven tons of uranium was processed.

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

Routine heating of process gasses (HF, O_2, and process air) to approximately 600° C instigated in February was continued during the first part of March with an average re-hydrofluorination rate of 10%. A sudden increase in the charges requiring re-hydrofluorination was noted on March 16 and investigation revealed that the monel pre-heaters were being severely corroded at the elevated temperature. Controls were installed to reduce the element fin temperature to 420° C and satisfactory hydrofluorinations were again obtained. The pre-heaters will be cleaned and repassivated to restore the original corrosion resistant properties of the monel metal.

2. Inventions or Discoveries

There was one invention reported during the month:

Inventor	Title
H. A. Moulthrop J. G. Attanas	Application of plastic bags and sheeting for operation and maintenance across a contamination barrier.

[redacted]

D. Events Influencing Costs

As a result of the record production attained in the Redox, $BiPO_4$, Isolation and Metal Fabrication facilities and the high level of production maintained by the TBP and UO_3 facilities, the total costs of operations in March are expected to show an increase over those for February. The increased costs reflect the additional essential materials required to meet the record production, and increased labor costs resulting from the longer working month.

Total force of the Separations Section increased by twenty-three as fifteen operators were added by Operations, four operators by P-10, two laboratory assistants by Process, and two inspectors by Radiation Monitoring.

E. Plant Development and Expansion

1. Project Status

a. Project CG-496, Recuplex Installation - 234-5

Project funds have been increased from $1,400,000 to $1,482,000 and physical completion date extended to March 1, 1955. Budgeted funds amounting to $100,000 for converting these facilities from a semi-works to a manufacturing unit have been withheld pending future justification. Construction was resumed on March 8, 1954; however, recent information indicates that vessel procurement may again impede construction. A concerted effort to expedite vessel procurement is being made.

b. Projects CG-549 (Task I); CG-551 (Task III), 234-5

Minor Construction forces have been designated to perform the installation and a portion of the fabrication of Task I replacement facilities. The ready-for-use date is estimated to be December 15, 1954.

Fabrication and assembly of Task III equipment is on schedule and progressing satisfactorily.

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

The Stage I portion of this project has been completely rescheduled upon receipt of a firm fabrication schedule from Pacific Coast Engineering Co. which is 20 days later than original estimates. However, it now appears possible to include the waste concentration equipment change with other replacements originally scheduled as Stage I.

The Minor Construction fabrication schedule remains unchanged. Receipt of connector heads from the Crane Company, however, remains critical and scheduling of jumper fabrication is extremely difficult because the Crane Company has not provided a realistic shipping schedule.

1. Project Status

c. Project CA-535, Redox Expansion, Phase II (Continued)

Equipment now planned for replacement under Stage I includes the IGU Concentrator (F2-F3), the organic still (G2-G3), the waste concentrator (D11-D12), and the 1-A, 2-D, 3-D, 1-O, 1-S, and 1-C columns. Tentatively, it appears possible to begin equipment replacement activities on May 24. Detailed planning of the replacement program is in progress. Based on the above schedules, and providing connector head receipts can keep pace with jumper fabrication work, the hopeful ready-for-operation date for Stage I is the week of June 14, and the realistic date is July 1.

Construction of the 233-S concentration building is on schedule with ready-for-operation date remaining at December 1.

d. Project CA-513-A, Purex

Purex design is 97.5 percent complete compared with a scheduled 100 percent. Construction of Part A is 29.3 percent complete compared with a scheduled completion of 30.1 percent, and the 202-A Building is 28.3 percent complete compared to a scheduled 28.7 percent.

Approval to start detailed design of the vacuum acid fractionator and make immediate field revisions to facilitate later installation of this facility was given by the Design Council and the AEC early in March. Included in the detailed design will be a concrete building, vacuum fractionation equipment, tie-ins to existing facilities, remote instrumentation, and raw water and condensate disposal piping and facilities.

A revision request to segregate the organic, recovered acid vault, and PR cage vessel vent systems from the canyon vessel vent system was approved by the Design Council and the AEC during the month. This revision will minimize the possibility of contaminating these contact maintenance zones with gases from canyon equipment.

The manual, "Introduction to Purex," is approximately 30 percent complete, and work on the "Information and Equipment Manual" was started during the month.

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

1. Sample Gallery Ventilation Improvements: Design is complete. Funds are available to include the riser and flush mechanism in the project. The completion date of July 1, 1954 still appears possible.
2. Backcycle of 2DW and 3DW as 1A Scrub: Design of 3DW backcycle is complete and construction is planned in association with Stage I of CG-535. Waste concentrator (D-14) and jumper designs are not yet complete due to the urgency of CG-535 work.

1. Project Status (Continued)

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

The new disposal basin was put into operation March 15, 1954 and backfilling of the swamp started March 17. Dozer operators are encountering very short time limits, and it is estimated that backfilling will take about 6 weeks to complete. By-passing of the retention basin will be accomplished during the Redox Plant shutdown scheduled for the first week of April.

g. AR54-M-20, Redox Recycle Facility

In spite of serious procurement problems necessitating borrowing a centrifugal pump from the 300 Area Chemical Development Unit and substituting some piping which has not been corrosion tested, it is believed that the facility will be made ready to operate by April 7.

h. Project CA-539, Additional Redox Storage, 241-SX

Construction is 75% complete, 12% behind schedule. Much work remains to place the first 6 tanks in operation and it is believed that the ready-for-operation date may be as late as May 1. A statement of urgency based on the desired April 15 ready-for-operation date was transmitted to the AEC; however, it is believed unlikely that this date can be met.

i. J-Cell Modifications - Redox

Preparation of a project proposal to install dual-series scrubbing and improved filtering facilities in the Redox oxidizer off-gas stream is expected to be completed early next month. The gravity of the stack emission problem necessitates that everything possible be done to expedite installation of this equipment.

2. Plant Engineering

a. Standards Program

The Preventive Maintenance Study for the Z Plant Instrument and Electrical groups, completed in February, has provided information permitting a standard to be set for this activity.

"Historical" cost standards are being reviewed, and new averages consistent with recent cost trends will be in use for reporting March performance.

Forty-seven pages of the revised Cost Standards Manual, which have been typed and printed, will be issued next month. A system for the review of cost standards will be initiated on April 1 to provide a monthly study of reported variances and scheduled reviews of all engineered cost standards.

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2. Plant Engineering (Continued)

b. Work Simplification

Five conference sessions were held during the month, involving a total of 95 man-hours by the conferees. The current program is now 60 percent complete.

It has been decided to proceed with the Non-Exempt Work Simplification Program on a plant-wide basis. It now appears that the program will be inaugurated sometime in late May.

c. Engineering Assistance

A combination rinsing, slurping, and disassembly device for "door-stop" decontamination in the 222-S laboratory is being fabricated for testing. Completion of fabrication is expected during April after delivery of a mock-up hood and procurement of an air cylinder.

A study to improve the methods of contaminated equipment burial has been expanded to include cask-car decontamination methods and procedures. Investigation has progressed to the point where a proposal for pre-treatment of contaminated equipment with a protective coating is being developed.

Assistance to the Engineering Department in the study of underground piping corrosion has resulted in plans to install a test installation of underground piping in the vicinity of the Hot Semi-Works in 200 East Area. Arrangements have been made to examine and/or photograph the piping which will be uncovered during the replacement of catch tanks 302-BR and 311-ER.

Engineering assistance was provided to the P-10 Facility as follows:

1) A new roller-type can-opener for slug-decanning was completed and run-in was made on the equipment before it was placed in operating service.

2) A procedure for can-opening hood filter replacement was completed.

3) Development of a shear-type can-opener continued and a mock-up of the equipment is in progress.

d. Property Management

A portion of the 2723-W Building was partitioned off for use as a temporary conference room. This will permit the dismantlement of the fire hall annex, which is considered a fire hazard and unfit for further use due to its deteriorated condition.

Preliminary planning for the 200 Area Weed Control Program was completed. Four thousand pounds of duPont's CMU (required for soil

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2. Plant Engineering

d. Property Management (Continued)

sterilization) was ordered along with 854 gallons of 2-4-D to be used for the killing of weeds. Heavy equipment used for weed spraying and soil treatment is being made ready at this time.

F. Significant Reports Issued

1. Routine

Number	Title	Author
HW-31287	Separations Section-Operations Sub-Section Monthly Report	V. R. Chapman
HW-31288	Separations Section-234-5 Operations Monthly Report	V. R. Chapman
Official Use Only	Separations Section-Plant Engineering Sub-Section Monthly Report	C. P. Cabell
HW-31286	Separations Section-Process Sub-Section Monthly Report	W. N. Mobley
HW-31353	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-31372	Separations Section-P-10 Extraction Unit Monthly Report	O. V. Smiset
HW-31252	Monthly Progress Report, Plant Expansion Plant Engineering Sub-Section, Separations Section, March 1954	F. A. Hollenbach
HW-31341	Separations Section-Essential Materials	J. P. McBride
HW-31136	Separations Process Council Meeting	O. F. Beaulieu

2. Non-Routine

None	200 North Area Reactivation Study, P.E. Report No. 112	R. M. Shervem
None	Trip Report - Savannah River, Wilmington, Providence, Rochester	P. R. McMurray
HW-30794-RD	Basic Information for 231 Building Labor Standards, P.E. Report No. 8, Addendum II	J. E. Fouts
HW-30792-RD	Basic Information for 221 and 224-T Bldgs., Labor Standards, P.E. Report No. 15, Addendum I	J. E. Fouts
None	Basic Information for 221 and 224-T Bldgs., Analytical Requirements, P.E. Report No. 17	J. E. Fouts
None	Basic Data for 222-S Analytical Labor Standards, P.E. Report No. 50	V. P. Madsen
None	Standard Analytical Requirements and Basic Data, Redox Plant, P.E. Report No. 56.	V. P. Madsen
HW-30793-RD	Basic Information for 234-5 Control Laboratory Labor Standards, P.E. Report No. 79, Addendum I	J. E. Fouts

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2. Non-Routine (Continued)

Number	Title	Author
HW-30115-RD	Redox Labor Standards, P.E. Report No. 95	V. P. Madsen
HW-30215-RD	Basic Information for Material Standards, 202-S Building, P.E. Report No. 98	V. P. Madsen
HW-30741-RD	Basic Information for Direct Labor and Material Standards, 234-5 Building, P.E. Report No. 108	J. E. Fouts
HW-30767	Basic Information for 231 Building, Analytical Requirements, P.E. Report No. 109	J. E. Fouts
HW-30766-RD	Basic Information for 234-5 Building, Analytical Requirements, P.E. Report No. 110	J. E. Fouts
HW-31087	Technical and Economic Feasibility of a Quantometer for the Analytical Unit	D. F. Shepard
HW-31185	Measurement Precision in SF Material Accounting - 200 Areas	W. N. Mobley
HW-31332	Radiation Incident, Class II, No. 71	A. R. Keene
HW-31139	Radiation Incident, Class I, No. 349	J. P. Corley

III. PERSONNEL

A. Organization

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

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	5	5	0
Operations Sub-Section	594	609	15
Power & Maintenance Sub-Section	562	562	0
Process Sub-Section	205	207	2
Radiation Monitoring Sub-Section	73	75	2
Plant Engineering Sub-Section	27	27	0
P-10 Extraction Unit	35	39	4
Section Total	1501	1524	23

C. Safety Experience

There were no major or sub-major injuries in the Separations Section in March.

D. Radiation Experience

There was one Class I radiation incident in March (No. 349, HW-31139).

D. Radiation Experience (Continued)

This involved the simultaneous application of steam to opposite ends of an underground process line in the 241-TX Tank Farm resulting in contamination of a section of steam line and gross levels of ground contamination. No personnel overexposure were involved. There was one Class II incident involving a small localized overexposure of an estimated 7.5 rads as a result of spot clothing contamination picked up during routine Redox laboratory operations (No. 71, HW-31332).

Processing of higher activity feed material has increased fission product concentrations in the UO_3 Plant operations. Exposure rates during pot unloading operations have slowly risen approximately four-fold since the first of the year and may seriously handicap production work due to the exposure problem which will grow in magnitude unless corrective measures can be taken.

Automotive equipment contamination as a result of ruthenium stack emissions is increasing in frequency. Data from Radiological Sciences Department indicate that of 225 vehicles surveyed from 200 West Area, 97 were found contaminated. A facility to decontaminate mobile equipment will be provided immediately.

E. Personnel Activities

1. Emergency-Disaster Training

The training of Rescue Teams was essentially completed in March, and procedure manuals and identity cards have been issued to team members.

2. Work Simplification Round Table

Twenty Separations Section exempt personnel completed 95 man-hours of training in work simplification methods.

3. G.E. Selection Program for Supervisors

Evaluation was completed for ten Power and Maintenance candidates.

4. Process Training Course

Eleven non-exempt Separations Section personnel completed the Process and Special Hazards training course on March 9 and 16.

5. Visitations

P. R. McMurray visited the Savannah River Works in South Carolina, the duPont Co. in Wilmington, Delaware, the Hammel-Dahl Co. in Providence, R.I., and the Consolidated Vacuum Corporation in Rochester, N.Y. from February 27 to March 10 for consultations on processing methods and equipment in connection with the P-10 expansion program.

ENGINEERING DEPARTMENT

MARCH 1954

TECHNICAL SECTION

Fabrication of externally cooled hollow slugs is underway on an experimental basis with a view to evaluating prospective slug manufacturing processes. Such slugs are potentially preferable to the present solid-cylinder type for high exposure and high power use in the piles. Three-eighths inch diameter holes are being machined in four-inch length uranium cores. The holes are being capped by welding uranium wafers in a recess across the ends of the holes. These initial pieces will be canned by lead dip canning process while other canning methods are being investigated for such slugs.

About 400 extruded "J" slug cores were obtained from Oak Ridge and have been hot press canned. These cores are much sounder than the previous cast cores. In the canning of the extruded cores, no instances of blistering of the can due to gas evolution from the core material has been noted. It is, therefore, indicated that extruded cores would be preferable to the previous type of cast cores for production operation if a hot press bonded slug is to be used.

Calibrating operation of a 4-unit pilot model gang press for the hot press canning of aluminum alloy slugs was started during the month. This press will be utilized in studies to establish design features of the mechanical components of a 16-unit prototype production model gang press. Initial operation revealed no serious mechanical problems that cannot be corrected by modification of operating procedure. Fabrication of the 16-unit gang press is proceeding on schedule. All components for this press should be available by the end of April and initial operation should be in early May.

Process evaluation of the prototype mechanized lead dip canning machine developed by members of the Design Section was started. Following the achieving of successful operation of the machine, a production run of several thousand slugs for pile use is planned. It is estimated that such slugs may be available by June 30.

The Redox Plant operated satisfactorily with three uranium and three plutonium cycles at rates of 240 percent of design capacity. Head-end treatments included the testing of the "simmer" and "reflux" procedures. The "simmer" operation resulted in higher than average amounts of ruthenium escaping via the stack and was terminated after one run. The "reflux" operation has not exhibited any major improvement over the previously employed "spare" operation but should minimize the possibility for ruthenium escape in the event of caustic scrubber failure. Recycle of isolation process (231 Building) supernates directly to Redox rather than to T Plant (224 Building) was successfully demonstrated.

Development studies disclose that reducing the free area of nozzle-type perforated plates brings the performance characteristics into closer comparison

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with the plastic type perforated plates for application in uranium stripping operations. Definition of satisfactory process conditions for the completely acidic dissolution of aluminum jacketed slugs is complete with the exception of correlation of gas composition (primarily hydrogen content) to process conditions. Process studies have permitted the definition of two preliminary flowsheets for the separation of U-233 from irradiated thorium cooled for 100 or 300 days. Principal problems are foreseen to be metal dissolution and decontamination from protoactinium and ruthenium.

Technical bases were defined for P-10 extraction, separation and enrichment operations as required for the 3X Program. Isotopic purity of the P-10 product

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Slugs composed of uranium pellets cast in a plastic magnesium matrix have a potential for long pile exposure but concern has been felt about a possible safety hazard in the event that a rupture should allow contact of hot water and hot magnesium. Preliminary tests are quite reassuring. Solid magnesium specimens heated to 600° C and quenched in boiling water remained untarnished and when molten magnesium at 800° C was similarly quenched, no noticeable reaction occurred.

Cored slugs are unusually promising for use in the present piles in respect to split-type ruptures at high powers and moderately long exposures. Four enriched cored slugs charged in the hot spot in C Pile in February as per PT-105-513-SI appear to be operating normally despite several thermal cycling occasioned by several pile outages. A rough draft of a supplement to the production test has been prepared to extend the irradiation of these slugs from 600 to 1000 MWD/AT.

Thermal stress calculations for a 1.36-inch diameter solid thorium dioxide target element indicate a limit on specific power of only 2.5 kw/ft. At this power level the stress equals the ultimate strength of unirradiated thoria; irradiation effects on the strength properties of thoria are not known. This limiting power level corresponds to a very low permissible U-233 concentration build-up in solid target elements for thoria as compared to that achievable with thorium metal.

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Anistropic growth of zirconium under pile operating conditions could prohibit its use for process tubes. Out-of-pile tests in air have shown a threshold temperature for this growth somewhere between 550° and 600° C, a temperature substantially above that anticipated for process tube operation even in a high temperature pile.

Two distinctly different types of UO_3 have been synthesized, identified, and evaluated in respect to reactivity in the subsequent fluorination step as conducted at Oak Ridge. The first is yellow, may have a reactivity index as high as 1.4 if prepared from solution containing sulfamate or sulphuric acid, and is the major component in Hanford UO_3 product. The second, red material may be produced at will in the laboratory by flash calcination of UNH solutions and has a reactivity index of 1.4 to possibly as high as 2.0.

Seventeen uranium slug failures occurred during the month. There were three at B Pile, seven at C, four at D, two at F, and one at H. At the present time, the rupture rate for metal obtained from Fernald is comparable to that for metal obtained from Simonds, for metal undergoing irradiation during the same period of time at all areas. Five ruptured J-type, aluminum U-235 alloy pieces were discharged from DR Pile during the month.

Thirteen tubes of J-thorium pieces were charged into H Pile during the month. These tubes were charged to determine (1) tube power generation relative to uranium loaded tubes, (2) relative graphite heating, and (3) conversion ratio.

A production test to irradiate 2000 tubes to 900 MWD/T has been authorized for all reactors except C. At present, rupture considerations may allow a maximum exposure of 800 MWD/T to be used as a basis for production forecasts.

DESIGN SECTION

During the month direct engineering effort for the Section was distributed approximately 29% to Expansion Program activities, 11% to the 3X Program, 30% to Research and Development, and 30% to other projects and design orders.

Design of the Hot Semiworks Conversion, CA-513-D, is 98% complete, an advance of 4% during the month.

Detail design of the 300 Area Expansion, CA-514, was advanced 5% during the month even though the emphasis was on the 3X Program. However, additional work in the slug recovery process equipment indicates a net gain of 3% to an over-all 84% complete.

Over-all design on Reactor Plant Modification for Increased Production, CG-558, was advanced 2.3% during the month to 11.7% complete. Detail and scope design were increased 2% and 7%, respectively, during the month to 7% and 73% complete. A rough draft of the drawing schedule was completed and issued for comments.

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Scope design of CG-575, Hanford 3X Program - P-10 Extraction Facilities was advanced 10% during the month to 15% complete. Scope items advanced during the month include process flow diagrams and feasibility studies for isotopic purification of product. Authorization for design of CG-574, Hanford 3X Program - P-10 Irradiation was received during the month and scope design is 66% complete. Over-all design for CG-573, Hanford 3X Program - 300 Area, is 84% complete, an increase of 18% during the month.

The design completion status of major projects and design orders is as follows:

		Progress March	Total to Date
CG-549	Activate Task I, Building 234-5	10%	95%
CG-551	Expansion of Building 234-5 Facilities	11%	96%
CG-562	Waste Metal Recovery - Solvent Treatment	13%	98%
CG-567	Alum-Activated Silica Water Treatment Facilities, Phase I	2%	100%

The scope activity for Reactor Design Development was reduced appreciably during March. Studies being conducted include economic evaluation of alternate types of reactor design at several operating levels, determination of flexibility of a power generation system for a variety of conceivable operating conditions, and investigation of several alternate reactor site locations.

Increased effort was applied in the field of Separations Design Development during the month. Major items included scoping of a scavening system for reducing waste storage, the completion of design scope for an ammonia scrubber installation for the Redox Plant, and the start of study of the problem of canyon contamination and stack emission.

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	Being revised	36%
CA-512	100-K Area Facilities		
	KW - Water Plant	86%	77.5%
	Reactor & Bldg.	78%	65.8%
	KE - Water Plant	56%	50.6%
	Reactor & Bldg.	45%	52.5%
	General Facilities	79%	70.3%
CA-513	Purex Facility, Part "A"	30% (a)	29.3%
	Part "D"	40%	28%
CA-514	300 Area Expansion	80% (b)	35%
CG-535	Redox Capacity Increase, Phase II	39%	20%
CA-539	Redox 241-SX Tank Farm	88%	84%
CA-546	Fuel Element Pilot Plant	7%	7%
CG-573	Hanford 3X Program - 300 Area	--	55% (c)

(a) Schedule revised by Blaw-Knox.
(b) AEC schedule is being revised.
(c) Work now authorized, which is a minor portion of proposed project.

A walkout by about 500 electricians engaged in a jurisdictional dispute with millwrights stopped work at 100-K from March 2 to March 4. The Carpenters' Union is still unwilling to sign a new contract until the question of isolation pay has been settled.

Minor Construction completed assigned work on two projects, Elevated Storage Tanks - 200-E and Redox Waste Line. A 24% increase of service contractor personnel was required. Swing shifts were added to the machinists and boilermaker crafts during the month.

At the end of the month there were 1,098 current orders for items which require inspection, an increase of 214 new orders during the month.

All pumps have been set at 181-KW, and one is being used to provide water for testing process pumps at 190-KW. One process water pump at 190-KW has been tested at full load operation for more than 24 hours. Erection of one boiler in 165-KW was completed, and two turbine generator sets have been placed. Piping in the valve pit was essentially completed. Graphite fabrication for KE was completed on March 31. Following completion of packing 105-KW graphite on March 1, installation work began on top shielding and top plates. Preparations were made for gas leakage acceptance tests. At 105-KE, installation of crates was continued. Prepacking and grouting was completed at fifth tier right and left sides, eighth tier front face, and ninth tier rear face. Base cast iron for the process unit was completed March 26. The AEC has scheduled May 12, 1954, as starting date for installation of 105-KE graphite.

Design for Purex is now about 98% complete. At 202-A Building 11,162 cubic yards of concrete were placed, thus completing 85% of estimated requirements. The roof slab was about 53% complete, and the Hot Pipe Trench was about 90% complete. Installation of the 40-ton auxiliary crane was started. Concrete work for 203-A UNH Storage was completed except for tank bases. Tank pads have been started for 203-A and 211-A Tank Farms. The 216-A-3 Waste Crib was installed, and excavation for the 216-A-5 Waste Crib was completed. The subcontractor for 291-A Stack completed 19 of the 27 lifts required. The 13.8 KV Transmission Line from 251 Substation to the 202-A Building area was completed March 22. At the Additional Waste Storage Facilities for Redox, all concrete tank walls have been placed, and the 11th tank dome was being completed. At Redox Capacity Increase, Phase II, construction of the 233-S Building is proceeding under SWP conditions.

ORGANIZATION & PERSONNEL

Total on Roll, March 1, 1954	1,504
Accessions	23
Separations	22
Total on Roll, March 31, 1954	1,503

A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

ENGINEERING ADMINISTRATION SUB-SECTION

MARCH 1954

The conversion of the basic classified document accountability records to IBM cards continued throughout the month. IBM completed key punching on the HW, GEH, 3- and 7- document series and has started punching the records for the classified notebooks. An almost 100% improvement in production has been achieved by premarking records prior to key punching. It is anticipated that the key punching of the basic records can be completed and the reconciliation carried out before the end of July. Four file clerks are now working full time on the reconciliation task, and the reconciliation of the Hw document series has been substantially completed.

New procedures are steadily being introduced which will tailor the Classified Files operation to the application of IBM techniques. By the end of the month all file record cards were being key punched on a current basis. Early next month all receipts and certificates of destruction will be key punched on a routine basis. The name cards in the 300 and 700 Area Classified Files have been combined as a step towards centralizing the route file in the 300 Area. In the future only one set of file route cards will be maintained, which will cut in half the posting operation. This set will be maintained in the 300 Area. During the month, also, the issuance of document numbers was transferred from the 700 Area Files to the 300 Area reference desk.

The annual research and development inventory required by the AEC was completed and submitted to GE Security on March 15. The inventory included the final results from consultant G. W. Watt, University of Texas, and from the Yellow File in Schenectady. The summary showed that 34,816 reports were inventoried of which 51 were unaccounted for. Thirty-five of those unaccounted for had been reported in previous inventories.

Plans have been completed for holding a Plant-wide field inventory during the latter part of April. On March 17 and 19 Security field memoranda informed Plant personnel of the inventory. An immediate effect has been the return of a large volume of classified documents to the Files.

As part of a continuing search for "unaccounted for" documents, all Classified Files document holdings were checked for misfiled material during the month. As a result of this effort, three "missing" documents were located. These documents had been stapled to other documents by the chargee and not cleared when returned to Files. In the future, Files personnel clearing documents will routinely check the front and back pages to catch this violation.

March was the first month when a complete month's work statistics have been available from the 100-D and 200-W Extension Files. A very satisfactory volume of business is being done. The work load in the 100-D

Extension at present is about double that in 200-W, although it is anticipated that the opening of the 200-E Area will balance this.

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 executed by the Contractor and conformed copies have been distributed.

2. Modification No. 4 to Subcontract No. G-107 between General Electric and the Swedish Hospital of Seattle was executed by the hospital March 9. Conformed copies have been distributed.

3. Modification No. 2 to Special Agreement No. G-2 between General Electric and Washington Transit Advertising covering fabrication of aluminum signs has been returned by the Commission with the request that the signs be procured by outright purchase instead of by rental.

4. Modification No. 1 to Consultant Agreement No. 110 between General Electric and Dr. Raymond E. Zirkle covering an extension of time of his contract was executed by the Consultant March 15 and conformed copies have been distributed.

5. Special Agreement No. G-41 between General Electric and Mary J. Williams covering her services as anaesthetist at Kadlec Hospital was approved by the Commission March 4.

6. Special Agreement No. G-42 between General Electric and Applied Research Laboratories covering servicing of laboratory equipment was approved by the Commission March 19.

7. Special Agreement No. G-43 between General Electric and the University of Washington covering graphite drying studies was approved by the Commission March 5 and sent to the University for execution March 9.

8. Special Agreement No. G-38 between General Electric and a joint venture consisting of Morgan Wheeler and Company and Hugh H. Russell covering appraisal services in connection with certain commercial, church and residential properties was approved by the Commission March 5.

9. 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 approved by the Commission March 26 and forwarded to the Supplier for final execution April 1.

10. Modification No. 3 to Consultant Agreement No. 115 between General Electric and Dr. P. E. Kendall covering an extension of time and modification of terms was forwarded to the Commission for approval March 19.

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11. Modification No. 3 to Consultant Agreement No. 113 between General Electric and Dr. S. T. Cantril covering an extension of time of the Agreement and modification of terms was forwarded to the Commission for approval March 19.

12. Modification No. 3 to Consultant Agreement No. 112 between General Electric and Dr. P. E. Church covering an extension of time of the Agreement and modification of terms was forwarded to the Commission for approval March 24.

13. Modification No. 2 to Consultant Agreement No. 100 between General Electric and Dr. Zay Jeffries covering an extension of time of the Agreement and modification of terms was forwarded to the Commission for approval March 29.

14. Consultant Agreement No. 112 between General Electric and Haughton Elevator Co. covering consultant services in connection with modifying the capacity of charge elevators was approved by the Commission March 29.

15. Special Agreement No. G-34 between General Electric and the Columbia Valley Credit Exchange covering collection of overdue accounts was sent to the Commission for approval March 10.

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PILE TECHNOLOGY SUB-SECTION

MONTHLY REPORT

MARCH, 1954

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VISITORS AND BUSINESS TRIPS

E. Beauchamp and J. H. Gillette visited here from Oak Ridge National Laboratory, Oak Ridge, Tennessee, March 23 through 25, for irradiations discussions.

R. F. Koenig visited here from Knolls Atomic Power Laboratory, Schenectady, New York, March 29 and 30, for consultations on modification of KAPL-120 in-pile loop for SIR work.

J. R. Wetch and C. W. Wheelock visited here from North American Aviation, Inc., Downey, California, March 22 through 26, for consultations on reactor safety project.

J. F. White visited here from the Atomic Energy Commission in Washington, D.C., March 18 and 19, for technical discussions on graphite irradiation effects.

L. P. Bupp went to Oregon State College in Corvallis, Oregon, and Reed College in Portland, Oregon, March 29 and 30, to recruit technical personnel.

W. H. Clark visited Westinghouse Atomic Power Division in Pittsburgh, Pennsylvania, March 11 and 12, Knolls Atomic Power Laboratory in Schenectady, New York, March 15 and 16, and Argonne National Laboratory in Lemont, Illinois, March 17 and 18, to discuss various outstanding HIR's and survey future requests.

M. Lewis visited Argonne National Laboratory, Lemont, Illinois, March 22 and 23, to observe high temperature loops in operation at Argonne. He also attended conferences on aluminum corrosion work being done by Atomic Energy of Canada, Ltd., March 24 and 25, in Chalk River, Ontario.

J. H. Rector visited the Carboloy Division of General Electric in Detroit, Michigan, March 29 through April 2, to attend discussions regarding fabrication of boron carbide-aluminum rings.

N. O. Strand visited several manufacturing companies in Chicago, Cincinnati, Louisville, New York City, Camden, Providence, and Boston, March 1 through 12, to discuss application of high pressure process equipment to experimental systems.

ORGANIZATION AND PERSONNEL

Personnel totals are as follow:

	February	March
Administrative	4	5
Pile Engineering	72	74
Pile Materials Development	60	61
Special Irradiations	23	23
Technical Liaison	4	4
Total	163	167

[redacted]

Administrative: One Technical Graduate transferred in from Project-Reactor Projects, one Technical Graduate transferred in from Employee and Public Relations, and one General Clerk B transferred to Applied Research.

Pile Engineering: Two Engineering Assistants transferred in from Project-Reactor Projects, and one Technical Graduate was converted to Junior Engineer.

Pile Materials Development: One Engineering Assistant transferred in from Manufacturing-Metal Preparations, one Engineer II was re-assigned to this Unit from Special Irradiations, and one Chemist I was re-assigned to Special Irradiations from this Unit.

Special Irradiations: One Engineer II was re-assigned from this Sub-Unit to Pile Materials Development Unit, and one Chemist I was re-assigned to this Sub-Unit from Pile Materials Development Unit.

PROCESS TECHNOLOGY

Power Level Limits

During March, H Pile was limited by outlet water temperature or at times by graphite temperatures within a special J-thorium loading; C Pile was limited by maximum allowable tube power; and other piles were limited by outlet water temperature 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 March

Seventeen uranium slug failures occurred during the month. There were three at B Pile, seven at C, four at D, two at F, and one at H.

Comparative Performances of Various Metal Groups

At the present time the rupture rate for metal obtained from Fernald is comparable to that for metal obtained from Simonds, for metal undergoing irradiation during the same period of time at all areas.

At C Pile the rupture rate for Fernald Metal appears lower than that for Simonds Metal, although uncertainties in the data do not allow the establishment of exact rupture rates.

Failure in Non-Uranium Loadings

Five ruptures J-type, aluminum U^{235} alloy, pieces were discharged from DR Pile during the month. Three of these pieces had been in the pile for nine to ten months. They were swollen and had splits in the can wall. Radioactive gases issued from these pieces contaminating the air at the rear face and storage area. One piece, which had been irradiated for two weeks, was

swollen at the cap end and had a small hole in the weld through which slightly radioactive gases were escaping. Subsequent inspection of the radiograph of this piece disclosed the faint outline of a bubble in the weld. The fifth piece, which had been charged for only four days, disclosed no hole in the weld or jacket. However, the piece was markedly swollen.

One ruptured C Metal, Aluminum U^{235} alloy, piece was discharged from H Pile. The piece had a hole in the side of the jacket. Bubbles were observed rising from the hole.

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. Since the last power increase (December 28, 1953) there have been approximately 75 equivalent 600 MWD/T tubes exposed in the experimental area (to April 1, 1954).

One rupture (below 600 MWD/T) has occurred since December 28, 1953; this was 2674-C on March 8, 1954, at 446 MWD/T. The maximum exposure 25-M tube is about 500 MWD/T.

Production Test 105-567-A, "Preliminary Irradiation of J-Q Columns" - Thirteen tubes of J-thorium pieces were charged into H Pile on March 14, 1954. Each charge consisted of 19 eight-inch J slugs alternated with 19 six-inch Q slugs. The tubes were charged in a block around graphite monitoring thermocouples. These tubes were charged to determine (1) tube power generation relative to uranium loaded tubes, (2) relative graphite heating, and (3) conversion ratio (grams U^{233}/MWD). Initial data indicate that (1) the power generation is 86 per cent of that of natural uranium in the same flux, and (2) the graphite heating (same flux) is about 1.3 times as great as that of natural uranium. The graphite heating was more than had been calculated (1.2), and this caused some operating difficulty in spite of the authorized 20 per cent (to 50 per cent) increase in helium concentration. It is expected that flattening readjustments made during the unscheduled outage of March 28, 1954, will eliminate the need for the temporary 530 C graphite temperature limit which had been set after the operating difficulties became apparent.

Production Test 105-549-A - This test authorized the exposure of the tubes covered by Production Test 105-533-A to a concentration of 900 MWD/AT. The test was terminated March 1 because of the high number of ruptures that had occurred to both Simonds rolled metal and Fernald rolled slugs. The rupture rate for material irradiated to 900 MWD/T at tube powers between 800-900 KW was approximately 0.20. From observation of the high exposure failures, cores were split, but the jackets of a few of them appeared to be so badly corroded that water penetration could not be ruled out as cause of failure.

Extremely pertinent to the results of this test is the fact that 44 tubes were discharged during December at exposures near 900 with no failures.

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Although it could possibly be coincidental, the 16 failures that occurred at C in the high exposure material all occurred in January and February after C Pile powers were raised. If the failure record for the metal remaining in the "hot spot" after January 1 is considered, the rupture rate appears to be near 0.40 at 900 MWD/AT. Such a rupture rate is not tolerable from operating considerations for any substantial number of tubes. An effort is being made to delineate further the effect of power by running high exposure tests at the old piles.

Production Test 105-532-A-4 - Increased slug powers are being investigated by irradiating uranium enriched to 1.75 per cent U^{235}. Three tubes containing 12 eight-inch enriched slugs were charged in the C Pile "hot spot" on February 14, 1954. The maximum power slug in these tubes has been calculated to operate near 80 KW/ft. with a core temperature slightly above 700 C. The exposure of these pieces as measured by heat flux would be approximately 400 MWD/T at the end of March. The fact that no ruptures have occurred in these slugs further points up the inter-relation of tube power and exposure discussed in the summary of the high exposure test. It is encouraging that no sharp power threshold has as yet been discovered beyond which the present slugs cannot operate, but it becomes increasingly apparent that the conditions of relatively "rupture-free" operation must be defined by both power and exposure.

Manufacture of Other Products

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 fissionable 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 at high exposure. The highest current exposure is 1350 MWD/AT.

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 and central zones. Sixty tubes have operated without incident for over a month. Forty tubes contain hot-pressed fuel slugs, the balance of the tubes being cold-canned or Al-Si canned. The maximum current tube exposure is roughly 25 MWD.

The tube powers of the J-N charges are about 88 per cent that of the surrounding normal uranium. In order to secure corrosion data at higher outlet temperatures, simulating increased tube outputs, it is planned to reduce the water flow to most of the J-N charges.

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 in the process of publication. 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 economic and technical feasibility of using enriched uranium as a substitute for U^{235} alloy fuel pieces in tritium or U^{233} production is being analyzed.

Substitution of Thoria for Thorium in Target Slugs

The possibility of using thoria instead of thorium metal in production of U^{233} is being studied with the assistance of other technical groups, and a preliminary draft will be issued shortly.

PILE PHYSICS

P-10 Program

Samarium buildup and U^{235} depletion effects in the DR Pile loading during the past month demonstrated the increased operational complexity of a full-pile P-10 loading as compared to the formerly employed partial pile loads. Because the pile will be loaded completely during only a portion of an exposure cycle, a total depletion transient approaching three to four per cent δ k is expected, with compensating spike enrichment required during the latter part of the cycle. The large depletion transients during "equilibrium" operation will require either frequent outages with complicated startup transients or the use of additional control. The Reactor Section is presently contemplating moving a large part of the poison column charge-discharge facility from the B Pile, where it has been demonstrated experimentally, to the DR Pile. Recommendations were forwarded to the Process Sub-Section pertaining to these depletion effect and requesting that up to ten per cent more enriched material be made available during the initial pile loading.

Liaison was maintained with Manufacturing Accounting relative to scheduling of the loadings. If a significant loading for production of U^{233} is required as has been tentatively discussed, a third pile will automatically be involved; it appears in this case that the fringe of the J-Q Pile might be used to damp the reactivity cycles caused by "crash" P-10 loading of the other two piles. However, it would appear wise to establish the reactivity status of a J-Q load during a reasonable operating period before loading the fringe with P-10 Columns; the fringe loading of the J-Q Pile would in this case be too late to help damp the reactivity cycles of the other two piles appreciably.

A major uncertainty in P-10 scheduling is the yield per column MWD to be expected from the new 20-slug columns containing 3.8-inch target slugs. Arrangements have been made for special processing of the 20 slugs from the central column of the 13-tube-diamond P-10 loading at C Pile which is to be discharged during April.

Storage basin and shipping procedures for J material are being reviewed in cooperation with Manufacturing. Recommendations concerning handling and design problems associated with the shipment of up to 280 slugs in a single cask were forwarded to Manufacturing in document HW-31170.

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Pile Control

A review of the considerations entering into the specification of total nuclear control was published during the month as document HW-30748, and process specifications in line with the recommendations presented were prepared for approval. Under the new philosophy control of the wet pile is to be maintained at all times with horizontal rods plus poison columns, leaving the vertical safety system to control during and following loss of water; the residual fission heating following loss of water is recognized as being of the same order of importance as loss of nuclear control, indicating that increased emphasis should be placed upon developing measures to insure the continuity of pile cooling.

Other specifications prepared for approval included a controlled rate of VSR withdrawal during a cold startup, and changes in trip settings and rod withdrawal rates during a hot startup in a P-10 loaded pile.

Work is proceeding to eliminate some of the systematic errors which seem to be present in the scram transient data (for measurement of vertical safety system effectiveness). To avoid difficulties in analysis due to metal coefficient effects (which is indicated to be approximately - .33 ih/MW in the range from 0 to 50 MW), the remaining tests will be performed with a rising period of the order of 30 seconds and with a maximum level of 15 to 20 MW.

K Pile Startup

A document covering the mechanics of performing a dry pile temperature coefficient test is nearly completed. Because calculations indicate that most of the rear nozzles would have to be removed from the active columns if the initially proposed goal temperature of 200 C is reached, the possibility of using lower temperature is being considered. Also being considered are the necessity for similar information in the case of P-10 loadings and short cuts which might be employed for obtaining such information once a hot dry test has been performed with natural uranium in the K lattice.

An ideal flux distribution pattern along a central K Pile row has been forwarded to the Design Analysis group for use in making up the orifice pattern for the K Piles. This pattern has been based on having sufficient enrichment in the eighth lattice unit from the fringe to provide 2400 effective tubes, assuming an 87 per cent flat zone efficiency.

Exposure Calculations

The theoretical form curves for predicting plutonium 239 and 240 yields as a function of exposure are presently being prepared for documentation. Maxwellian neutron energy distribution has been assumed and a front to rear cosine correction has been applied in setting parameters of "effective" thermal neutron temperature. The pile effective thermal neutron temperature may then be considered to be the one which is indicated by plant separations yield data.

It has been pointed out in meetings with SF Accountability people, appropriate Technical Section representatives, and 200 Area Process people that no curve could be derived either empirically or theoretically with accuracy of the order of one or two per cent which would remain valid over long periods of time because of the numerous factors associated with the operation of the piles which do not remain constant. For example, an apparent drop in 200 Area recovery rates in recent months has been found to correspond to "paper" power increases following flow recalibration in the 100 Areas. It is felt, therefore, that curves with the correct theoretical form should be used, with normalization performed when found to be necessary.

Reactivity testing of the natural uranium slugs for Production Test 105-553-A, "Slug Irradiations for Long Term Reactivity Studies", have been completed in the test pile.

Four eight-inch slug types were requested for testing purposes containing 45 per cent, 50 per cent, 55 per cent, and 60 per cent thoria (thorium oxide) pellets by volume, with the remaining volume to consist of J alloy material of the normal percentage composition. This type of slug could conceivably circumvent some of the problems associated with poor conductivity of thoria and gamma escape from the J alloy in a J-thoria loading.

Shield Attenuation Studies

Preliminary data from the simulated burnout experiment indicates that the radiation rates which had been predicted are reasonable. During the first stage of simulated burnout, the thermal neutron flux at the outside of the shield increased approximately a factor of ten whereas the gamma radiation escape increased by about 3.5. The escape during the second stage increased by a factor of approximately 100 for thermal neutrons and 7.5 for gamma radiation compared to the zero-burnout condition. The amounts of masonite left out during each phase of the test are listed in the following table:

Cycle:	1st (Inner)	2nd	3rd	4th	5th	6th(outer)
Fraction of Masonite Removed						
1st stage	3/4	1/2	1/4	0	0	0
2nd stage	3/4	3/4	1/2	1/4	0	0
3rd stage	3/4	3/4	3/4	1/2	1/4	0
4th stage (maximum removal contemplated)	3/4	3/4	3/4	3/4	1/2	1/4

Measurements of the attenuation in lead of the gamma energy emitted from irradiated J pieces with respective decay times of six and 60 days were made in support of the design for new J shipping casks. It was concluded from these measurements that the use of 11 inches of lead for cask wall thickness as is presently employed is near optimum when it is necessary to shield a large number of J slugs with decay times of the order of 150 days.

Masonite Damage Data

Upon checking on the inconsistencies noted in the density data reported in the Pile Technology Sub-Section Monthly Report for February, 1954, those data reported were found to be in error. Apparently in the density measurements performed by Analytical Services, the exposed and somewhat more porous masonite absorbed sufficient water to cause an apparent increase in density, whereas independent experiments now indicate a uniformly decreasing density with heating. It has been noted also that with extreme heating the masonite is altered to such an extent that a reaction with water becomes visibly evident. Samples are now being coated with a light film of paraffin before being weighed in water; the bouyancy effect of the paraffin can easily be determined.

HEAT TRANSFER

Tube Flow Studies

Additional research and development tests were performed to study "cooling by boiling" in a process tube. The full-scale process tube mock-up was utilized, and tests were performed with a 250 psig rear header pressure, a tube power of 400 KW, a uniform heater tube and a C Pile annulus. The results may be summarized as follows: Tube flow rates could be reduced as low as 4.8, 5.8, and 7.7 gpm without reaching burn-out conditions for inlet water temperatures of 50 F, 200 F, and 300 F, respectively. The saturation temperature at the end of the heater or "slug" section was approximately 410 F, and these flows represented calculated steam qualities of 38 per cent, 36 per cent, and 36 per cent, respectively. These burn-out steam qualities may be compared with corresponding values of 62 per cent, 73 per cent, and 72 per cent obtained at 250 KW and reported previously. Comparison of the data leads to the conclusion that the 62 per cent value may be low; difficulties encountered recently in operation of the equipment also support this belief. The difficulties have consisted of a bowing and subsequent melting of the heater tube due in part to the tube coming in contact with the process tube. Such geometry restricts the flow of coolant over the heater tube.

Further tests of the above type are planned at 600 KW tube power. In addition, steps are being taken to permit raising the static pressure on the system to 500 psig at the outlet. These steps will probably involve both pressure testing and procurement and installation of new pipes and fittings. Success cannot be guaranteed until all of the components have been tested in operation, but the uncertainties should be essentially eliminated in about a month.

Additional plans are being made to permit installation of a short section of glass tubing (process tube) in the downstream portion of the test section. This will permit visual observation of the boiling phenomena. These tests will be performed in conjunction with the Water Quality Sub-Unit. All of the necessary components are on hand, but some changes in the process tube support stand will be required before tests can be performed.

Detailed cost estimates for installation of a new generator were obtained during the month. If a labor force is available, construction of the foundation is expected to start in April. Installation of the generator is being coordinated with the addition of a new 440 V Sub-Station to the 189-D facilities. This coordination will result in reduced costs on both programs.

"Recommended K Pile Tube Screens", H. H. Greenfield, HW-31081, March 8, 1954, was issued. It reports the results of work performed jointly with Design Section personnel to improve the performance of the cone screen assembly proposed for K Pile. A new assembly was recommended, and its use should lead to pump cost savings on the order of $75,000 per year. In addition, the cone screen which is part of the new assembly will lead to more reliable operation of the Panellit system. The new screen was also recommended for installation on the old piles as part of CG-558.

Hydraulics laboratory work is being conducted to determine the optimum design of venturis to be attached directly to the inlet crossheader fittings under CG-558. Such installations will eliminate an unnecessary pressure loss due to expansion. Use of the cone screens mentioned above will improve the pressure drop characteristics and also permit decreasing the over-all length of the venturi assembly body. This latter feature will aid in overcoming some of the problems in designing a flexible one-inch O.D. pigtail to fit between the venturi body and nozzle.

Construction of the new Hydraulics Laboratory in 189-D is about 20 per cent complete. The project is presently being held up due to lack of Minor Construction pipefitters.

A study was initiated of the heat transfer aspects of a method to cool the pile following loss of process water by injection of water into the graphite. Analysis indicates that such a system would be advantageous if the pile were down for five or more hours before water loss; however, its value is questionable at present if the pile were down for shorter periods before water loss.

To obtain more basic data to aid in studies such as the one above, equipment is being installed at C Pile to measure the temperatures of outlet water and slugs following scrams.

Fuel Element Studies

The Ike thermocouple slug located in tube 2877-C has continued to perform satisfactorily. Axial temperatures as high as 620 C were recorded, and both thermocouples in the slug are indicating within 10 C of each other. Irradiation of the slug is about two-thirds complete, and both it and a control charge will be discharged in approximately a month.

Specific power data will be obtained from the latter charge, and this will permit comparison of computed and measured axial temperatures.

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Four additional Ike slugs machined for thermocouples have been canned. Plans are being made to install one of these in C Pile following discharge of the present slug. It is anticipated that temperatures above 660 C will be reached with the new slug located in a different region of the pile.

Assembly has been almost completed on a slug having a thermocouple mounted at the can end and two thermocouples mounted on the surface. Some features of the slug will require testing before it can be installed in a pile.

Resistance heating tests of slugs were waived in view of higher priority work this month.

Four additional nickel-plated hot-press bond samples were tested to determine their thermal conductances. Data from these and other tests are being evaluated.

Moderator and Other Tests

"Calculated Temperature Distribution at H Pile with Helium Addition - Report No. 4", S. R. Fields, HW-30970, March 1, 1954, was issued. The report presents estimated graphite temperatures for considerably broader conditions than considered before, tube powers up to 1500 KW and helium concentrations up to 100 per cent.

Additional data have been obtained from the 13-tube, diamond-shaped P-10 load at C Pile. They are being evaluated and the test work is largely completed.

"Horizontal Control Rod Cooling Requirements", W. D. Gilbert, HW-31155, March 17, 1954, was issued. It reports the results of studies of rod cooling requirements. The recommendation was made that the rod outlet temperature be limited to, arbitrarily, 60 C and that the pile be shutdown following rod water loss unless the rod can be removed from the pile in, arbitrarily, 30 seconds. The outlet temperature can be monitored, in effect, either by a flow or temperature monitoring system. Modified process specifications are expected to result from this report.

Calculations are being made to determine the temperatures which may be expected in shipping casks loaded with 300 J slugs. The primary variable in the problem is the amount of time by which the slugs must be "cooled" before they can be loaded in the cask. It is understood that savings of several hundred thousand dollars are involved in the over-all problem.

EXPERIMENTAL PHYSICS

Slug Rupture Detection

Formal approval by the Hanford Operations Office of the Atomic Energy Commission was given the proposal to replace the existing beta systems with gamma spectrometer units at all existing piles except C Pile and the directive to proceed has been received. The replacement at C Pile was not

included as an item in the construction budget; hence, it was considered separately from the older piles and is now awaiting Washington approval.

The prototype gamma spectrometer unit at H Pile continued to operate without electronic maintenance. Flow rate regulators have been installed on all sample lines and some minor malfunctioning has been detected and eliminated. A C slug rupture in 2955 H was detected with the expected sensitivity.

The design for a portable high sensitivity scintillation detector has been completed for application in isolating process tubes containing ruptures under conditions of slight fission product deposition on the tube fittings. A lead collimator will be used in conjunction with the crystal detector in the initial models of this instrument to reduce general backgrounds; redesign of the detector may eliminate the requirement for massive collimators. The assembly and testing of the slug rupture detector designed for the Fuel Element Irradiation facility at Arco is progressing on schedule. The system will be complete and ready for shipment to Arco early next month.

The radiation levels to be expected on the inlet face of a pile recycling the water were calculated for the case of a severe rupture in which shutdown was not effected for several minutes. These estimates - reported by R. S. Paul in Secret Rough Draft HW-31197, "Estimate of HDPR Charging Face Activity Following a Severe Rupture", - show that in the severe case considered the fission product gamma activities on the charging face will be substantial. The requirements for cumbersome shielding of the inlet piping, if required for such a reactor, cannot be specified without a more detailed consideration of the rate of uranium release to the effluent and the deposition of contamination on the piping.

Measurement of the Diffusion Length in the KW Pile Graphite

The diffusion length of thermal neutrons in the KW Pile graphite, with process tubes, was measured to detect the presence of significant contamination, if it existed, prior to completing the pile and attempting startup. The preliminary experimental result - 51.9 ± 1.2 cm. - agrees with the predicted "as stacked" value of 53.0 cm. within the combined errors of measurement and calculation. Fifty-eight independent diffusion lengths were determined about each of eight neutron source positions; the average of the diffusion lengths about each source position was in good agreement with similar averages about the remaining positions. Analysis of all the data indicates that significant gross contamination did not exist.

The major uncertainties in the predicted diffusion length lay in the correction for neutron "streaming" through voids and in the selection of the proper graphite absorption cross section to employ. The indicated error of measurement in the experimental value for the diffusion length was obtained simply from a graphical analysis of the raw data. The data are now undergoing comprehensive statistical treatment to yield a refined over-all pile average "as stacked" experimental value for this pile constant.

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Measurement of Lattice Constants

A review of the methods employed to calculate conversion efficiency and reactivity in pile loadings designed for tritium production, i.e., J-N type loads employing U^{235} - aluminum alloy "J" fuel slugs and lithium - aluminum "N" target slugs, reveal that in the past account has not been taken of the lower volume average neutron density in the "N" slug as compared with the "J" slug. A diffusion theory calculation, utilizing "J" and "N" slug specifications as employed in the H-10 load, yields a predicted conversion efficiency

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Measurements of the conversion ratio and importance of resonance capture in "J" - thorium slug loadings designed for U^{233} production are in progress. Preliminary results indicate a resonance capture probability for the "J" - thorium loading (six-inch thorium) which is less than half that for natural uranium and on atom-wise conversion ratio slightly less than that which would be predicted for a J-N loading of comparable reactivity. A series of direct in-pile measurements of the resonance integral for thorium, thorium oxide and natural uranium are also in progress. Additional measurements planned for the immediate future include the determination of the metal temperature coefficient of reactivity for enriched loadings employing thorium and thorium oxide target slugs and a direct measure of the conversion efficiency and reactivity of "J" - thorium oxide type loadings.

Fast Neutron Distributions and Spectra

A series of exploratory experiments are in progress to develop techniques applicable to the determination of fast neutron spectra with thick nuclear emulsion plates. Techniques to be employed in properly developing the irradiated emulsions have not yet been refined. The initial irradiations in this program have been made in the Test Pile Lattice.

Instrument Development

The low level period trip safety system for the K Piles has been placed in operating condition and is now ready for performance testing. Transients in the Test Pile - rising periods of the order of 20 seconds - will suffice to evaluate many of the operating difficulties associated with the use of

this instrument. An "exponential rate pulse generator", which gives pulses increasing in rate exponentially over a two decade range, has been designed and fabricated to test this safety system in the short period ranges.

The circuitry to be employed with the sub-critical pile neutron flux monitor has been specified and requisitioned. Procurement of a U^{235} fission chamber of special design has been initiated. It is planned to have this system fabricated and ready for on-pile tests during the first quarter of next fiscal year.

Recent experience in using television equipment to locate and view highly radioactive material has indicated the desirability of a supplementary directional radiation detector designed to direct the camera toward the general locale of interest. A simple probe employing a small scintillating crystal detector on a long light pipe is expected to suffice. The integrated response is indicated remotely and the area of interest scanned from the moving carriage provided for positioning the television camera. This equipment is being fabricated for test.

A gain stabilizing circuit for a Dumont 6292 photomultiplier has been developed and is in service in the prototype gamma monitor at H Pile. A preliminary measurement of the effect of temperature upon the performance of a scintillation counter indicates an increase in amplification as the crystal and photomultiplier are heated. More definitive experiments are planned to investigate this effect which can bear adversely upon precision gamma spectroscopy.

Outlet Water Temperature Recording Facilities

An electro-mechanical analog to digital data converter has been installed in the C Pile Flexowriter automatic tube outlet water temperature recording facilities in lieu of the specified electronic converter which the vendor has not been able to provide. Assistance as requested has been provided both Design Section and vendor personnel in an attempt to arrive at an acceptable C Pile system. Assistance also continues in the design and specification of the Flexowriter installations being installed at D, DR, and F Piles under a project sponsored by Reactor Section.

The prototype of the K Pile temperature monitor was installed at H Pile as were the special rear face fittings and resistance thermometers. The system has been operated during the month and several undesirable features isolated and modifications in the K Pile installation recommended. The on-pile tests are continuing to isolate and eliminate as many undesirable features of this system as possible prior to K startup.

Reactor Safety Project

A program of flux traverses and reactivity measurements were completed on simulated "safety fuse" elements to provide North American Aviation personnel with basic physics data upon which to base fuse designs. The fuse is expected to consist of pressurized $B_{10}F_3$ which is permitted to expand into

a slug-type can as a solder seal is melted by fission heat in a U^{235} cap. Full-scale prototype fuse assemblies are expected next month for test; the in-pile economics of employing this type of safety device will hinge upon these projected measurements on the prototype elements.

Test Pile - Routine Tests

Regular metal testing proceeded routinely during the month. Eight lots of billet eggs were tested to yield TDS values ranging from 13 to 17. One "J" slug per heat was sampled and tested from 268 heats to yield single slug reactivity values ranging from 14.0 to 16.3 inhours. Eighty heats of lithium-aluminum alloy P-10 target slugs were tested with five rejected for non-conformance with specification in lithium content.

Test Pile - Graphite Tests

The purity of graphite produced by National Carbon under contract G-12 continues high at an average dih (purity) of about 1.00 while the density continues to average about 1.7 grams cm^{-3}. The purity of graphite produced by Speer also continues high at an average dih (purity) of about 1.07 and the density averages about 1.64 grams cm^{-3}. All graphite produced under the Speer contract has now been tested.

Test Pile - Special Tests

The cold, clean reactivity of over 100 natural uranium slugs was accurately determined to serve as base points in long-term gains measurements. These slugs will be given various exposures ranging up to 3,000 MWD per ton and the net change in neutron economy resulting from the irradiation determined through past irradiation danger coefficient measurements in the Test Pile.

The remaining samples of residue collected from the graphite during the KW Pile lay up were tested. No evidence of significant contamination was found in any of the samples.

Physical Constants Test Reactor

The directive to proceed with design and construction of a building to house the Physical Constants Test Reactor and the thermal Test Reactor has been received. Design of the building is progressing; it is expected that all drawings and specifications will be prepared and submitted to the Atomic Energy Commission early in May to enable the invitation for bids to proceed.

The graphite scope designs for the Physical Constants Test Reactor have been approved and layer by layer detailing is in progress. It is expected that the graphite design will be complete and approved early in May. Prototype assemblies for the safety and control systems have been fabricated and some redesign effected on the basis of performance test results. The instrument systems for safety and control are largely specified and procurement initiated. It is expected that the hazards report will be submitted next month for review by the Advisory Committee on Reactor Safeguards. Specifications are also being prepared in support of fuel procurement.

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MECHANICAL DEVELOPMENT

Charging and Discharging Studies

A rough draft of document HW-30867 which discusses the potentialities of segmented discharge, particularly with respect to different exposures of uranium and various target slug loadings was completed during the month and reviewed. The final document is in the process of being published at month's end.

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

The design test to determine the flushing characteristics of the K Pile poison column control system will begin shortly. The revisions to the mock-up in the 108-D Laboratory are almost complete.

Horizontal Rod Studies

The first replacement horizontal control rod was installed in the #9 rod opening at B Pile early this month. Operation during the month was proved satisfactory in every respect. A second rod is being prepared using a purer grade of boron. This rod, to be installed in the "A" hole at H Area, will be equipped with numerous thermocouples to determine the skin temperature of the aluminum extrusion. A third rod is being prepared for installation in F Pile. This rod will be a half-rod and will use an enlarged cooling tube in the non-poison portion of the rod.

A built-up washer seal was installed on the rod at B Pile and has functioned satisfactorily. The molded washer seal for use on the new rods is being fabricated by a vendor. Several prototypes are expected to be available for testing by the middle of April.

The horizontal rod mock-up in the 189-D Laboratory is still being modified to permit the design testing of the K rod. Several of the components have not yet been received from the vendors and completion of the mock-up may be delayed pending their arrival.

Vertical Rod Studies

The built-up washer seal installed on VSR-16C continues to operate satisfactorily. No leakage or apparent damage has occurred to date. This seal has now been in service approximately six months and will be inspected during the next shutdown.

The molded washer seals for the K vertical rods were tested during the month and a report presenting the data obtained is being prepared.

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The design test for the K Pile Ball 3X system was continued during the month. Alterations have been made to the tripping mechanism to permit it to function properly, and suggestions made to have the vendor alter the design. Measurements of the ball flow rates have been made to determine the times required to fill the slot with the rod full in, the rod half in, and full out. Times have also been obtained for the first balls to reach the bottom of the graphite slot for all positions of the rod. The amount of force required to remove the rod from the ball filled slot has also been measured.

Supplemental Control

The report on the BF_3 Supplemental Control system is being issued as of the end of the month. Further development work on several of the aspects of adapting this system to supply additional control to the old piles is being started.

The evaluation of the suggested pile flooding procedures for nuclear control under disaster conditions was continued during the month. A report outlining the conclusions derived has been prepared and will be issued shortly.

Process Tube Assembly and Piping

Some progress was made in the program to determine maximum allowable tube inlet pressures during the month. The last phases of the out-of-pile test work will be completed shortly.

The design test on the Cross-Header Strainer Pressure Drop was performed during the month. All test work has been completed and pertinent data transmitted to Design Section. A final report discussing the test in detail is being prepared.

Results from some of the samples being heat-treated under the design test to determine the effects of temperature and irradiation on the rubber bellows for K Pile gun-barrels have indicated that these seals will be unsatisfactory for use on the rear face. Several high temperature resistant neoprene formulations have been suggested for this use and orders placed with a vendor to supply the new seals.

Flexure testing of various connector designs for K Pile continued during the month. Other connectors for use as replacements on the rear face of 105-C were flexure tested during the month but a satisfactory one has not yet been developed.

A design has been started for a new pigtail flexing device which will permit greater deflections than are presently available and also provide for installation of nozzles. The new tester will permit the use of various lattice spacings, and high pressure, high temperature flow for study of vibrational problems.

Materials Testing Reactor Test Facility

With the exception of the flow controller, pressure recorder, and flexible hoses, all of the equipment for the Materials Testing Reactor Test Facility has been received. Assembly of the mock-up is proceeding on schedule and is now approximately 80 per cent complete. It is expected that testing can start early in April. Preparation of the operating manual has also been initiated.

Physical Constants Testing Reactor

Minor revisions were made to the prototype model of the horizontal control-safety rod prior to the initial testing. A completely new arresting mechanism for the vertical safety disks is being fabricated. Design of the carriage for the movable front face section was delayed pending selection of a suitable driving motor and mechanism. Design of the flux leveling device continues. The final plan, view, and elevation drawings of the reactor packing were received from Design Section during the month and approved. Architectural drawings for the building to house the reactor are expected to be ready for approval early in April.

Other Engineering Development Work

Fabrication of the core boring device for the Graphite Sub-Units continued during the month.

Process tube examination equipment for the B and C Basins is awaiting installation. The completion of these areas will leave only H Area to be equipped. A new saw design is being made to permit cutting of badly warped and bent tubes.

Exposure of the samples for the rubber testing program continued during the month. Preliminary results have indicated those compositions which are worthy of more detailed study and are suitable for possible application on the piles.

Assistance was provided during the month on the preparation of design criteria and preliminary drawings for the application of television to budget item B-2116 Discharge Area Viewing Facility. In view of the recent operational difficulties at B Area the possibility is being studied of incorporating a counter to work in conjunction with the television camera for the location of lost fuel elements.

PILE GRAPHITE STUDIES

Graphite Oxidation - Production Test 105-532-E

As part of the general program for monitoring graphite burnout under conditions of actual pile operation, samples have been prepared and will be charged into DR and F Piles. Samples will be charged into process channels 2577-DR and 0965-DR on April 2. Samples will be charged into 1075-F at the conclusion of Production Test 105-514-E.

Radiation Induced Reactions

Samples of the systems graphite and carbon dioxide, graphite and oxygen, and carbon monoxide contained in revised quartz tubes were discharged from 0776-H on March 5. These samples are being stored at H Pile until radiation levels decay to a tolerable working level. A new series of samples has been prepared and will be charged on the forthcoming shutdown. Samples of the following systems have been prepared: (1) graphite, nitrogen, water vapor, (2) graphite and liquid water, (3) graphite and a mixture of 70 per cent CO_2 and 30 per cent He, (4) aluminum and carbon tetrafluoride, and (5) carbon tetrafluoride.

High Temperature Burnout Experiments

During the month Production Test 105-536-E, "Higher Temperature Graphite Burnout", was issued. It is the main objective of this test to obtain graphite burnout data at temperatures of about 600 C and under flux conditions equivalent to a full pile J-N loading operating at tube powers in excess of 600 kw/ft. Special perforated gun barrels have been prepared to insure adequate gas flow over the graphite samples. A single birdcage, with no lead wires, fabricated from zirconium will be charged on the scheduled shutdown at C Pile on April 5. In the initial operation of the 13-tube diamond array of J-N material as authorized under Production Test 105-562-A and Production Test 313-105-35M, the following conditions have been observed:

1. The maximum graphite temperature in the center of the diamond array as measured by the 2285-10 thermocouple varies from 500-575 C. This variation is in part due to the variation in helium concentration 25-40 per cent.

2. Tube powers within the diamond array vary between 600-650 kw/tube as compared to those tubes outside both the array and bumper zone at 750-800 kw/tube.

3. Removal of the poison column in tube 2782-C would increase diamond tube powers and thus raise the diamond graphite temperature.

Pile Operation

Present estimates indicate that a net loss of 90-100 ih resulted from the ruptured HSR thimble at F Pile on February 22. On February 24, process channel 1075-F was mined over the central eight feet. Spectrographic analysis of the powdered graphic samples indicated from 0.1-0.5 ppm. boron contamination. This was considered to be insignificantly above purified graphite. On March 19, at the request of Operations Sub-Section, process channel 1776-F was mined over the central eight feet. Spectrographic analysis of these samples indicated a boron contamination of 50-600 ppm, thus definitely confirming the presence of boron as a result of the ruptured rod and thimble. From these data, it is estimated that the boron contamination is concentrated in a semi-circle of about three feet radius under the HSR channel.

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Also on March 19, the floor plates under the #8 HSR channel were cut and partially removed. Additional plates were removed on March 29 on an unscheduled shutdown. At the present time 46 out of a possible 85 plates have been removed. Analysis of samples from these plates should further confirm the boron contamination.

GRAPHITE DEVELOPMENT

Factors Influencing Machinability of Graphite for Future Piles

Artifical graphite varies in machinability from material which cannot be machined to easily machinable products. The cost of machining and producing graphite for new piles makes it profitable to determine factors in graphite preparation which influences machining characteristics. A separation and study of certain of these factors has been made. The materials used were produced by the Battelle Memorial Institute in a cooperative program with Hanford. Machinability was determined at Hanford.

For molded graphite made from Texas coke and standard pitch, the following conclusions have been reached:

1. Variation with Temperature of Graphitization

   The materials graphitized at a maximum temperature of 1800 C to 2700 C have been tested for machinability. Graphite prepared to 1800 C is at the borderline of machinability for present methods of machining. Machinability increases with increasing temperature of graphitization. Material graphitized at 2000 C is definitely machinable.

2. Variation with Density

   All material in this series was graphitized at 2500 C. Density varied from 1.32 to 1.84. The material became increasingly difficult to machine with increasing density and graphite with a density of 1.84 is on the borderline of machinability. Cross comparison of the curves obtained for the study of machinability variation with temperature of graphitization indicates that graphites of 1.85 density may be readily machinable if they are graphitized to 2800 C.

3. Variation with Particle Size of Filler

   Using a highly graphitized filler of varying particle size and the same binder, it has been concluded that it is definitely more difficult to machine graphites made with particle size of below 325 mesh.

WATER PLANT DEVELOPMENT

Flow Laboratory Studies

Operation of the two in-pile raw water tubes in 105-D Flow Laboratory continued. No film formation has been experienced after three months of operation. The effluent activity of this water is higher than that of normal

process water and is roughly equivalent to that measured in unchlorinated process water at DR Pile. Film formation previously experienced in the three tubes operating at pH 7.3 stopped when lime addition in the 183-D Water Plant was reinstituted. On two occasions, off-standard water produced in the D Water Plant was detected in the flow laboratory tubes before it caused film in the rest of the pile tubes.

Construction of the 1706-KE Water Studies Semi-Works is proceeding, with much of the excavation completed and some concrete poured.

Plant Tests

The high filter rate test at 183-D continued. Several turbidity surges were handled effectively. During the month, filter rates were increased from 5.5 to 6.0 gpm/sq.ft. Preliminary indications are that operation of the B, D, and F Water Plants at this rate will be satisfactory using all-anthrafilt type filters. Experience shows that very close control of filter plant operation is needed to produce satisfactory water quality under high filter rate conditions.

The lime evaluation test continued at 100-F. As authorized by a production test supplement, small amounts of lime are being added for film control. The acid addition equipment is being readied for use, and a half plant reduced pH test will begin in April. Operation of the chlorine evaluation test at 100-DR was concluded. Discharged tubes and slugs are awaiting examination.

Recirculation Studies

Conversion of the H Recirculation Loop for high temperature operation was completed. Operation was begun with deionized water, an aluminum tube and slug jackets, and an effluent temperature of 125 C. Flow control difficulties prevented reaching higher outlet temperatures during this operating period.

The out-of-pile isothermal loop was down for pump repair most of the month. At month's end, a test was initiated in this system using deionized water at 175 C.

Boiling Studies

Canned 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. After four weeks' exposure, the slugs experienced a slight weight gain and minute pits covered the surfaces. Test conditions were changed as follows: steam quality, 20 per cent; temperature, 190 C, velocity 150 fps. After two weeks' exposure, severe "rib grooving" was observed on the slugs; one slug exhibited a groove one-eighth inch wide and 20 mils in depth, apparently due to chattering. The aluminum dummies were replaced with reject uranium pieces; after one weeks' operation a slight weight gain occurred, and no ribe grooving was apparent. The test is continuing.

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Short runs were made in the out-of-pile steam heated boiling loop, at a calculated steam quality of ten per cent. Safety controls are being added to enable continuous operation of the loop without operator coverage.

Estimated schedules for modification of the H loop for in-pile boiling have been made. Because of extensive equipment modifications required during pile shutdowns, it appears that in-pile boiling tests will begin sometime in July.

PILE COOLANT STUDIES

Corrosion data from the weighed slugs in tubes operating under Production Test 105-9-P and Production Test 105-519-E were correlated by plotting corrosion rate versus calculated surface temperature with specific slug power as a parameter. An interim report describing this correlation is now in preparation. Corrosion specifications based on these data have been submitted for approval. These specifications are a departure from previous practice in that they allow the corrosion limit to be determined by the severity and length of exposure. Similar specifications for J-N loadings are being prepared.

Operation of H and D Piles with outlet water temperatures of 95 C on a production test basis has been satisfactory. No corrosion data were obtained this month.

Data from three tubes operating under Production Test 105-549-A which allows long exposures agree with corrosion data from Production Test 105-9-P and Production Test 105-519-E referred to above.

A production test allowing exposures to 950 MWD/T of large numbers of production slugs is being circulated for approval and will be issued as Production Test 105-539-E.

Tube Examination

Eight pile process tubes were examined during March. An unusual type of damage was observed in tube 0378-F. A leak in this tube occurred at a point where the tube wall appeared to be folded over on itself. The original damage to the tube was undoubledly machanical in nature.

Considerable attack of the 72-S cladding was observed in the rear part of all the tubes examined. It is not yet known whether the corrosion rate so far observed for 72-S aluminum at 95 to 100 C also applies to the 2-S base metal.

Tube 3284-H was removed from a zone in the pile that had been thoroughly wet from a p. evious leak. The outside of the tube showed only a minor amount of corrosion which was not considered serious.

Examination of the stainless steel pigtails from tubes 3387-D and 3388-D, the outlet fittings of which were examined last month for cavitation damage,

showed no pitting attack at all. It does not appear that there is any cavitation attack of the outlet fittings at least up to 93 C.

Laboratory Corrosion Studies

A test, in the minitube apparatus in the 105-D Flow Laboratory, to determine the effect of water velocity on 2-S aluminum corrosion has been operating during the month. Data are being obtained at 95 C and at velocities of 15, 22, 30, and 45 ft./sec. Chattering of the aluminum slugs is suspected to occur at the highest velocity. However, slugs discharged after eight days exposure showed very little damage from chattering.

The minitube mock-up in the 100-D Power House was placed in operation during March. Corrosion data of 2-S aluminum in softened water at temperatures of 115, 135, 155, and 175 C are being obtained.

Initial operation of an apparatus to determine the solution potential and short circuit current data of 2-S and 72-S aluminum under simulated pile operating conditions has shown that reliable data can be obtained with this equipment. The unit was operated isothermally at temperatures up to 100 C. A graphite helix will be electrically connected to provide internal heat for measurement of potentials under heat transfer conditions.

A weighed tube mock-up has been started at temperatures of 90 and 105 C to determine tube corrosion rates. Sections of 2-S, 72-S clad, and 63-S process tubes are being exposed. The 50-tube mock-up is being modified for a long term test of front tube corrosion in low pH, low dichromate water.

A test was conducted to determine the corrosion effects of process water on 2-S aluminum in electrical contact with wet graphite. Preliminary data show that the effect of dichromate is negligible. The attack of the aluminum was observed to be more severe at 75 C than at 25 C. Additional testing is necessary before final conclusions can be drawn.

An inspection of steel samples immersed in effluent water was used to make recommendations for the pretreatment of the 107-K effluent tanks. It was recommended that the tanks be sandblasted but not coated. This treatment is expected to provide a service life for the tanks considerable longer than ten years.

The construction of the natural convection loop to operate up to 300 C is being completed. The loop should be in operation some time in April.

A flow laboratory test of three cold pressed slugs with drilled pin holes is being carried out. The manner in which the rupturing of the slug takes place will be determined in a glass tube system.

TECHNICAL LIAISON

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KE Loop

A rough draft document concerning the applicability of recirculating water cooling systems to Hanford piles was completed and circulated for comment. Estimates were made of: (1) the probable limits placed on the rate of heat removal by single pass coolant operation, (2) the potential rates of heat removal by recirculating coolant operation, and (3) the relative costs of utilizing the full potential of the two systems. The conclusion was reached that the higher power levels potentially attainable with recirculating coolant systems provide incentive and justification for a program of high pressure, high temperature, recirculation studies.

A summary of the information developed in this report was prepared for consideration by Section and Department management as justification for the proposed KE Recirculation Test Facility. Approval was given for resubmission of the proposal to modify the CA-512-R Project to include this facility. The necessary information was furnished to the Project Proposal Sub-Unit for the preparation of the project proposal, which is scheduled for AEC consideration on April 1.

Project Representative's Activities

Three CA-512-R Project Representatives' Meetings were held during the month. Approval was given to a molded, washer-type silicone rubber seal design for the vertical and horizontal rods. It was recommended that if possible, large gage thermocouple wire be used for the KE Pile graphite thermocouples to improve the potential service life. Suggested replacement of the 24-point graphite thermocouple recorder with a 272-point recorder to scan and record all the active zone graphite thermocouples was not approved. Other items considered included poison charge-discharge equipment design and cone screen elimination or redesign.

CG-558 Project Representatives activity was mainly concerned with the replacement horizontal rod design and procurement.

U^{233} Production Costs

An estimate was made of the cost of producing U_{233} in the Hanford piles by means of full pile J-1066 loadings. Best available estimates of raw material, handling and processing costs of fuel, target, and product were obtained. About 80 per cent of the calculated unit cost is fuel charges, including the basic cost of the U_{235}, conversion to the form of J slugs, recovery of the depleted U_{235}, and reprocessing to the original isotopic concentration. Due to the substantial fuel charges, the unit cost is quite sensitive to the degree of U_{235} burn-up allowed during pile residence. Increasing discharge exposure from 100 MWD per tube to 200 MWD per tube would decrease unit costs by approximately 26 per cent. It appears that this material might be competitive with low exposure plutonium if goal exposures of 200 MWD per tube or higher could be tolerated.

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Reactor Safety Project

Representatives of North American Aviation, Inc., visited HAPO this month to carry out test pile reactivity measurements necessary for predicting safety element performance, and to plan in-pile performance tests of prototype safety elements. Test pile work was done by members of the Experimental Physics Sub-Unit. Discussions of in-pile test problems were held with Heat Transfer and Special Irradiations Sub-Unit personnel who have had experience with similar problems.

SPECIAL IRRADIATIONS

The creep rate of three samples of nickel has been studied in an in-pile experimental assembly (KAPL 105) charged in F Pile January 31. In general, the creep rate has decreased the exposure to pile radiation. At this date, one sample has ruptured and the remaining two are exhibiting erratic behavior.

Information has been received from KAPL that the control rod and shielding cans containing boron carbide (KAPL 114) and irradiated in C Pile show no gross deformation that will interfere with SIR performance. Free helium in the cans resulting from boron fission was reported to be approximately 20 per cent of the theoretical amount. Of the two germanium crystals being subjected to fission bombardment (KAPL 118), one has failed and the second is continuing to gradually increase in power (of the order of microwatts). The crystals were charged in F Pile January 31.

The new flowmeter has been installed on the high-pressure, high-temperature recirculating tube (KAPL 120); the DP Cell to be used in conjunction with this flowmeter is being installed. The new saturation scram meter replacing the old Bailey-type scram meter is essentially complete. The loop was subjected to a trial operation after the installation of the flowmeter and was found to operate satisfactorily. Plans are being made to pull the in-pile tube assembly in July. This removal is necessary to avoid melting the aluminum thimble around the in-pile tube if H Pile graphite limits are raised.

Operational difficulties at F Pile necessitated premature discharge of 30 of the Savannah River thorium slugs being exposed to study dimensional stability (DPI 103). Thirty-two slugs now being irradiated in B Pile will be discharged after a six-month exposure.

P-10 slugs made of Savannah River aluminum have been charged in C Pile to determine activities that will be encountered in future operational processes. Foils made from materials from these slugs have been exposed in

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H Pile to determine if the high activities encountered in these materials in the past is a property of the aluminum or of the lithium alloying process. Preliminary data indicate that the source of the activities is the aluminum.

Continued delays in the arrival of the zirconium process tubes have been reported. Equipment being fabricated for in-pile testing of these tubes (HAPO 110) will be ready by May 1. A guillotine has been manufactured which will readily cut the tubes as required for discharge procedures.

Anticipated high temperatures in H Pile will require the removal of the Snout Facility in the Y Test Hole. A new facility (HAPO 126) is now being designed for a replacement.

Routine irradiations in support of research and development programs and isotope production continue.

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
D. C. Pound	"The Exponential Rate Pulse Generator"

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

RBR:mvt

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HW-31267

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SEPARATIONS TECHNOLOGY SUB-SECTION

MONTHLY REPORT

MARCH, 1954

[redacted]

VISITORS AND TRIPS

W. J. Gardner visited here from North American Aviation Company, Downey, California, March 29, 1954, to discuss analytical procedures.

B. Weidenbaum and W. W. Wright visited here from Dow Chemical Company, Denver, Colorado, March 24 through 26, 1954, on slug manufacturing, canning operations and 234-5.

G. B. O'Connor visited here from duPont, Savannah River Plant, March 17, 1954, on product purity.

M. Kreitzer visited here from the Washington AEC, March 26, 1954, on general discussion of technical matters.

F. Vance visited here from Phillips Petroleum Company, Arco, Idaho Falls, Idaho, March 15, 1954, to discuss continuous dissolution.

H. H. Bulkowski and A. E. Aletti visited here from Catalytic Construction, Oak Ridge, Tennessee, March 16 and 17, 1954, on solvent extraction process and equipment discussions.

Roy Anderson visited here from FMPC - AEC, March 16 and 17, 1954, on solvent extraction process and equipment discussions.

L. Weber visited here from Mallinckrodt Chemical, St. Louis, Missouri, March 26, 1954, on solvent extraction and calcination.

J. B. Tinker visited here from duPont, Savannah River Plant, March 9, 1954, on hot pumps and flow.

K. J. Schneider attended the American Chemical Society Meeting, Kansas City, Missouri, March 24 through 28, 1954.

P. B. McCarthy visited Stearns Roger Manufacturing Company, Denver, Colorado, to witness purex pulse generator tests on March 12 and March 22 through 24, 1954, respectively.

ORGANIZATION AND PERSONNEL

Personnel totals are as follow:

	February	March
Administrative	2	2
Chemical Development	74	74
Plant Processes	49	48
P-10 Process Studies	9	9
Analytical Laboratories	34	34
Total	168	167

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Plant Processes: One Stenographer was retired.

Analytical Laboratories: One Technical Graduate - Rotational was transferred in from Technical Information Group and one Laboratory Assistant "A" was terminated.

PUREX DEVELOPMENT

Purex Plant Design Liaison

1. Specifications for 2A Column interface control instrument components were transmitted to the Purex Project Unit. The specifications provide details related to both air-purge and capacitance probe type of interface detection systems to be installed on the 2A Column.

2. Comments were issued to the Design Section relative to suggested bubble-cap design and method of cap installation for the low-pressure Purex nitric acid fractionator.

Chemical Engineering Development

Three-Inch Pulse Column Studies - With a liquid-liquid system involving a relatively high heavy-phase flow and a relatively low light-phase flow it is generally advantageous to use a bottom interface position and to make the column internals (plates or packing) out of a material preferentially wetted by the light (i.e., continuous) phase. This bottom-interface operation, in conjunction with the use of one-inch fluorothene (organic-phase wetted) Raschig-ring packing, has been specified for the Purex Plant 2A Column, where the extraction section aqueous (heavy) phase flow is 4.5 times the organic flow (by volume, in accordance with Purex Chemical Flowsheet HW #2). An investigation of the extent to which the favorable performance characteristics of a 2A Column of the above-mentioned design could be approximated with all-stainless-steel column internals, with the interface either at the top or at the bottom, was the objective of a series of 2A Column studies. Fifty-eight 2A Column extraction section and 15 2A Column scrub section runs were made in a three-inch diameter glass pulse column, with "cold" uranium used as a stand-in for plutonium.

The four designs described below appeared operable with the interface at the bottom; the rings appeared operable with the interface at the top or bottom. None of the designs duplicated the excellent performance over the wide range of operating conditions characteristic of bottom-interface operation with one-inch fluorothene Raschig rings. (For details see HW-31350, Chemical Development Unit - Progress Report for March, 1954.)

The following four stainless-steel internal designs were tried in a three-inch 2A pulse column:

(a) One-inch stainless-steel Raschig rings. (These tests supplemented earlier results.)

(b) "Nozzle" plates with 23 per cent free area, 1/8-inch diamter holes, 1/16-inch deep nozzles (indentations) pointing down, two-inch plate spacing.

(c) "Nozzle" plates with nine per cent free area, 0.12-inch diameter holes, 0.04-inch deep nozzles pointing down, four-inch plate spacing.

(d) Louver plates with two louvers per plate giving a 23 per cent total free area, louvers oriented upwards, six-inch plate spacing. The louvers were arranged radially, imparting a swirling motion to the column contents as they were pulsed.

Purex Technical Manual

On March 25, the preparation of the Purex Technical Manual was approximately 18 per cent complete.

Mechanical Development

Pump Development - A Magnaflow, Model B, 3/4-hp., axial flow, "canned" motor pump has operated on life test for 8800 hours pumping water at 13.5 gallons per minute against a discharge head of ten feet. This pump is equipped with Graphitar bearings and stainless-steel journals.

Acceptance Test of Purex-Plant Pulse Generator - An engineer in Mechanical Development witnessed part of the acceptance testing of the first large (Size 2) Purex Plant pulse generator at the Stearns-Roger plant in Denver. Operation of the unit was very smooth except for a light knock which was attributed to backlash in the drive gears and large clearances in the spherical roller bearings on the cam shaft. The backlash in the drive gears will be reduced by decreasing the tooth clearance between the gears. Leakage rates of process solution past the piston were low: e.g., 0.3 to 0.6 gallons per minute.

Instrument Development - Interface Control - An air-purged dip-tube interface control system for the Purex 2A Column was found to operate satisfactorily if each air line enters the side of the "beaver tail" bottom disengaging section through a volume chamber and a restriction. The volume chamber consisted of a five-inch length of three-inch diameter pipe and the restriction was a six-inch length of rod drilled and reamed to 0.305-inch diameter. The drilled rod was welded flush to the side of the volume chamber at the bottom and extended three inches into the beaver tail.

Further tests are being conducted to develop a capacitance probe which can be replaced by remote maintenance in the event of failure of the probe.

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Materials Testing

Nitric Acid Fractionator Corrosion Studies - A pilot-plant nitric acid fractionator was operated under total reflux for 175 hours, in two runs, fractionating nitric acid at 100 to 110 mm. Hg absolute pressure at the top of the fractionating column. Steam pressure was 21 lb./sq.in.ga. and the boiling 60 per cent acid temperature was 160 to 165 F. Fresh 60 per cent HNO_3 was charged to the fractionator at the beginning and end of the day shift. Weight loss from the Type 347 stainless-steel heat-transfer surface was not detectable (corrosion rate less than 0.001 in./mo.). With comparable operation at atmospheric pressure, the corrosion rate for this tube was 0.013 to 0.018 in./mo.

Corrosion of Type 347 Stainless Steel Nozzle Plates - Specimens of Type 347 stainless-steel "nozzle" plates and Type 347 sheet were subjected to the Huey test to determine the effect of cold working on corrosion resistance. The nozzle-plate specimens had 3/16-inch holes, 23 per cent free area, with a 1/16-inch indentation on each hole. The control specimens were cut from the same sheet of steel used for fabrication of the nozzle-plate specimens. The average corrosion rates for the nozzle plates and the control specimens were identical, 0.0010 in./mo.

Flexural Fatigue of Kel-F - A flexural fatigue tester has been built to evaluate the useful life expected from the perforated Kel-F plastic plates specified for the Purex Plant HC, IC, 2E, IO, and 20 Columns. Unirradiated, perforated Kel-F coupons currently under test have not failed after 2×10^7 cycles of flexing at an average maximum stress (calculated) of 600 lb./sq.in. This is estimated to be 10 to 20 times greater than the stress which will be set up in the perforated Kel-F plates in the Purex Plant Columns. Flexing for 2×10^7 cycles corresponds to about 160 days of operation in Purex O-type and C-type columns.

Irradiation of Kel-F - The irradiation of 32 Kel-F test coupons (four sets of eight coupons) by immersion in fresh Redox-Plant dissolver solution began on March 22 by Process Chemistry. Samples will be exposed to total radiation dosages of approximately 10^6, $10^{7.5} \times 10^7$, and 10^8 R (beta plus gamma). After irradiation the samples will be tested by Radiometallurgy to determine the effect of radiation on physical properties such as tensile strength, hardness, and flexural fatigue.

REDOX DEVELOPMENT

Process Chemistry

Behavior of Mercury in the Redox Process - A series of laboratory tests was carried out with a view to determining whether any process difficulties would arise in the Redox Plant if mercury-catalyzed dissolving of the irradiated uranium slugs and aluminum jackets were employed. The tests

indicated (a) no adverse effect on $KMnO_4$ half-life in head-end treatment; (b) no effect on uranium distribution in solvent extraction; (c) no significant volatilization of mercury during uranium solution concentration; and (d) quantitative removal of mercury from hexone by distillation of the solvent.

Neutralized Waste Properties - Laboratory studies have been continued on the effects of temperature and caustic concentration on the properties of Redox neutralized wastes, to aid in planning improved procedures for handling these wastes in the neutralizer and for transporting them to the underground storage tanks. As excess caustic is added beyond that amount stoichiometrically required for neutralization, the freezing point of the solution (i.e., temperature of formation of first solids) increases, but the tendency for gradual decomposition of the metastable sodium aluminate, followed by the slow deposition of solid alumina, is decreased. The amount of this solid alumina formed, both on neutralization and after subsequent aging, is less at higher neutralization and storage temperatures, and the solids formed at these elevated temperatures are of a crystalline structure more favorable to slurrying and pumping.

Mechanical Development

Materials Testing

Corrosion in Mercury-Catalyzed Dissolving - Stainless-steel and titanium coupons which were exposed in the 321 Building pilot-plant dissolver during the mercury catalyzed dissolving tests reported in January, have been examined by the applied Research Sub-Section. Samples were exposed in both the liquid and vapor phases for 95 hours. No intergranular attack was evident on any coupon. Pitting could not be determined due to imperfections in sample surfaces prior to exposure. The corrosion rates for specimens of Type 304-L, 309-SCb, and 347 stainless steels and for titanium were all well below 0.001 in./mo.

URANIUM RECOVERY DEVELOPMENT

Process Chemistry

Two-Cycle Mixer-Settler Runs - The first of a series of two-cycle runs under TBP-HW #6 Flowsheet conditions has been completed in "Mini" miniature mixer-settlers using current T-Plant waste (7-3-WS) as feed. The data indicate a satisfactory product RCU (gamma activity about 80 per cent of aged natural uranium) may be obtained through two cycles. The comparison of first extraction cycle operation at 25 C with that at 50 C is not considered conclusive; however, a two-fold improvement in both gamma decontamination and uranium waste loss appears to be indicated at the higher temperature. High Zr-Nb decontamination attained across the first cycle (logarithmic dF = 3.23) is attributed to the presence of phosphate in the feed.

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Since the processing of unneutralized T-Plant waste requires a high feed acidity (approximately 5 M HNO_3) to maintain a satisfactory net salting strength, ($K^{1/2}NO_3$ value), it may be possible to achieve a more economical method of processing by blending with aged metal waste. Future laboratory runs on current T-Plant waste will be made on this basis.

Recycle of Nickel Ferrocyanide Scavenger Precipitate - Separations Section (Manufacturing Department) personnel are interested in using the waste tank in which the nickel ferrocyanide scavenging was carried out, for the storage of additional waste uranium from T Plant. The tank still contains, however, an estimated 50 per cent of the original precipitate.

To determine the effect of this inclusion of $Ni_4Fe(CN_6)$ scavenger precipitate in neutralized metal waste on subsequent uranium recovery by solvent extraction, a sample of RAW was scavenged in the laboratory and the precipitate was added in varying amounts to acidified plant RAF solution. Only slight dissolution of the $Ni_4Fe(CN)_6$ occurred and no HCN evolution was noted. Centrifugation for one minute at 1000 G produced a clear RAF not inferior to unspiked "normal" RAF in phase disengagement and rate of uranium transfer characteristics. Mixer-settler runs indicate that no adverse effect on decontamination is to be expected at any anticipated RAF/$Ni_4Fe(CN)_6$ ratio. Feed analyses indicate that little or no desorption of Cs^{137} occurred on acidification of the $Ni_4Fe(CN)_6$ precipitate.

RCU Filtration - Operation of the TBP Plant stripping columns at an elevated temperature (approximately 55 C) has materially reduced the amount of entrained organic phase in the RCU, producing a clear solution with only a few "lenses" or organic phase floating on the surface of the sample. However, filtration studies on the RCU have continued to show that an average gamma decontamination factor (arithmetic) of 1.5 to 2 may be obtained by filtration through paper, glass wool, sintered stainless steel, or sintered glass, and by centrifugation. However, no method short of dissolution of the filter media was found for cleaning the sintered stainless-steel or glass filters. This difficulty of cleaning, along with the fact that several widely different media were effective, is believed to indicate that the mechanisms involved is the filtration of a small amount of refractory solids rather than a surface adsorption phenomenon. Such solids exist in quantity in the 276-U Building organic batch wash tanks. Contingent upon break-through studies now in progress, a disposable filter (ceramic or glass wool) may be suitable for RCU filtration. Such a filter may also be adaptable for supplementary separation of an organic phase from the second-cycle aqueous feed in two-cycle operation.

Fe(II) Stability in RAIS - The stability of Fe(II) in RAIS was determined as a function of nitric and sulfamic acid concentrations and temperature. The results indicate that Fe(II) is not sufficiently stable at 25 C in nitric acid concentrations exceeding 6 M to maintain a ferric/ferrous ratio equal to or less than unity with an RAIS holdup time of 15 hours (corresponding to a 5-ton U/day processing rate). At 50 C, the acid concentration

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is limited by the Fe(II) stability at about 4 M HNO_3. It was found that the oxidation rate of Fe(II) in 8 M HNO_3 at 25 C was reduced by a factor of 2 by increasing the sulfamic acid concentration from 0.2 to 0.3 M, but that an increase in NH_2SO_3H concentration from 0.2 to 0.4 M reduced the Fe(II) oxidation rate only by a factor of 2.5.

On the basis of these data, high acid and/or high temperature RA Colum operation will require the use of oxalic acid as the Pu partitioning agent. The efficiency of oxalic acid for this purpose is currently being investigated under high-acid flowsheet conditions.

Continuous Calcination

Further studies on the continuous screw-type calciner were made. The operation has not, as yet, succeeded in producing material satisfying specifications.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

Thorex Process Studies

Document HW-31131, "Thorex Process Study Flowsheets", was issued. This document includes six preliminary study flowsheets developed for a possible Hanford Thorex Plant. This document also includes a number of process questions which must be resolved by research and development studies before firm design flowsheets may be specified. Two additional study flowsheets are currently in preparation. The Tentative Thorex Study Flowsheet #7 depicts the proposed flowsheet conditions if the thorium fuel elements are "cooled" for approximately one year before processing in the Thorex Plant. Since the protactinium remaining in the fuel elements after 300 day's "cooling" is 0.03 per cent or less of the U^{233} content, recovery of this Pa is not necessary, although it must still be decontaminated away from the U^{233} and recovered thorium products and sent to waste along with the radioactive fission products. On the #7 Flowsheet, nitric acid is used as salting agent instead of aluminum nitrate (ANN), and the flowsheet conditions are generally quite similar to those used in the Purex process.

The following chemical and waste storage costs have been estimated for the #7 Thorex Flowsheet:

	$/Ton Th Processed
Chemicals	$185
Process Steam	273
Waste Storage (36 ¢/gal.)	62
Total	$520

The #8 Thorex Flowsheet depicts proposed chemical conditions for processing Thorex fuel elements "cooled" for 100 days. The flowsheet is quite similar to the #5 Tentative Thorex Flowsheet presented in HW-31131. However, instead of employing a solvent extraction cycle to reduce the Pa stored waste to a small volume, the acidic waste from the first solvent-extraction column (containing essentially all the Pa) is sent to waste storage after concentration. Some thorium is sent along with this waste to prevent a slow-neutron reaction in the storage tank in the remote event of precipitation of the U^{233} formed by decay of the Pa^{233}. After a storage period of approximately ten months, the U^{233} (resulting from Pa decay) in the stored waste is recovered by reprocessing through the Thorex Plant. Preliminary costs for chemicals, process steam, and waste storage for the #8 Flowsheet total approximately $900/ton of Th processed, compared with the $520/ton, above, for #7 Flowsheet.

Thoria Processing - Document HW-31261, "The Feasibility of Processing Irradiated Thoria in the Thorex Plant", was in the process of issuance at the month's end. This document discusses the effects on the capital investment and operating costs of a proposed Thorex Plant of processing either aluminum jacketed thorium oxide slugs or aluminum jacketed heterogeneous core slugs(*). It is concluded that greater process complexity and costs encountered in processing the slugs containing thoria would be confined to the dissolution facilities.

Cesium Recovery Process Studies - On the basis of a tentative flowsheet supplied by the Chemistry Unit for the recovery of cesium from TBP waste supernatant, order-of-magnitude estimates have been made of the cost of modifying the TBP Plant tank farm process vaults to permit cesium recovery operations. A capital investment of as little as $320,000 would be required to provide the additional facilities necessary for processing TBP Plant waste supernate. (One centrifuge and three tanks in a new 20-foot by 10-foot by 23-foot deep centrifuge vault). However, this low investment cost is accompanied by a high unit cost for the cesium recovered, approximately $2 per curie.

HOT SEMIWORKS

Conversion to Purex

The design phase of the Semiworks conversion (original scope) is now about 99.5 per cent complete, with the design of the experimental waste self-concentrator and the line to "C" Waste Tank Farm approximately 50 per cent complete. All design work is expected to be complete about April 15.

The construction phase of the conversion effort is now approximately 25 per cent complete.

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* A slug containing thorium oxide pellets (approximately 0.1-inch in diameter) mixed into "J" metal (aluminum - U^{235}) alloy.

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URANIUM RECOVERY PROCESS TECHNOLOGY

Tank Farm Activities, Feed Preparation, Waste Handling

Removal operations at three tank farms supplied 89 per cent of the feed processed through the solvent extraction columns. One farm (U) has not shipped any sluiced uranium feed since February 4, 1954, due to a failed Johnston sluice pump which was replaced at the close of this report period. Transfer of BY Tank series supernatant to 104-C for supplemental blending in CR Vault facilities was initiated early in March and is continuing. Combined water sluicing and direct supernatant transfer to blend tanks led to the removal of about 4450 net gallons of stored waste per ton of uranium processed. Water sluicing increased the above volume by about 3230 gallons per ton of uranium. Ninety-seven per cent of the removed uranium was aged a minimum of 3.2 years since pile discharge while the balance, produced during operations leading to the final cleanout of 201-C, was aged about 5.5 years. Major production curtailments, other than at U Farm, resulted from 001-BXR Johnston sluice pump failure (220 hours).

Routine acidification of tank farm feeds required about 11,880 pounds of 100 per cent nitric acid per ton of uranium and was followed by about 62 volume per cent average boiloff in 221-U evaporators. The concentrated feed was fed uncentrifuged to the RA Columns. Non-routine feed handling included processing high gamma RCU through feed evaporators with concentration to about one pound of uranium per gallon (0.5 M) and adjustment to one pound of nitric acid per gallon (2 M), and an increase in tank farm feed nitric acid molarity to 3.7 titratable HNO_3 in an attempt to improve Ru^{106} dF.

About 4270 gallons of concentrated neutralized waste per ton of uranium processed were returned to underground storage at an average pH of 8.6. This salt waste contained about 1.7 per cent of the new feed uranium processed. About 26,800 gallons of low activity waste, containing an additional 0.39 per cent of new feed uranium processed, were routinely cribbed per ton of uranium processed.

Solvent Extraction

Operating Conditions

The uranium processed by the solvent extraction batteries was 93 per cent of the nominal design input, the virgin uranium processed was 83 per cent. Of the total uranium processed, 9.7 per cent was rework RCU, 0.7 per cent 224-U Building rework, and 0.1 per cent RAW rework. Both lines had an on-stream time efficiency of 92 per cent. About two-thirds of the down-time was scheduled for flushing and RCX heat exchanger installation; the remainder was caused by equipment failures in "A" Line. Single-line instantaneous processing rates ranged from 75 to 150 per cent of nominal design rate.

Operations were generally carried out at nominal HW #4 TBP Flowsheet conditions using 20 volume per cent TBP in hydrocarbon diluent as the organic phase and dual-scrub RA Columns. Flow ratios were:

RAS:RAIS:RAF:RAX:RCX

100:100 to 120:80 to 120:90 to 100:60 to 110

Other departures from HW #4 Flowsheet conditions were:

1. The RCX (which contained 0.01 M nitric acid) was heated to about 55 C starting March 9, 1954.

2. Extra nitric acid was added to the feed, starting March 12, 1954, to give a ratio of nitric acid to uranium of 3.5 lb./lb. Resultant RA Column feed-point acidities were about 3.4 M (HW #4 Flowsheet concentration 2.7 M).

3. The RAIS nitric acid concentration was increased from 4 to 6 M on March 24, 1954 with resultant RA Column feed-point acidities of about 3.7 M.

Process Performance

RAW losses averaged 0.3 and 1.1 per cent of the total feed uranium on "A" and "B" Lines, respectively. Steady-state operation at less than 70 per cent pinching L/V resulted in losses less than 0.5 per cent whereas at 70-75 per cent of pinching L/V, losses were about 1.0 per cent. Losses over 1.0 per cent were generally caused by high uranium feed rates or column upsets. The magnitude and duration of these transient high waste loss periods depended directly on the per cent of "pinching L/V." The difference in average loss between lines was not unexpected since "B" Line operated about six per cent closer to "pinching L/V" than "A" Line. The "B" Line RAW loss was not significantly different at RA Column extraction section volume velocities from 360 to 730 gallons per hour per square foot.

RCU rework was processed through "A" Line at over 80 per cent of "pinching L/V" with RAW losses which averaged 0.06 per cent of the feed uranium.

RCW losses averaged 0.5 per cent at RCX flows of 100 percent or greater and with the RCX at ambient temperature. On the otherhand, RCX losses were only 0.01 per cent at RCX flows as low as 60 per cent after heating the RCX to about 55 C. At the close of the report period, RA losses accounted for 98 per cent of the over-all solvent extraction losses.

Gamma dF's ranged from 4.5 to 4.0, as feeds varied from supernatant-rich to slurry-rich, giving RCU gammas of about 180 to 340 per cent of aged natural uranium. Significant variances in over-all gamma dF may be attributed mainly to variations in feed ruthenium activity. For either slurry-rich (low Na/U ratio) or supernatant-rich (high Na/U ratio) feed the decontamination

from cesium, the major gamma emitter in the feed, appears to be adequate to give less than five per cent of the total gamma activity in RCU with the balance being essentially Ru^{106}. Slurry-rich feeds, however, may contain up to three times as much Ru^{106} per unit of uranium and consequently, assuming a constant ruthenium decontamination factor, a three-fold variation in RCU gamma activity may be expected. No significant change in over-all gamma dF, for feeds of comparable composition, has been realized as a result of changes in RAX flow from 90 to 110 per cent of HW #4 Flowsheet. Extra nitric acid employed in feed and in scrub has not been evaluated for slurry-rich feed since all feed processed under higher acid conditions has been supernatant-rich. Actual ruthenium decontamination factors under higher acid conditions are being investigated.

A major fission product separation from uranium is fortuitously accomplished in the RC Column. Average material balance data across the RC Column show that from 80 to 96 per cent of the activity (nearly 100 per cent Ru) in RCF (RAU) remains with the solvent waste stream (RCW), giving an RC Column dF from 0.7 to 1.4 This dF appears to be independent of temperature and slightly higher at low aqueous to organic ratios indicating firmly fixed ruthenium species in the solvent. The importance of maintenance of high solvent quality and low residual activity is thus clearly indicated, and the requirement for segregation of very high ruthenium activity solvent (e.g., green-feed first cycle) from contact with final product stream is implied.

Plutonium, metallic impurities, and HNO_3 in RCU product averaged 3.9 parts per billion parts of uranium, 130 parts per million parts of uranium, and 0.01 lb./gal. (0.02 M), respectively.

Solvent Treatment

Essentially no batch treatments were employed on the solvent during the report period. Three weight per cent Na_2CO_3 continued in use both as ROS at an L/V = 0.06 and as a wash in the ROO Tank at an L/V = 0.1. Average uranium and gamma dF's were 1.3, and 0.6, respectively, giving RAX at an average of 1×10^{-5} lb. U/gal., and 20 gamma microcuries per gallon.

Consumption of diluent and TBP dropped sharply to 5 and 8.3 gallons per ton of uranium processed (as against 79 and 15.5 per cent for the last report period), reflecting improved operation, less batch washing, and possibly better phase disengagement due to the higher operating temperatures resulting from use of hot (55 ± 5 C) RCX.

Equipment

Major equipment changes included the installation of a heat exchanger to raise the temperature of RCX to 55 ± 5 C. One feed pump failure, P-19-6 ("A" Line RAF) required 15 hours down time for replacement.

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Capacity

On March 29, operation of "B" Line was successfully maintained at 8.5 tons per day with gamma dF, RA losses, and RC losses at about 4.3, 0.4 per cent, and 0.01 per cent, respectively. Limitations at these rates were those expected, viz., RAS at 5 gallons per minute giving 91 per cent of flowsheet water scrub flow and RAW let-down valve wide open at about 33 gallons per minute. The RC Column was operated at 60 per cent RCX, heated (55 ± 5 C) and exhibited excellent performance.

URANIUM CONVERSION, ACID RECOVERY PROCESS TECHNOLOGY

Summary

Routine stripping and concentration operations were carried out to provide 100 per cent UNH feed containing about 57 per cent TBP and 43 per cent Redox source uranium as feed to calcination furnaces. Calcination operations produced 86.0 per cent of design capacity UO_3 at average values of 10 per cent ANU beta, 80 per cent ANU gamma, L 5 parts plutonium per billion parts uranium, and 114 parts metallic impurities per million parts of uranium. Two carloads slightly exceeded 100 per cent ANU gamma at 105, and 103 per cent. Tests of sulfamic acid as an additive to improve reactivity confirmed an optimum value of about 0.1 weight per cent (uranium basis) but an attempt to produce a carload lot for customer testing resulted in serious pot caking and deferment of carload production pending further study. Pot radiation continued high at an average of about 60 mrad/hr.

About 950 pounds of 100 per cent HNO_3 per ton of uranium calcined were removed for use in tank farm blending operations.

Steam Stripping, UNH Concentration

Modification of auxiliary steam feed to T-B-4 stripper to permit coupling with E-D-1 (6 to 60 per cent evaporator) included removal of the two-inch restrictions on March 10, 1954. An increase of approximately 20 per cent in available steam flow resulted and no pot foaming has been experienced since this change. Initial values of DBP in RCU show about 1.9 parts DBP per million parts of solution.

The 60 per cent UNH concentrator, E-D-1, operations were routine.

The 60 per cent UNH concentrator, E-B-1, failed for the fifth time and 18 tubes were found to be leaking. These tubes were plugged giving a total of 37 plugged tubes or about five per cent of the original 751 tubes. Radiation levels of up to 5700 mrad/hr. were encountered during evaporator repair and these values were reduced to 20 to 700 mrad/hr. by permanganate decontamination treatment, and shielding. Ninety-five per cent of the fission product activity associated with sludge removal from the failed evaporator was found to be due to ruthenium.

The 100 per cent UNH concentrator, E-D-6, was operated routinely to produce UNH at 9.3 to 10.2 lb. U/gal. for feed to calcination pots.

Calcination

Routine operations were carried out employing about 103 average per cent of nominal uranium charge weight per pot.

Reactivity improvement tests were carried out at sulfamic acid to uranium weight per cent ratios from .09 to 0.13 in six charges. An attempt to produce a carload of UO_3 using the 0.09 weight per cent sulfamic acid value anticipated to be about optimum for operability and reactivity improvement resulted in caking of six of the 18 pots thus charged. Reduction to 0.08 weight per cent sulfamic acid did not improve caking characteristics and the test was deferred. No direct correlation of either product quality or operating conditions exists at present to indicate the reason for the caking experienced and plant and laboratory studies are continuing in an attempt to define and minimize conditions leading to caking.

A single test of sulfamic acid as a foam-inhibitor did not support an earlier qualitative observation that when sulfamic acid is present less foaming is likely to occur.

Fume Recovery, Ventilation, Unloading

Continued satisfactory furnace vacuum was maintained at about 3.5 inches H_2O. When one new 8-foot diameter Luckey pot was operated at about twice the expected boiloff rate, using water as the pot charge, this value dropped to about two inches H_2O. At two inches water vacuum no serious problems are expected to be encountered due to oxides of nitrogen in the ventilation system or in the operating area.

The first X-11 bag failure since January 7, 1954, occurred on March 13, 1954, (66 day) due to rupture of one bag.

An orlon fiber bag, replacing wool in the unloading system has given satisfactory service since February 1, 1954, (54 days to report date) whereas wool bags averaged about a 12-day service life. There is some evidence to indicate that orlon may not have as high a dust removal efficiency as wool (based on fiber glass filter (X-12) pluggage) and comparative data are being laboratory checked.

A new one-sixteenth inch mesh hammer mill screen was installed on March 8, 1954, to replace the unit installed in October of 1953.

224-U Expansion

Water boilup tests and personnel training operations are complete and the eight-foot diameter Luckey pots are ready for productive operation.

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REDOX PROCESS TECHNOLOGY

Summary

The Redox Plant production commitment for the month was completed on March 29, and the plant was shutdown for an extended period for decontamination and repair of the canyon crane. The H-2 Centrifuge, which failed on February 22, was replaced on March 5. Process performance during the month was normal with the use of a permanganate oxidation of IAF, three Uranium Cycles, and three Plutonium Cycles. Plant tests of processing 231 Building "killed" oxalate recycle solution were completed, and no process difficulties were encountered.

Process Performance

Decontamination performance and waste losses have been normal throughout the month as indicated in the following table:

Period covering March 15 to 18; processing approximately 95-day "cooled" metal at a rate of 7.5 tons uranium per day with permanganate oxidation of IAF and partial scavenging with manganese dioxide.

	Gamma Decontamination Factors (dF)		Per Cent to Waste	
Cycle	U	Pu	U	Pu
Head-End	0.2	0.2	0.05	0.14
First	3.9	4.3	----	----
Second	1.8	1.8	----	----
Third	1.0	1.1	----	----
Over-all	6.9	7.4	0.8	0.8

The plant was operated from February 22 to March 4 without the benefit of centrifugation or scavenging but with the maximum possible amount of settling of the IAF prior to processing through the columns. Both decontamination and recovery were maintained at a high level during this period. However, toward the end of this period, increased IA Column instability was apparent, and there were indications of increased entrainment of activity into the third cycles. Following the installation of H-2 Centrifuge No. 4 on March 5, and the use of manganese dioxide scavenging again, normal performance gradually returned as the accumulated solids were purged from the system. One batch of uranium product (having a fission product gamma activity five times that of natural uranium) required blending with low activity material before shipment. A recurrence of the 3A Column overflow line binding (experienced frequently until May, 1953) resulted in approximately 2000 units of plutonium product which required rework (1.4 to 2.6 times maximum fission product activity specification) through the Plutonium Cycles. This difficulty should probably be attributed in part to all of the following causes: (1) lack of centrifugation discussed above, (2) inadequate filtration of several batches of

aluminum nitrate, and (3) overflow of 2A and 3A Column interfaces as a result of water in the organic (which caused a "crash" shutdown on March 21). The extraction columns (IA, IS, 2D, 3D, 2A and 3A) were all water flushed on March 5, and are to be nitric-acid flushed on March 30. In addition, the IA and IS Columns required water flushing on March 15 and 22, because of flooding. No waste rework was required.

Feed Preparation

The dissolvers were charged with uranium having an average pile exposure of 595 (573 to 621) MWD/T. The semi-continuous acid addition technique for dissolving was refined further.

All IAF batches were oxidized by a permanganate Head-End treatment procedure using chromic nitrate as the reductant. Complete dissolution of manganese dioxide was effected until IAF Batch HE-6, which was processed after H-2 Centrifuge No. 4 was installed, and the remaining runs were scavenged with approximately 0.009 M MnO_2. Head-End runs which were oxidized during the period without centrifugation were performed with air sparge and without condensation and reflux in the H-4 Oxidizer tower. All others, with the exception of HE-10, were oxidized as "reflux" runs without air sparge and with maximum boil-up and reflux in H-4 Oxidizer. IAF Batch HE-10 was oxidized by a "simmer" technique whereby the H-4 Oxidizer contents were agitated (without air sparge) and maintained at 80 to 85 C during the oxidation period. These modifications in procedure were made to determine their effects on the behavior of the ruthenium volatilization technique and the over-all discharge of ruthenium to the stack. In all cases the process ruthenium decontamination factor was essentially constant. However, considerable differences in ruthenium emission from the stack were evident. The emissions from the stack were practically identical for the standard and the "reflux" runs, but the ruthenium emission as a result of the "simmer" run was approximately five-fold higher than either of the other techniques. Although the differences in behavior are not completely understood, the "reflux" procedure has been adopted.

Processing of 231 Building "killed" oxalate recycle solution in Redox was tested by addition to H-4 Oxidizer. Three cans of solution were added to IAF Batches HE-35 and HE-36, each, and the additional 78 units of plutonium were recovered without indication of any higher process losses or reduced decontamination.

Waste Processing

Additional information regarding the condition of Tank 101 in 241-S Farm is available. Three temperature measuring elements (iron-constantan thermocouple, chromel-alumel thermocouple, and nichrome resistance thermometer) installed in the thermowell in the tank were located two feet from the bottom. All three instruments indicated a temperature in the range of 120 to 130 C which is probably the supernate temperature. (The chromel-alumel couple is the only element still properly indicating.) It is hypothesized

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that a crater may have developed in the sludge at the point of the thermowell introduction during its installation on February 5, as a result of the subsequent eruptions with the possibility for a lower temperature zone to be created. Thus, efforts will be made to install a thermowell at another location in order to measure the sludge temperature. Pressure surges were observed only one day during the month on March 2. Two incidents occurred, then, about ten hours apart. One incident involved a series of 11 individual eruptions (up to pressure of 35 inches of water) over a 20 minute period, and the other incident was a two minute pressurizing of the tank up to 36 inches of water.

IN-LINE INSTRUMENTATION

A beta-detector head was installed in the Redox automatic stack-gas filter, and coaxial pulse-transmitting cable was laid from the 291-S Building to a new count-rate-meter and activity-recorder panel in the dispatcher's office in Building 202-S during the report period. Final stages of installation, calibration, and shakedown are in progress.

TBP-Plant in-line analytical instruments continued to give generally satisfactory performance. After five months of continuous service, the "A" Line RAF uranium photometer sensing unit was broken and highly contaminated during sampler back-flushing operations designed to clear a plugged jet. It was discarded and replaced with a new unit at a cost of approximately $200.

A packaged RAW uranium polarograph sensing unit, developed to facilitate installation and replacement with minimum exposure of personnel to radiation, was installed on "A" Line with excellent initial results. The packaged unit contains a D.M.E. (dropping - mercury electrode), S.C.E. (saturated - calomel electrode), salt bridge, helium sparger, mercury reservoir, and mercury sump in a compact, cylindrical assembly of glass and Scotchcast.

The increased gamma background activity reported last month for the "A" Line RCU gamma monitor was found to be associated with the stainless steel bayonet sampler and jet assembly. The installation of a new sampler resulted in a brief return to normal background levels followed by a steady rise; however, it has been found possible to maintain satisfactorily low background activity at the detector by interposing sheet lead shielding.

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

Isolation Building (Task I)

An average plutonium material balance of 99.86 per cent was realized from 60 S-Plant Batches (Cell 2) using the direct assay for charging plutonium in and a radio assay correction factor based on the direct assay for charging recycle out. This compares to a 97.13 per cent material balance using the radio assay and "F" factor correction based on MWD/T for both charge in and recycle charge values.

A total of six filter boats were loaded with two plutonium(IV) oxalate batches in accordance with the authorized process. (HW-30367) All runs filtered with no apparent increase in filtration time when a vacuum tight system was used. Bulk densities ranged from 0.40 to 0.45 grams of plutonium per cm^3.

The hold-up of plutonium by the N-1 filter in Cell 4 has decreased markedly. The amount of plutonium recovered by leaching with 60 per cent nitric acid has decreased from about 19 grams/run filtered to about 3 grams/run filtered.

Washing tests run to date indicate that distilled water for the last 2.5 Kg of wash does not affect metal purity and possibly increases the reactivity of the oxalate since a lower rehydrofluorination rate was experienced from this test material.

The type 316 stainless steel wire cloth used as a filter medium in a P-2, filter stick from January 14, 1954 to March 10, 1954, was attacked by process solution reducing the wire diameter from ca. 0.0023 inches to ca. 0.0019 inches during this period. The reduction in wire diameter allowed the wires to part thus increasing the minimum particle size the cloth could retain.

The porous Kel-F filter medium failed mechanically after about one months service in a P-1 filter stick. The cause of this failure can be alleviated by changing the filter stick design and since "Kel-F" is not attacked by the process solutions further testing with an improved design is planned.

Dry Chemistry (Task II)

Based upon fluoride color, 16.9 per cent of all runs through Task II required rehydrofluorination. This compares to 23.1 and 17 per cent for January and February, respectively. Furnace 2 has now processed a total of 176 runs with only seven rehydrofluorinations required using a 500 C maximum temperature. Furnace 1 has been fitted with a 450 C maximum temperature control cam and it has processed 34 runs with only one requiring rehydrofluorination. Other data recently obtained from furnace 2 operation also indicate that possibly the 500 C maximum cycle is better than the 600 C maximum cycle. For example, a run that was particularly hard to hydrofluorinate in furnace 5 was placed in furnace 2 for rehydrofluorination using a 600 C maximum cam for the rehydrofluorination. This run was acceptable after rehydrofluorination. When the 600 C cam was not removed for three runs thereafter these three runs required rehydrofluorination. On the otherhand, when the 500 C maximum cam was returned to the furnace 2 controller the furnace operation returned to normal.

Six boats processed in Task II this month contained two 231 oxalate batches each. Three required rehydrofluorination, but the cause could not be attributed to the fact that the batches were larger than normal.

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Reduction (Task III)

The average plutonium yield from Task III reductions of plutonium fluoride powders was 98.25 per cent for this period. The average yield for January and February was 97.1 and 97.5 per cent, respectively. The apparent higher yields for March are partially due to an increased incidence of blue powders (containing appreciable amounts of PuF_3). Forty-two per cent of the Task III runs were processed as double batches during the period of March 1 to March 19, 1954. The plutonium yield from double batches averaged 98.22 per cent as compared to 98.63 per cent for single batch reductions.

Casting (Task IV)

Coating (Task VII)

Final Inspection and Quality Control

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234-5 DEVELOPMENT

Calcium Plutonium(IV) Fluoride: Purification Studies

The precipitation of calcium plutonium(IV) fluoride has been found to give separation factors for uranium of 15 to 230, but no separation of plutonium from aluminum, iron, nickel, or chromium. In the reduction of the double fluoride to metal, the following separation factors were measured: aluminum, 1; uranium, 28; iron, 100; chromium, 40; and nickel, 1.6.

Dry Chemistry Studies

The course of the thermal decomposition of plutonium(IV) oxalate has been more completely defined by recent work. In addition to the compounds previously reported, evidence for an intermediate containing a peroxy linkage was obtained. Laboratory work on the reactivity of plutonium oxide and its relationship with calcination temperature has shown the following: 1) the plutonium dioxide produced by calcination of a given sample of plutonium(IV) oxalate at temperatures of 300 to 480 C varies little in reactivity or behavior upon hydrofluorination; 2) calcination at a temperature of 510 C or more produces a dioxide which is much less reactive than 480 C oxide; and 3) the formation of the oxide of low reactivity at temperatures of 510 C or higher takes place very rapidly.

Continuous Task II Equipment

Refinements in the suspension and damping weight distribution of the prototype calciner have resulted in an increase in the powder flow rate, at eight degrees tilt, from five inches per minute to about 45 inches per minute. Orders have been placed for a reactor tube and accessories, to be constructed of Hastelloy C. The reactor tube will be lined with Baker Alloy No. 413.

Recuplex

Flowsheet SCX-1 has been designed for the dissolution of the slag and crucible residues produced in the reduction of double batches of PuF_4 in RS-4 crucibles. Using this flowsheet, the HF concentration of the system is 0.76 M during the dissolution step. Three modifications of the flowsheet have been tested in the one-crucible dissolver, in an effort to determine the aluminum/HF ratio which should be used to keep corrosion to a minimum while permitting rapid dissolution of the plutonium. Results thus far indicate that the use of aluminum/HF ratios between 1:6 and 1:4 will necessitate process times of only 12 to 14 hours per batch, while giving corrosion rates, for 309 SCb stainless steel, of five to ten mils per month.

It has been shown that in slag and crucible solutions of average plutonium content, plutonium(VI) concentrations as low as 0.01 g/l (three per cent or less of the total Pu) can be reliably determined by the measurement of absorption spectra. Solution prepared by flowsheet SCX-1 was found to contain less than one per cent plutonium(VI)

Recuplex, solvent extraction flowsheet EX-1 has been designed to process Recuplex feed composed of slag and crucible solution and oxalate supernatants. Preliminary laboratory experiments have shown that the oxalate concentration (0.03 M) in the CAF stream is not great enough to interfere with the extraction of the plutonium. Batch, counter-current runs are planned to further test this and other Recuplex flowsheets.

Measurements of the rates of decomposition of TBP and CCl_4 by alpha activity, in a system corresponding to the feed plate of the Recuplex extraction column (85 g/l Pu in the organic; 15 per cent TBP in CCl_4) have continued to show the following: 1) the formation of about 20 parts of DBP per day per million parts of TBP, for each g/l Pu present in the solution; and 2) the formation of about 12 parts of chloride per day per million parts of CCl_4, for each g/l Pu. The decompositions do not appear to be catalyzed by hood light.

Crucible Shop

Slip-cast MgO casting crucibles, CDS-1104, were successfully fabricated in the shop and use tested in Task IV. Exploratory work indicated that the porosity of fired magnesia crucibles is decreased by impregnation and refiring. Crucibles soaked first in a Na_2SiO_3 solution, then in a $MgSO_4$ solution, and refired were satisfactory for magnesium melts. Molten magnesium soaked excessively into the standard magnesia crucible.

234-5 Technical Manual

The Plutonium Purification and Fabrication Technical Manual is estimated to have reached 88 per cent of completion.

234-5 PROCESS RECOVERY

Hood 40 Operations

The A.I.S.I. Type 309 SCb stainless steel skull dissolver was replaced after approximately nine months operation due to definite evidence of "root pass" corrosion at the welds and the incipient failure of the shell. Operation of the hood has since proceeded routinely.

Recuplex Construction

Construction of the Recuplex facilities in Rooms 221 and 337 of the 234-5 Building was resumed on March 8, 1954, after a four-month shutdown that was necessitated by the vessel vendor's failure to supply the process vessels according to their previous schedule. A revised construction schedule prepared by members of Project Section indicates that the temporary shutdown will delay completion of the facility until November 15, 1954. In the event the on-site arrival of process equipment will permit a six-day work week, it is estimated that construction may be completed by approximately October 15, 1954.

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P-10 PROCESS STUDIES

Activities of the Sub-Unit during the month were primarily for the purpose of producing technical bases, process flowsheets, specifications for process flowsheet components, and analytical requirements for the 3X Program. Six documents on the above topics were prepared as well as a study on alternative methods of shipping tritium. The specifications for the existing 108-B process were approved.

Preparations are being made for a small P-10 Development Program at HAPO. For this purpose, Project CG-581 is being prepared to install prototype thermal column tritium enrichment, and other, equipment in 108-B and prototype equipment is being placed on order. In order to utilize existing experimental facilities at KAPL for tritium work, several developmental problems have been posed for solution there.

ANALYTICAL LABORATORIES

General Chemical Laboratory - A study has revealed a positive error of about ten per cent in fluorometric (low level) uranium analyses if the dishes are allowed to stand as much as two hours. This error can be minimized by either: 1) taking the largest permissible sample, or 2) again checking the blank just before mounting the sample. A series of RAW type standard samples were analyzed for uranium content. The results indicated the fluorometric method is in good control and verified observations made by the Chemistry Unit's polarographic in-line sampling technique. In preparation for thorium analyses of Thorex process samples, the X-Ray Photometer has been calibrated for high level thorium samples. A colorimetric thorium procedure employing the reagent Thoron (or Naphtharson) is being checked out. The range of 5 micrograms to 80 micrograms has produced a curve obeying Beer's Law. Interference of various ions known to be present in the Thorex process are being studied.

Radiochemical Laboratory - Gamma Spectrometer background was lowered by a factor of five as a result of proper placement of additional lead around the detector. No loss of resolution or incease of Compton pulses resulted. The Cs-Ba 137 pulse distribution remained the same. Permanganate titration of

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oxalate occurring in amounts as low as 0.001 M in plant RCU was confirmed. Accuracy and precision appears to be about ten per cent. Assistance was given to the Fission Product problems by measuring individual ruthenium and cerium activities as a means of elucidating their paper chromatographic behavior.

Spectrochemical Laboratory - Calibration of the Baird Associates Grating Spectrograph to handle analyses normally performed on the B & L Spectrograph is about half completed. This is necessary to avoid delays at the time the B and L is moved from the 3706 Building to the 325 Building. The volume of work performed during the month was higher than any month since the 300 Area Spectrographic Laboratory was divided (between Technical and Manufacturing) in September of 1953.

Mass Spectrometry and Water Quality Laboratory - The ion source that has been in the G.E. Spectrometer since its early operation was found to be coated with carbon and shorting out internally. This source was replaced and an effort is being made to clean it. Previous reports have indicated that pure oxygen could be analyzed without adverse effects upon the filament. This is still true, however, it has been observed that the spectrometer shows carbon monoxide when pure oxygen is introduced. It has been shown that carbon monoxide is not present in the oxygen samples and that this comes from within the spectrometer in the presence of pure oxygen. This phenomenon is being scrutinized further in an effort to determine its significance in treating pure oxygen samples in the future.

Work volume statistics for the Analytical Laboratories are as follows:

	February		March	
	Number of Samples	Number of Det'ns.	Number of Samples	Number of Det'ns.
Research and Development				
Applied Research	284	611	1247	2244
Pile Technology	29	400	55	562
Fuel Technology	39	286	38	550
Separations Technology	309	520	526	620
Process Assistance	36	289	164	1646
Others	96	503	133	1201
Total	793	2609	2163	6823

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Standards and Calibrations	February	March
Number of standard solutions prepared	4	34
Stock solutions dispensed	35	30
Number of calibrations performed	0	62
Number of calibrated glassware dispensed	2	62
Number of checked glassware dispensed	39	77
Total	80	265

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

April 6, 1954

VRC:mvt

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APPLIED RESEARCH SUB-SECTION

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Applied Research Sub-Section

VISITORS AND BUSINESS TRIPS

E. K. Halteman, WAPD, visited at Hanford on March 11-12 to inspect the double crystal x-ray spectrometer for the study of irradiated materials.

H. W. Long, G.E. Welding Sales, Seattle, and A. Herrick, J. E. Hazeltine Co., Portland, spent March 15 at Hanford checking equipment.

D. T. Hooker, Ames Laboratory, visited at Hanford on March 25-26 for a conference concerning analytical procedures.

H. E. Myers, Pacific Scientific Co., Seattle, spent March 26-27 at Hanford inspecting and servicing a tensile testing machine.

R. P. Schuman, KAPL, spent March 25-26 at Hanford discussing nuclear chemistry problems.

Welden Gardner, North American Aviation Co., Downey, California, spent March 29 at Hanford discussing plutonium analyses.

U. L. Upson attended the Analytical Conference, Pittsburgh, Pa., March 1-5, where he presented a paper. March 8 was spent at GEL, Schenectady, and March 9 at the Research Laboratory, Schenectady, to discuss alpha scintillation phosphors and counting techniques. On March 10 Mr. Upson visited the Detecto Laboratory, Chicago, and on March 11 he visited ANL, Lemont, Illinois, to discuss counting instruments.

E. M. Kinderman spent March 5 at Brookhaven National Laboratory, Upton, N.Y., March 8-10 at KAPL, and March 11-12 at ANL, Lemont, Illinois, to discuss fission yield experiments and other analytical problems.

J. E. Minor spent March 4-5 at WAPD, Pittsburgh, Pa., to consult on metallurgical problems.

W. R. Smith visited A. E. Smith Co., Milwaukee, on March 1; Graham Manufacturing Co., Batavia, N.Y., on March 2; Carpenter Steel Co., Union, N.J., on March 3; and Linde Air Products, Newark, N.J., on March 5 to advise on fabrication of heat exchangers for the Purex facility.

D. J. Donahue spent March 8-10 at ANP, Lockland, Ohio, and March 10-12 at KAPL discussing reactor instrumentation.

J. J. Cadwell visited ANL, Lemont, Illinois, on March 17-18 to attend the responsible reviewers conference and to discuss metallurgy items of interest to HAPO.

R. E. Burns attended the National American Chemical Society Meeting, March 29-31, at Kansas City Mo.

H. H. Hopkins, Jr. and G. B. Barton spent March 31 at KAPL discussing separations chemistry.

J. Braunstein attended the National American Chemical Society Meeting, March 29-31, at Kansas City, Mo.

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Applied Research Sub-Section

ORGANIZATION AND PERSONNEL

Personnel totals as of March 31 were as follows:

	Exempt	Technical Graduates		Non-Exempt	Total
		Permanent	Rotational		
Physics Unit	26	2	1	7	36
Metallurgy Unit	44	0	5	24	73
Chemistry Unit	49	1	2	16	68
Administration	1	0	0	6	7
Total	120	3	8	53	184

PHYSICS

Lattice Physics

The conversion efficiency has been calculated for the simultaneous production of 23 and tritium using 25 as fuel in a Hanford pile with 8-3/8" lattice spacing. For the case considered, the process tubes are loaded with N slugs (3.5% Li and 96.5% Al) and M slugs (a canned assembly of alternating discs of thorium and Al-25 alloy) in such an M/N ratio that five atoms of tritium are produced per atom of 23 produced. This ratio of production is, of course, adjustable. The total conversion efficiency is then 0.93. The chief characteristic of this kind of pile loading is that it materially reduces graphite temperatures when compared with a loading that utilizes J slugs. A fuller discussion of this method is given in HW-30839.

A calculation has been made to determine the change in conversion efficiency, C, that would result from the substitution of thorium oxide for thorium metal in a lattice composed of J and thorium slugs. While the meagerness of experimental data on thorium precludes an exact result at this time, it is possible to obtain limits for this change. These are:

$$-0.03 < C(\text{oxide}) - C(\text{metal}) < 0.01.$$

The difference in conversion is thus very small. Details of this work may be found in HW-31153.

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Dry buckling measurements have been made of four lattices loaded with 1.66" O.D., 1.10 I.D. hollow slugs. The results are given in the table below.

Lattice Spacing	Buckling x 10^6 cm^2
6-3/16"	2.8
7-1/2"	103.0
12-3/8"	14.4
15"	-61.4

The cross-over points of dry and wet reactivity have been determined experimentally for solid slugs of three diameters -- 1.36", 1.17" and 0.925". These data bracket the maximum cross-over reactivity that is possible with any slug size, but apply only to a water/uranium ratio of 0.2 (BDF, H DR Piles). The predicted maximum cross-over buckling is 85 x 10^{-6} cm^{-2}.

A Monte Carlo calculation carried out with the assistance of the Computing Unit has shown that the angular distribution of thermal neutrons incident on an absorber imbedded in a moderator has very nearly the form of a hemisphere. With this result, a calculation method has been developed for obtaining accurately the distribution, the blackness, and the average angle of escape, of thermal neutrons in a solid cylindrical fuel rod. This method is applicable in media in which the absorption cross section is comparable to, or greater than, the scattering cross section. Diffusion theory is known to be inaccurate for this case. A table of integrals, for use with the new method, is being prepared.

The critical mass of the Lattice Test Reactor has been calculated. The result, believed to be somewhat on the low side, is 4.4 kg of U-235.

Nuclear Physics

In connection with the examination of the feasibility of producing U-233 in Hanford piles, an attempt is being made to develop a technique for determining conversion efficiencies for this process. The requirements are: a) that the method be usable in a flux of 10^5 n cm^{-2} sec^{-1} available in the exponential piles, b) that it yield relative information on different lattices, and c) that it detect a change in conversion of 2%.

So far, one scheme has been examined. This utilizes the 23-minute Th-233 activity as a measure of U-233 formation and the counting of fission pulses in a U-235 fission chamber as a measure of U-235 consumption. It was found by measurement that the natural β-activity of the daughters of Th-232 was larger than the induced Th-233 activity. However, a chemical separation carried out by the Chemistry Unit reduced the daughter activity by more than a factor of 100, thus making the method possible.

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The chamber to be used in the measurement of the energy variation of α (25) has been mounted at the neutron spectrometer and is undergoing stability tests.

Some preliminary work has been done to extend the range of the spectrometer to lower energies (below 0.02 ev). The problem here is to find an experimental method for making higher order corrections with the use of sele tively absorbing foils.

A mathematical analysis has been made of the errors in pile constants arising from the inaccuracy of the individual experimental points making up a cross-section curve. The results are too lengthy to present here but generally it can be said that, provided the correct functional form of the curve is used, the error of the curve will be less than the statistical error of each data point.

Plant Physics

The feasibility of a device which could measure neutron fluxes over a range of 10^{10} is being investigated. Briefly, it consists of a fission chamber in a tube of liquid looking at the pile reflector. The position is adjusted automatically to keep the counting rate constant, thus the flux level is shown as a function of position. This device, along with applications to automatic pile control, is described in document HW-31200.

The solution of a complete set of equations leading to U-233 production and the U-233--U-234 ratio is being carried out.

One possible way of detecting the neutron flux in a shut-down reactor is to raise the flux level by means of internal sources to a more easily measurable value. One internal source, the deuterium in the cooling water, is already present. An additional source might be beryllium. In order to find how much beryllium is needed for a pile, an experiment is being done to determine the relative yields of photo-neutrons from beryllium and water.

A document, HW-31135, describing methods of calculating Xenon Reactivity effects has been issued.

A document, HW-31169, outlining the chain-reacting limits of J slugs has been issued.

CHEMISTRY

Purex Process

Batch countercurrent tests were carried out with cold uranium to investigate a proposed high capacity Purex flowsheet. The modified 1A column conditions employed were 35% TBP, 50 C, and a uranium feed concentration of 1.8 M. Two such runs employing different flow rates were carried to steady state and demonstrated suitable organic/aqueous flow ratio and satisfactory waste loss, and defined the nitric acid and uranium profiles. The data indicated that the two conditions bracketed the optimum flowsheet condition. In subsequent laboratory scale 1A pulse column runs based on these data, a volumetric throughput of 132% of that of the standard flowsheet was demonstrated at the flooding point. The increased TBP concentration,

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of course, further enhances the uranium capacity. Although analysis of the run is not complete, a satisfactory waste loss is indicated.

Laboratory extraction data were obtained to evaluate the flowsheet conditions. The increase in temperature and TBP concentration increases the uranium distribution (E_a^o) twofold and decreases the plutonium E_a^o twofold, so that the distribution coefficients for the two components become about equal. Considerations of transfer rate, dispersion, and viscosity show that uranium transfer is the limiting factor.

The increased 1A capacity suggested that a flowsheet limitation would develop in the 1B extraction column by virtue of the lower density difference between aqueous and organic phases. An attempt to magnify this difference led to consideration of 2 M acid as a 1BX stream. Preliminary studies showed the higher acid to have no deleterious effect on stability of ferrous ion or on reduction of plutonium under the higher temperature conditions.

Pulse column runs under the high TBP-high acid conditions showed, surprisingly, that increased acid in the 1BX reduced the flooding rate at room temperature and at high temperature.

As a result of this unexpected behavior, laboratory extraction studies were carried out with the vibrating stirrer under modified 1B column conditions. An increase in TBP concentration at room temperature has little effect on dispersion or coalescence; an increase in temperature at 35% TBP decreases the dispersion time and markedly decreases the coalescence time (80%); an increase in aqueous acidity has essentially no effect on dispersion and lengthens the coalescence time somewhat. It was noted, however, that the dispersion volume -- i.e.; the volume occupied by the dispersed system -- is a function of stirring time; with an aqueous phase of two molar acid the dispersion volume increases rapidly with time to a constant value, with a dilute acid aqueous phase it increases rapidly to a maximum and then decreases. These phenomena suggest a strong influence on the system by free TBP because of its surface active property.

Distribution data were obtained to compare carbon tetrachloride and Amsco solvents and studies were carried out which showed that the diffusion rate of the TBP uranium complex is much higher in carbon tetrachloride. All evidence indicates that carbon tetrachloride solvent yields more favorable HA and 1A column operation, both at room temperature and elevated temperature.

Previous work showed that an appreciable amount of uranium daughter (UX_1) tracks with plutonium through the Purex flowsheet. A repeated examination of the path of UX_1 in Purex 1A and 1B columns yielded appreciably different distribution results and indicated an inconsistent transfer rate. Further work will involve batch studies to examine the distribution of the element in greater detail.

Previous reports described investigations of a Purex flowsheet employing 50% uranium saturation in the organic stream rather than the standard flowsheet value of 75%. Satisfactory waste loss was obtained but decontamination was unacceptable. Two subsequent runs established waste loss and decontamination data at intervening degrees of saturation to evaluate the situation in detail.

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Solvent Quality Studies

Metal Recovery process difficulties associated with solvent quality pointed to the need of investigating similar difficulties that might arise in Purex and Thorex operations. A sample of used Metal Recovery solvent was subjected to chromatographic treatment on an alumina column which led to the segregation of five impurity components, most of which are colored. Two were shown to have a twofold adverse effect on uranium extraction rate, and high activity was shown to be associated with one of the components. Further work will attempt to define the effect of each on dispersion rate, extraction rate, and fission product hold-up.

Similar work with red oil -- a TBP degradation product -- led to the segregation of three distinct components. One is present to the extent of about 1%, is not water soluble, and contains one or more nitro groups. The other two components are present in about equal quantities. Both are yellow colored, one is water soluble, and the other water insoluble. Infrared examination of molecular structure indicates that both are very similar to aldol condensation products of butyraldehyde, that they contain no nitro groups, and that bonded OH groups and conjugated double bonds are present. It is known that TBP is partially decomposed to butyl alcohol, and that sodium carbonate, such as are used in ROO column treatment, promotes aldol condensation.

Uranium Nitrate Processing

Two distinctly different types of uranium trioxide have been synthesized and identified. The first has a fluorination activity in the range 1.0 to 1.4. It is a yellow crystalline material, has sharp x-ray diffraction bands, has a distinct infrared absorption pattern, and is typified by the major component in Hanford product UO_3. When prepared by the slow drying and ignition of UNH, it has a reactivity of about 1.0. When prepared by more rapid heating or from solutions containing sulfamate or sulfuric acid, it may have a reactivity of 1.4.

The second type of oxide has a reactivity of 1.4 to possibly as high as 2.0. It is red, amorphous, and exhibits only indistinct x-ray and infrared patterns. This material may be produced at will in the laboratory by flash calcination of UNH solutions.

A series of Oak Ridge experiments has been directed towards the direct fluorination of UNH through the use of ion exchange and electrolytic treatments. A modified approach to the same objective at Hanford gives promise of a continuous process in which nitric acid is recovered from the anode compartment of an electrolytic cell and uranium is reduced and precipitated as UF_4 or uranium ammonium fluoride in the cathode compartment. The principal feature of the process is that which involves separation of the cathode compartment from the UNH feed solution by a cation exchange membrane and separation of the anode compartment from the feed by an anion exchange membrane. Preliminary estimates have been made concerning the membrane areas, the electrode areas, and the current efficiency, and a preliminary engineering evaluation of the system has been requested.

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Slug Dissolution Studies

The Oak Ridge procedure for dissolving thorium metal employs 0.05 M hydrofluoric acid in nitric acid. Studies were carried out to relate the concentration of HF in 60% HNO_3 with the initial dissolving rate of thorium metal. The initial dissolving rate of thorium is essentially constant for HF concentration above 0.05 M HF and drops off rapidly at lower concentrations. The rate is decreased rather markedly with increased concentration of thorium in solution. It increases slightly at higher nitric acid concentrations and decreases appreciably at lower nitric acid concentrations. The indications are unpromising for a reduction of HF concentration below 0.05 M.

Electrolysis of thorium in 30% HNO_3 results in rapid attack on the metal but yields a thorium oxide precipitate which is not readily soluble. Electrolysis in 60% HNO_3 plus dilute HF results in slow attack. The attack on the metal by steam at 300-500 C is very slight.

Work continued on the examination of the explosion reaction undergone by uranium-zirconium alloys after etching treatment. A supply of the sensitive material was obtained by electrolysis and separated from the parent U-Zr (1.6%) alloys. The powder undergoes slow dissolution and more rapid desensitization in nitric acid; in both cases, the rates are increased in a systematic manner with nitric acid concentration.

In examining methods for dissolving zirconium jacket material, it was shown that zircalloys and pure zirconium are similar with respect to dissolution in various concentrations of HF. The former leaves a small tin-containing residue. In solutions of HF and HNO_3 the dissolution rate is more rapid than in HF alone. Fluoboric acid attack on the metal is comparable to that of HF when compared on a fluoride basis.

Tests made in support of metallurgical development showed that U-Cr (0.3 atomic percent) and U-C (300 ppm) alloys dissolve at the same rate as pure uranium in 60% HNO_3.

Cesium Scavenging

Previous reports have described the scavenging treatment of nickel ferrocyanide applied to fresh Metal Recovery waste solutions. Stored waste supernates have a twofold higher Cs content as a result of concentration treatment and yielded an appreciably lower quantity of solid upon scavenging as a result of the prior settling of uranium and iron oxides from the solution. Laboratory tests with a synthetic supernate show essentially complete precipitation of cesium and indicate that the settled residue contains a several-fold higher concentration of cesium activity.

Dilute perchloric acid at 90 C was found to solubilize 95% of the cesium activity associated with the scavenging solid.

Ruthenium Contamination

Previous work has led to the synthesis of a ruthenium nitroso nitrate complex that is believed to be similar to that found in process solutions. Other work established a chromatographic procedure that allows semi-quantitative determination of the

complex in solution. Application of this technique to dissolver solutions shows that about 30% of the ruthenium present exists as the complex. Application to oxidized dissolver solution (HIMO) and to Redox 1CU fails to reveal any of the complex. If further work verifies these observations, it will be of appreciable significance since it is commonly believed in project circles that this complex is the cause of poor ruthenium decontamination in separations processes.

In-Line Analyses

In preparation for installation of a variety of in-line analyzers in the Hot Semi-Works, a gamma monitor cell was tested and found to be suitable; gamma photometer, polarograph, and photometer cells have been designed and constructed in such a manner that each formed an integral unit cased in plastic; the console supports and connections have been established; construction of the programming switch is nearing completion; and suitable high voltage sources have been tested and placed on order.

The previous report described a gamma absorption photometer being tested for the determination of uranium in C and J slugs. Because of the high sensitivity of the instrument and the immediate need for accountability analyses, the instrument has been loaned to the 300 Manufacturing laboratories for routine service, and personnel have been trained in its use. One slug of low reactivity was found to have a normal uranium content; subsequent spectrographic analysis in the Manufacturing laboratory revealed about 100 ppm boron.

The extension of gamma absorption photometry, particularly for determination of low concentrations of heavy metals, requires a source of radiation of lower energy than that normally obtained from fission products. A promising new source under investigation is one which employs high energy radiation to bombard a target material, which in turn emits its characteristic x-rays. Tin and indium are promising target materials in that they allow mono-energetic radiation of suitable wave length.

During the reporting period, the analytical requirements for P-10 isotopic purification were received and at month's end the specifications for analytical mass spectrometers and in-line connections were being issued.

Radiochemistry

Several problems are receiving attention in cooperation with the Physics Unit. A method has been agreed upon for the determination of the Np-239 capture cross-section involving the irradiation of 50 g of depleted uranium for a short period of time in the high flux of the Arco pile, and the subsequent determination of the Pu-240 formed; a procedure has been established to purify a sample of irradiated plutonium to be employed for Pu-240 and 241 fission cross-section determinations; and a sample of thorium was separated from its daughters to facilitate determination of the conversion ratio in 23 production. A sample of graphite mined from the F pile adjacent to a poison tube was analyzed cooperatively with the Analytical Service group and found to contain 50-100 ppm boron.

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Analytical Development

During the month the analytical requirements for Thorex research and development work were reviewed and attention was directed towards the techniques that appeared most promising. A colorimetric and a volumetric method for determining low concentrations of zirconium were examined. In cooperation with the Metallurgy Unit, equipment and procedure for determining carbon in irradiated slug sections were reviewed. A highly sensitive colorimetric reagent for copper was investigated for its application to pile water. Design was initiated on a spectrographic arc stand suitable for analysis of radioactive samples.

Data obtained on the analysis of the various Hanford samples with the direct reading spectrograph in the Applied Research Laboratories were analyzed; it was concluded that the instrument is capable of direct determination of 70-58 and of various impurities in plutonium, including those presently determined by wet methods. It was further concluded that the instrument is suitable for the analysis of all impurities in UO_3 product. Further work will be required to establish applicability of the instrument for uranium isotopic analysis. A report on the subject was issued to the 200 Areas Manufacturing laboratory personnel.

In support of Pile Fuel work the first analysis in a proposed series has been made to identify the gas existing in non-bond regions of canned slugs. The gas was extracted by means of a hollow needle and was found to consist of hydrogen; there was no indication of any other gaseous component.

Waste Disposal and Decontamination

The 300 North (Technical) burial ground was accepted for use, thus providing a disposal area for Works Laboratory dry waste. Three gloved boxes from Building 3706 and one from Building 222-T were prepared for disposal and discarded into this burial ground. These boxes were too "hot" to decontaminate economically. The Works Laboratory Buildings and Grounds Engineer is investigating the possibility of connecting into the 321 organic crib well water system to provide water for use in case of a burial ground fire; the water is now outletted about 200 feet from the pit and a preliminary report indicates that an adequate supply will be available.

Seven trips were made to the 222-S Building crib area to dispose of 35,000 gallons of "crib" level waste from the Works Laboratory area. "Crib" level waste is transported by means of a 5000-gallon tank truck.

All other radioactive waste was discarded via 300 Area waste disposal facilities.

Other building service and laundry functions were accomplished in a routine manner.

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METALLURGY

Irradiation Effects on Uranium

The powder metallurgy x-ray wafer, irradiated in the mechanical properties production test (PT-105-3N), exhibits no surface irregularities after exposure to 310 MWD/AT; in fact, the Rockwell Hardness indentations are still sharply defined impressions. This confirms that a fine grained material will not "bump" as does beta heat treated material and suggests that localized work hardening, caused in this instance by the Rockwell hardness indentation, does not in itself cause dimensional instability. It was also noted that this powder metallurgy wafer was not bonded to the aluminum inserts, although the machining marks of the aluminum spacers were reproduced on the uranium indicating some diffusion and possibly slight bonding at these localized areas. In other specimens "spotty" bonding between aluminum and "bumped" uranium provided evidence that the high pressures at localized areas promote diffusion and bonding of uranium and aluminum.

Uranium-Magnesium Fuel Material

Two uranium-magnesium slugs have been prepared, one using 0.16-inch diameter by 0.07-inch thick uranium punchings, and the other using 0.015-inch diameter uranium turnings which had been formed into a compact by pressing at 15 tsi in a cylindrical die. Attempts to produce satisfactory compacts using larger turnings were unsuccessful because of the fragile nature of the compacts. The technique used to fill the voids with magesium was as follows: the uranium was charged into a mild steel tube, an excess of magnesium was placed on top of the uranium, and the tube sealed and evacuated. The tube was then placed in a salt bath at 750 C. Fifteen minutes were allowed for the tube to come to bath temperature, and then the vacuum was broken with helium. An additional 15 minutes soaking time in the salt bath was employed before the tube was removed from the salt bath and quenched. The two specimens produced in the above manner were free of porosity. The specimen produced with uranium punchings contained 54 volume percent uranium and has been machined to four-inch slug dimensions. This slug is being held for reactivity studies.

Work is continuing on the design phase of an experimental shot tower to be used for preparing uranium pellets for additional studies of U-Mg fuel elements.

A section of the aforementioned specimen prepared with uranium turnings was subjected to a twenty-one hour boiling water corrosion test. Swelling occurred and considerable corrosion product spalled off the specimen. Examination after testing indicated the uranium phase had suffered the major part of the corrosive attack.

Preliminary tests to evaluate the hazard associated with heated magnesium in a water-cooled reactor were conducted by heating magnesium in evacuated quartz capsules and breaking the capsules under water. Magnesium specimens heated to 400, 500, and 600 C and quenched in boiling water showed no indication of rapid reaction -- the magnesium surface remained untarnished. In a more drastic test a specimen was melted at 800 C, and the molten metal quenched in boiling water. No noticeable reaction occurred.

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Metallurgical Techniques

The vacuum cathodic etching apparatus for use on irradiated metallic systems has been completed and is now located in the Radiometallurgy Building; the initial use of this equipment will be directed to the establishment of the effect of various mounting media on the etching characteristics of polished, mounted specimens. Extensive application will then be made on the etching characteristics of uranium irradiated to various exposure levels. Another vacuum cathodic etching unit for use on non-irradiated metallic specimens is in the final stages of completion. The major characteristic of this unit is its versatility for a wide variety of vacuum applications. As the exploratory experimentation in the field of cathodic etching and analytical sputtering progresses, modifications of the "hot" unit in the Radiometallurgy Building can then be made.

The experiment designed to determine radiation effects on aluminun and Faxfilm, two replicating media for radioactive materials, has been completed. No differences between the original structure of the aluminum and the Faxfilm with that of control specimens was observed at the magnifications employed.

Uranium Alloy Studies

The radiometallurgical evaluation of the uranium-chromium alloy specimens which were irradiated to an exposure of approximately 200 MWD/T has been completed. The percent change in length of these specimens ranged from 0.3 percent for the beta heat treated control uranium sample containing 0.0 percent chromium to 16.8 percent for one sample containing 0.61 atomic percent chromium. The pre-irradiation orientation data, chemical composition, and mechanical property data of this material are being correlated with the post-irradiation data. It has been tentatively concluded that chromium content, per se, does not affect the dimensional stability of uranium fuel material.

Material for a proposed production test to determine the behavior of metastable uranium alloys under irradiation is being evaluated. A cursory analysis of the x-ray diffraction patterns of the gamma-quenched and alpha-annealed uranium-14 atomic percent molybdenum alloy specimens indicates that the greater portion of the metastable gamma structure transforms to the equilibrium alpha plus epsilon structure in less than 24 hours at 400 C. In order to determine the minimum transformation time, two uranium-14 atomic percent molybdenum alloy specimens have been gamma heat treated at 795 C for 8 hours and water quenched in preparation for short time anneals at 400 C.

Fuel Element Studies

The rough draft of the production test for irradiation of mechanically bonded fuel elements with end caps formed by upsetting a section of the can wall was completed. Information received on the status of the operating conditions of the piles made it advisable that the irradiation take place in B or F pile. Three mechanically bonded fuel elements were sent to Pile Technology for flow lab studies. Two of these had a heavy-walled can sized on the slug and a fusion weld closure. One had a small hole drilled through the weld between the end cap and the can wall to the uranium, and the other had a hole drilled through the can wall midway along the length of the

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slug. These pieces had been autoclaved and frost tested. The third slug was the first of the pieces to be tested having the end cap formed by upsetting a can wall section. A hole was drilled at the center of the end cap. The destructive testing of these slugs should provide information on the character of the failure should one of these slugs fail in the pile.

A comparison of the properties and chemical composition of good grade uranium prepared by present production methods (Billet 5835) with those of pickled-derby uranium which is contemplated for future use at Hanford has been completed. The conclusion from the comparison is that the quality of the pickled-derby uranium available for study is not significantly different from the quality of Billet 5835.

Four enriched, cored slugs charged in the hot spot in C pile in February as per PT-105-513-SI appear to be operating normally despite severe thermal cycling occasioned by several pile outages. A rough draft of a supplement to the production test has been prepared to extend the irradiation of these slugs from 6000 to 1000 MWD/AT.

An approximate plastic stress analysis for a solid fuel element having its core in the beta phase has been calculated and will be issued as HW-31269. For such a slug operating with a core temperature of 715 C (65 kw/ft), the stress criterion is 5 percent greater and the strain criterion is 40 percent greater than for a slug operating with a core temperature of 600 C (48 kw/ft). Thus, thermal stress failure would not be likely under steady-state conditions, but the probability of thermal cycling failure is greatly increased by having a beta phase core.

A variational method has been developed for calculating thermal stresses in an infinite cylinder and has been written up in a preliminary unclassified report. Use of this method simplifies thermal stress calculations applicable to fuel elements and long thick hollow tubes.

Fuel Elements for Isotope Production

Thermal stress calculations for a 1.36-inch diameter solid thorium dioxide target element indicate a limit on specific power of only 2.5 kw/ft. At this power level the stress equals the ultimate strength of unirradiated thoria; irradiation effects on the strength properties of thoria are not known. This limiting power level corresponds to a very low permissible U-233 concentration build-up in solid target elements for thoria as compared to that achievable with thorium metal.

A survey of the available literature has been made and it appears that for higher lithium content fuel elements, i.e., three times the lithium content of our present lithium-aluminum alloy target slug, the lithium-magnesium alloys are superior to lithium-aluminum alloys from both the standpoint of fabrication and corrosion. Calculations are currently being made to establish the nuclear advantage of the proposed lithium-magnesium alloys over the lithium-aluminum alloy.

Zirconium Metallurgy

Prospective embrittlement of zirconium when exposed in-pile to circulating pressurized water is under investigation. Tensile and impact specimens of zirconium and Zircaloy-2 were charged in the H-Loop for this purpose on March 15 for a

scheduled one month exposure at approximately 120 C. The effect of in-pile exposure in a simulated pile atmosphere on gas reaction rate, embrittlement, and other mechanical properties will be determined in conjunction with Pile Technology's dry zirconium process tube experiment under PT-105-516-SI. Fabrication and ex-pile evaluation of Zircaloy-2 specimens for standard impact, stiffness, tensile, and slow bend testing is in progress to permit choice of an optimum method for post-irradiation measurement.

Anistropic growth of zirconium when heated in air at elevated temperatures as reported in the literature would have serious consequences if it occurred to pile process tubes. Accordingly, growth observations have been made on Zircaloy-2 sheet specimens (1/16 x 1/4 x 2-inch) exposed ex-pile in air over the temperature range 300-600 C. The specimens at 600 C have lengthened by 3 percent in nearly 700 hours at an exponential rate expressed by: percent growth = 2×10^{-4} (time in hours)$^{1.5}$. Samples cut longitudinally and transversely with respect to the rolling direction show no significant difference in growth rate. More important, however, no growth was observed in any specimens exposed at temperatures up to 550 C. Further, growth of a sample held at 600 C ceased when the temperature was reduced to 400 C. Thus, it appears there is a threshold temperature for the growth phenomenon near 600 C, a temperature substantially above that of expected process tube operation.

PT-105-509-SI is being conducted to determine the effect of approximately 150, 500, and 1,200 MWD/AT exposure on the properties of zirconium having 0, 10, 20, 30, 40, and 50 percent cold work. Samples for two of the exposures were charged in F pile on February 2, 1954, and the first exposure was discharged March 19, 1954. A comparison of the tensile properties, hardness, and microstructure will be made to determine the effect of pile exposure on this cold worked material.

Preliminary report HW-31121 has been issued describing the results of the first in-pile exposure of zirconium to pile gas. The average weight gain of the samples amounted to only 0.45 mg/cm^2 after 60 days in H-pile under ambient conditions, as previously reported. The effects of gas reaction and radiation on the mechanical properties of zirconium were found to have been masked by the large effect of thermal annealing. Accordingly, a study of the annealing characteristics of zirconium and Zircaloy-2 has been initiated since process tubes would probably be installed in the worked condition and would be subject to annealing in-pile. A qualitative study of the effect in the gas phase of coupling other metals to Zircaloy-2 is being made by exposing the latter in contact with graphite, aluminum, brass, copper, steel, and stainless steel to air at 250 C. Inspection after 21 days indicates no effect obvious without distrubing the specimens; the graphite specimen had, of course, completely oxidized. Construction of the ex-pile gas flow and electrical control equipment is in progress. The predicted operation date has been extended to late June due to delays in equipment delivery.

High Temperature Uranium-Water Reaction

Design of the pressurized water loop has been considerably modified and simplified following consultation with WAPD personnel. The reaction chamber proper, however, is a new departure in such loops and its design is still under development. Construction design drawings are in progress for the remainder of the loop.

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Radiometallurgical Examination

Two chemically stripped enriched uranium slugs from the Pile Technology production test (PT-105-532-A-2) designed to exceed present end cap temperature limits were examined. These slugs (A-12 and A-13) have been previously reported as having holes and cracks in the uranium surface. Detailed examination revealed that there were no holes and only a few superficial cracks were observed.

Examination of the three ruptures from the 63S evaluation production tests 313-105-14M and 17M has been completed. No evidence as to the cause of failure could be ascertained since the jacket covering the failed portion of the slug was missing. However, it is theorized that a single imperfection in each jacket coupled with imperfect bond could have caused these side-blowout ruptures. A report of this examination has been issued as document HW-31181.

The examination of the ruptured thorium slug was continued. The aluminum jacket was removed by mechanical means and the fact that the cause of the failure was the result of canning a non-standard size slug was confirmed. The preliminary investigation is now completed and a report has been issued (HW-31179). The contamination resulting from stripping the can from the slug was greater than that from any previous similar operation.

The macro examination of two ruptures, which represented the first failures (#279 and #283) from production test of Fernald rolled material (HW-26851) has been completed and a report is in progress. The macro examination of one showed a core through the center of the slug which resisted electrolytic cleaning with dilute HNO_3. Identification of the slugs for determination of their rolling history could not be made.

The study of a ruptured slug from the Fuel Technology production test (PT-313-105-13M) of 0.4 percent chromium alloy was begun. The rupture differed from regular uranium split type ruptures in the fracture pattern and the direction taken by breaks in the metal. A longitudinal split terminated within 1" of each end of the slug, and at the ends of this split, transverse breaks slanted toward the slug center giving a total effect of a Z-shaped crack which separated the slug into two pieces. The alloy was observed to have fractured with a very fine grained, conchoidal fracture pattern. A smooth area, free of corrosion product, was observed near one edge of the longitudinal break. After cleaning in HNO_3, an indistinct core was observed at the slug center. A red corrosion product formed on the cleaned surfaces but was gradually converted to the brown or black coloration usually observed on other ruptured slugs.

Radiometallurgy Facilities and Equipment

Gross contamination from the examination of the ruptured thorium slug spread through the roughing filter inside the shielded cell and through the collecting filter in the basement to raise the radiation level to a point wherein it was necessary to replace the filter. A revision to the building liquid waste system was authorized to permit a direct piping of cell liquid wastes to the crib waste system in the Works Laboratory area instead of collecting the waste in casks and concreting in the 325 Building. An incident at 111-B was investigated when it was discovered that during

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a period of lead brick removal from the abandoned cut-off box a radiation exposure of 8 Rad/hr could have been obtained. The personnel involved were not over-exposed.

Most of the shop work on equipment for the cut-off box has been completed. Unirradiated uranium pieces were cut successfully to prescribed dimensions. A schedule for cutting irradiated uranium and thorium slugs has been formulated. A vacuum annealing furnace is being modified for cell use to conduct annealing experiments up to 900 C on irradiated material. The cathodic etching equipment has been modified for cell use and preliminary experiments on unirradiated material will begin as soon as the vacuum system has been tested. The set-up to make carbon analyses on samples taken from selected portions of irradiated uranium was started with assistance from the Chemical Instrumentation Sub-Unit. Samples will also be obtained for fission product analyses.

Separation Plant Corrosion Problems

The corrosion resistance of pulse column plates of a new design developed by Separations Technology was tested in the laboratory and was found to be satisfactory. The design is one which allows wetting of one face by the aqueous phase and of the opposite face by the organic phase; plates of this design are fabricated by drilling holes in the blanks and punching the holes to the required diameter. The effect of the cold work in the final operation on the corrosion resistance of the material was determined by testing three rectangular specimens of type 347 stainless steel fabricated in the same manner as the column plates and three rectangular specimens without holes obtained from the same sheet stock. The specimens were exposed in boiling 65 percent nitric acid solution for 240 hours under standard Huey test conditions. The corrosion rates calculated from weight loss data averaged 0.001 ± 0.0001 inch penetration per month for both the cold-worked specimens and for the control specimens; no evidence of intergranular attack or of preferential attack was observed on either type of specimen. These data indicate that the extent of cold work performed on the column plates has no effect on the resistance of the plate to boiling nitric acid solutions at concentrations up to 65 percent.

In the field corrosion test of Redox waste tanks mild steel specimens have been exposed for a period of eight months. Recovery of these specimens for examination has not been possible for the past few months due to the geysering of the waste solution in the tank used for the test, TK-104, 241-S, and to the proximity of the sample port to the vapor condenser made highly radioactive by the geysering action. The earliest date for the sample recovery operation has been set at mid-April.

Plans are being formulated for the introduction of corrosion test equipment at the Redox SX waste tank farm, the Purex tank farm and in the Hot Semi-Works waste tank. At all of the latter sites vapor condenser capacities have been increased over that provided at 241-S to prevent the difficulties presently experienced at that site.

A report of the 4-1/2 month laboratory corrosion test of spring steel wire in neutralized Purex waste solution has been prepared.

Rotameters purchased for installation in Purex were found to have extensive defects in the metering tube sections. In the course of examining one unit in close detail, the defects were found to extend to a depth of approximately one-third the wall

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thickness of the metering tube section. Accordingly, it was decided to reject all the metering tube sections. Examination of the lower section of the rotameter disclosed that three welds were inadequate because of lack of penetration. Further, corrosion tests indicated that at least two parts of the inductance coil in the lower section of the rotameter were not resistant to intergranular attack. Service conditions were reviewed and it was decided to replace only those lower sections in the most critical service. The faulty welds in the lower sections of those accepted for non-critical service will be re-welded by the vendor.

The interior of the waste concentrator in the Hot Semi-Works was visually inspected. The closest approach to the surfaces under examination was about four feet, and it was necessary to use a fresh air mask and a lucite shield, consequently the viewing conditions were not too satisfactory. However, it did appear that relatively little corrosion damage had occurred, and it is quite certain that the extent of the damage is of a lower order of magnitude than that observed on the Redox D-12 waste concentrator coils which were examined in detail. Verbal reports place a fair estimate of the total operating time of the Hot Semi-Works waste concentrator concentrating Redox type wastes at about 4-5 months. The operating steam pressure was reported to be 90 psig. This length of service, combined with the relatively good appearance of the heat exchange surfaces lead to the conclusion that either the material of the coil was of superior quality, or more likely, that the operating cycle resulted in less corrosive conditions prevailing. Details of operating conditions are currently under investigation.

Corrosion tests of specimens cut from short lengths of type 304 tubing tack welded to the tube sheet of the first tube bundle for Redox service heat treated in 200 East Area were completed during the month. Four specimens were exposed in Huey tests and all passed. Local areas of intergranular attack were observed and on one specimen the attack, though shallow, affected about one-half the wall thickness. Sectioning the specimens to determine the depth to which the attack extended is now in progress.

Five heat exchangers were fabricated of various types of stainless steel and exposed to Redox waste solution for a period of 41 days at 32 psi gage steam pressure followed by 53 days at 80 psi gage steam pressure. One of the exchangers was fabricated with four one-inch diameter bayonet type tubes with the solution on the outside of the tube; one tube was type 304L, one type 347, one type 309SCb, and one type Carpenter 20 alloy. Four of the exchangers were of the cannister type having the solution on the inside of the tube and on the outside of the shell. The cannister type exchangers were fabricated as follows:

#1 304L tube - 304L shell
#2 347 tube - 347 shell
#3 309SCb tube - 309SCb shell
#4 Carpenter #20 alloy tube - 304L shell.

All the tube sheets were type 304L. All the welds were made with type 308L rod by the TIG (tungsten inert gas) process. A visual examination of the exchangers after the first period did not reveal any significant differences of corrosion attack. At the end of the second period the cannister with the Carpenter #20 alloy tube failed from corrosion. A visual examination of the exchangers has been made and all appear to have suffered from corrosion attack and the type 304L appears to be attacked the

least; however until the tubes have been sectioned, measurements made, and metallurgical examinations made to determine the nature of corrosive attack, a more comprehensive statement cannot be made. The type 308L welds appeared to be very slightly attacked and no evidence of "weld crater" corrosion exists. New heat exchangers of the same design are being fabricated to evaluate type 329 (30-5) stainless steel, titanium, and tubes welded with various alloys.

Metallurgy of Plutonium

Plutonium alloys containing 0.20 and 0.10 weight percent gallium were prepared to supplement the 0, 0.5, 0.6, and 1 percent alloys previously prepared. Cast unalloyed plutonium tensile test specimens heat treated in the delta region (325 C) exhibited improved room temperature ductility. Fracture of these heat treated specimens occurred in the reduced test section as desired. As cast specimens previously tested failed in the grip area and consequently yielded less information. The ultimate tensile strength of unalloyed plutonium is about 52,000 psi, the 0.2 percent off-set yield point is 45,000 psi, with about 1 percent ductility as measured by either percentage elongation or by reduction of area. The modulus of elasticity is 14,700,000 psi. Alloying with gallium decreases the ultimate tensile strength, yield point, and elastic modulus while greatly increasing the ductility. The 1 w/o alloy has an ultimate tensile strength of 20,500 psi, yield point (0.2 percent off-set) 13,500 psi, reduction of area 69 percent, elongation 56 percent in 1/2 inch and modulus of elasticity 6,000,000 psi.

Stress Rupture of Reduction Bomb Materials

Type 309SCb stainless steel being stress reupture tested under simulated reduction bomb conditions failed after 440 cycles from room temperature to 750 C while under a constant stress of 4,500 psi. This is the maximum fiber stress produced in the new design bomb by an internal pressure of 450 psig. The total elongation of the test specimen at failure was 11.9 percent in 4 inches. A welded 309SCb stainless steel specimen is now being tested to determine the effect of welding on time to rupture.

Plutonium Coating Studies

Diffusion coating studies have been continued using uranium as a stand-in until such time as facilities for experimentation with plutonium are available. Complete wetting of uranium has not been attainable in a solution of nickel in calcium-magnesium eutectic at temperatures sufficiently low to make the process applicable to plutonium. The difficulty is believed to lie in surface contamination of the metal being coated. Attempts have been made to coat uranium pieces by dipping in molten zinc or in molten KCl-$LiCl$-$ZnCl_2$ without success.

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 March, 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.

Applied Research Sub-Section

Inventor(s)	Title
M. B. Leboeuf	The Use of Long-Lived Gamma Emitters as Localization Markers for Aircraft and Ships
C. E. Michelson & K. Koyama	A Disposable Cell for a Polarographic In-Line Uranium Analyzer
W. N. Carson, Jr.	A Process Involving Single Step Production of Uranium Tetrafluoride from Aqueous Uranyl Nitrate
R. E. Connally	Fission Counting by Use of Scintillation Counters in Coincidence
J. E. Meinhard	Purification and Isotopic Enrichment of Heavy Elements by Means of Undulatory Heating and Cooling
T. K. Bierlein, H. L. Rutan, E. F. Gates, & D. C. Kaulitz	Glass to Zirconium Metal Seals for Vacuum Applications.

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

FWA:kb

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GENERAL ELECTRIC COMPANY

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HW-31267 [redacted]

RICHLAND, WASHINGTON . . . . . HANFORD ATOMIC PRODUCTS OPERATION

April 6, 1954

This document consists of
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_____ copies. Series A .

MONTHLY REPORT

FUEL TECHNOLOGY SUB-SECTION

MARCH, 1954

A PRIME CONTRACTOR FOR THE [redacted] U.S. ATOMIC ENERGY COMMISSION

G-1532, 2-D

GENERAL ELECTRIC COMPANY

Fuel Technology Sub-Section [redacted] HW-31267

VISITORS AND BUSINESS TRIPS

Name	Date	Address	Purpose
R. A. Quadt	3/2-3/3	Hunter-Douglas Corp., Riverside, Calif.	Extrusion problems
J. A. Fellows	3/23-3/25	Mallinckrodt Chemical Wks., St. Louis, Mo.	Fuel element development discussions
C. D. Harrington	3/23-3/25	Same as above	Same as above
L. J. Weber	3/23-3/26	Same as above	Same as above
B. Weidenbaum	3/24-3/26	Dow Chemical Co., Denver, Colorado	Same as above
L. F. Coffin, Jr.	3/30-4/2	KAPL, Schenectady, N.Y.	Stress Problems

Name	Date	Place Visited	Purpose
A. G. Blasewitz	2/28-3/11	KAPL, Schenectady, N.Y.	Fuel element development discussions
		New York Operations Office, New York, N.Y.	Same as above
		Bridgeport Brass Co., Bridgeport, Conn.	Same as above
		Battelle Memorial Inst., Columbus, O.	Same as above
		Ames Laboratory, Ames, Iowa	Same as above
		Oak Ridge National Lab., Oak Ridge, Tenn.	Same as above
		Vitro Corp., W. Orange, New Jersey	Same as above
G. E. McCullough	2/28-3/11	KAPL, Schenectady, N.Y.	Fuel element development discussions
		New York Operations Office, New York, N.Y.	Same as above
		Bridgeport Brass Co., Bridgeport, Conn.	Same as above

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VISITORS AND BUSINESS TRIPS

Name	Date	Place Visited	Purpose
G. E. McCullough	2/28-3/11	Battelle Memorial Inst., Columbus, O.	Fuel element development discussions
		Ames Laboratory, Ames, Iowa	Same as above
W. T. Kattner	3/1-3/5	Mallinckrodt Chemical Wks., St. Louis, Mo.	Uranium quality discussions
		Fernald, Cincinnati, O.	Same as above
		Battelle Memorial Inst., Columbus, O.	Same as above
		Argonne National Lab., Lemont, Illinois	Same as above
		New York Operations Office, New York, N.Y.	Same as above
		Bridgeport Brass Co., Bridgeport, Conn.	Same as above
R. S. Dalrymple	3/14-3/21	National Corrosion Conf., Kansas City, Mo.	Annual Meeting
O. W. Rathbun	3/21-4/3	Bridgeport Brass Co., Bridgeport, Conn.	Fabrication of uranium
		Fernald, Cincinnati, O.	Same as above
R. L. Reynolds	3/21-3/27	GEL, Schenectady, N.Y.	Underwater examination facilities
		Hadley Associates, Burlington, Vermont	Same as above
K. P. Bokish	3/22-3/27	GEL, Schenectady, N.Y.	Same as above
G. S. Cochrane	3/23-3/26	Bouillon & Griffith, Seattle, Washington	Pilot plant design
G. E. McCullough	3/28-4/3	Mallinckrodt Chemical Wks., St. Louis, Mo.	Fuel element development discussions
		Fernald, Cincinnati, O.	Same as above
		ALCOA, Edgewater, N.J.	Same as above

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URANIUM QUALITY

Slug Core Characteristics

Test conditions for the thermal cycling of uranium cores by electrical induction ("woodsplitter") with simultaneous water cooling were modified. The new conditions permit completion of more tests in a given length of time with only a slight sacrifice in test severity.

Previously reported studies demonstrated that striations lower the ultimate transverse strength of transformed slugs, the reactivity, and the resistance of slugs to splitting during thermal cycles similar to those encountered in the piles. However, the striations appear to have little, if any, effect on the bi-axial strength of as-rolled uranium, and the striations apparently do not effect the uranium core properties as measured by a bend test either before or after transformation.

The reduction of uranium ductility due to hydrogen is under study from several facets and preliminary tests indicate that slugs containing hydrogen can be split more readily than those without hydrogen in the woodsplitter.

Reduction and Casting

A production test is being arranged for the canning and irradiation of uranium cast from both pickled and unpickled derbies into molds of five inches diameter without hot tops, 6-1/2 inches diameter with hot tops, and seven inches diameter with hot tops. Data received from Mallinckrodt and National Lead indicates that hot topping virtually eliminates the central pipe in the casting and that casting of larger diameter ingots causes more effective liquation of impurities to permit fabrication of rods freer of striations than the metal that is currently manufactured. Use of pickled derbies may further reduce the striation content of the uranium rods. It is anticipated that these developments will contribute substantially to improvement of the Hanford fuel cores.

The capacity of the Mallinckrodt and National Lead plants may be increased by faster feeding of the uranium oxide through the fluorination process. The greater feed rate results in a less complete conversion of the oxide to tetrafluoride. Metal samples have been received reduced from green salt with both low and high oxygen content for thorough study of the effect of this variable upon metal quality.

Rolling Processes

On February 26 and March 1, five split ruptures occurred among the first group of Simonds rolled slugs to be irradiated to over 600 MWD/T. These data confirmed the expectation that the rupture rates for Simonds and Fernald rolled metal are comparable at exposures both in the range 800 to 900 MWD/T and as previously reported up to 600 MWD/T.

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Samples were selected for the first stage of the investigation of the effect of rolling deformation patterns upon the ability of slugs to survive in the pile environment. In the course of this investigation, it is planned to seek correlation between the rolling deformation pattern, the ultrasonic absorption pattern, metallographic structures, compression and bend test data, thermal cycling to simulate pile temperature conditions, and bi-axial stress tests. This investigation is expected to lead to a better understanding of the type of fabrication which is essential to the successful irradiation of slugs at higher power levels and to greater goal exposures.

Heat Treatment of Uranium

Analysis of post irradiation data of lead dip canned slugs from beta heat treated rods in Production Test 313-105-6-M indicates that the salt bath beta heat treated lead dipped slugs grew in length to the same extent in both DR and H piles while the alpha rolled triple dip canned slugs increased in length during irradiation in H pile and decreased in length during irradiation in DR pile. No explanation has been developed for this anamolous behavior which is the more perplexing because the triple dipped and lead dip canned slugs were loaded alternately in the tubes in these two piles.

Data are presented giving the warp experience for lead dip canned slugs from salt bath transformed rods and for a smaller number of triple dip canned slugs in Production Test 313-105-7-M. Adequate comparison of the warping of slugs is not possible with the limited facilities and manpower presently available for obtaining the needed data.

Information on plutonium and beta and gamma activity distributions in the cross-section of some slugs indicates that the pile effects which contribute to these unusual distributions may also contribute to slug warping. These possibilities are being explored.

Encouraging progress in drawing as-rolled and beta heat treated rod stock through dies to effect 3-1/2 and 7 per cent reductions in area was made at Bridgeport Brass Company. The 10 per cent reduction in area was not successful, presumably due to use of an unsatisfactory taper on the rod end.

URANIUM DEVELOPMENT

Fabrication of Uranium

Thermally induced stresses developed in an externally cooled slug during pile exposure can be reduced by removing the central core of uranium from the slug. The reduction in surface stresses may reduce the frequency of cleavage-type slug ruptures. To exclude aluminum-silicon from the hole during canning, it is essential that the ends be capped and preparations are underway to accomplish this by welding plugs into the ends of the central cavity. Several hundred cored slugs produced by drilling the central cavity will be irradiated in the near future.

The 4000 uranium powder metal compacts received from Sylvania Electric Products Company were tested for grain size by ultrasonic means. Eighteen slugs were rejected for grain size in excess of .033 mm in diameter. One slug exhibited a uniformly large grain size equivalent to that of gamma extruded uranium while the balance of the rejected slugs showed band of large grain size near the end of the slug. Alpha annealing in argon atmosphere at 600 C for four hours increased the ductility of two of four samples tested by a factor of four, but did not increase the ductility of the other two. Of three annealed slugs tested under cyclic strain induced by a thermal gradient (using the "woodsplitter"), one withstood 50 cycles without splitting; one split after 23 cycles, and one after 12 cycles compared to 2 to 7 cycles required to split unannealed slugs. Examination of the interior of the slug which failed after 23 cycles indicated that the core had been in the beta phase and that cracks were progressing transversely from the central axis to the external surface of the slug. One such crack located approximately one inch from the end of the slug extended to within a few tenths of an inch of the surface but no evidence of the crack was apparent on the surface of the slug. Additional tests are progressing to ascertain the benefits to be gained from alpha annealing the powder metal compact slugs prior to canning.

Tensile tests and bi-axial stress tests on samples of the uranium - 0.4 atomic per cent chromium alloy slugs indicate a 60 per cent increase in ultimate and yield strengths and comparable elongation to that of beta heat treated natural uranium. Comparison of the force and deflection at fracture in a bend test between unirradiated uranium-chromium alloy slugs and slugs irradiated to 830 MWD/T exposure, indicate a decrease of force of 50 to 100 per cent and a corresponding decrease in deflection at fracture of the irradiated material.

Rods rolled from 500 pound uranium-silicon alloy ingots produced at HAPO were received from Fernald. The material exhibited no recrystallization and heavy stringer-type inclusions. It is not possible to distinguish whether the heavy inclusions or the alloy per se resulted in the severe brittle behavior exhibited by these ingots during rolling evidenced by billet fish-tailing and transverse cracks found in the rods. Arrangements have been made to obtain rods fabricated from co-reduced uranium-silicon alloy ingots produced by Mallinckrodt. Steps were also taken to modify the melting and casting procedure at HAPO to improve the quality of ingots produced in the future.

COMPONENTS

Zirconium Cans and Process Tubes

Two hundred zirconium cans have been received from the Bridgeport Brass Company. Of this preliminary lot, eighteen of these cans have been classed as rejects because of excessive grinding marks, overheating during blank preparation, and can imperfections evidenced as leaks [redacted] mass spectrometer type vacuum leak detector.

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Seven zircalloy 2 shells have been drawn by Bridgeport. Difficulties previously experienced with this material were eliminated by additional cold finishing of the blanking stock by a rolling operation to improve the surface quality. Zircalloy 2 is more reliable as regard corrosion resistance than is pure zirconium.

A draw sizing operation was necessary to restore the roundness and straightness of four zirconium and two zircalloy process tube blanks for tube reducing to size at Superior Tube Company. These tubes were distorted during stretcher straightening following blank extrusion.

Uniskanning

Drawn thick-walled cups of 63S aluminum have been successfully uniskanned to shells of 0.012 - 0.016 inch thickness for can application and to 0.002 inches for the development of a technique to fabricate sweater coats from zirconium and other materials. Surfaces of the aluminum specimens exhibited galling and surface flaking which can be related to the roll design and heat treatment of the material prior to the forming operation and hence will be eliminated by process alterations.

Aluminum Component Quality

The potentially serious results which can occur using components containing discontinuities such as smeared over-folds, seams, and inclusions has warranted a survey of the techniques applicable to routinely non-destructively test cans and caps for such defects. From initial results, it appears that an instrument employing the eddy-current principle is the most sensitive for detecting flaws of this nature as has been demonstrated by the MIZ-1 prototype which is being developed for routine determination of the canned slug residual wall thickness. It is planned to investigate more fully the adaptability of this instrument to the aluminum component quality problem.

63S Aluminum Process Tubing

The pre-in-pile testing of 63S process tubes was completed and the tubes were found to be satisfactory for the in-pile testing which will be under the direction of the Pile Technology Sub-Section. Moderate heating of the tube alloy to enable the Van Stone flanging operation to proceed with less chance of splitting the tube is under investigation. Process tubes of 63S aluminum alloys are stronger and should corrode less than 2S tubes.

Aluminum Melting

An aluminum - 0.1 weight per cent beryllium alloy ingot was cast to provide a source of corrosion coupons and cylinders to enable an evaluation of this alloy as a potential can and cap material which should have corrosion resistance superior to the present 2S alloy. Modifications to the vacuum furnace facilities have been made to allow a finer grained melt to be cast with a shorter pipe in the mold.

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Fuel Technology Sub-Section

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CANNING PROCESS

Mechanized Lead Dip Canning

Process evaluation of the prototype mechanized lead dip canning machine developed by members of the Design Section was started. Following the achieving of successful operation of the machine, a production run of several thousand slugs for pile use is planned. It is estimated that such slugs may be available by June 30.

Use of Nylon Sizing Dies for Unbonded Jacketing

Nylon as die insert material for the "C" process sizing dies is being evaluated as it has been demonstrated that nylon can be used in operations of this type without a lubricant. Slugs canned by the "C" process (unbonded) are currently sized in steel dies. The slug assembly must be coated with a wax lubricant to prevent galling and scratching the can during the sizing operation. Contamination of the slug closure with the lubricant used, through accidental pickup or incomplete component cleaning following sizing may lead to porosity or pinholes during the welding operation. It will be desirable to avoid the requirement for a lubricant.

Rupture of "C" Process Slugs

During March, two "C" process canned "J" alloy cores failed after four and seven days' irradiation, respectively. Cause of the failures is not evident although failure due to entrance of water through the closure would be expected. One slug exhibited no visually detectable weld defect and no serious defects in the weld were noted upon re-examination of the closure radiographs of either.

Canning of Powder Metallurgy Slugs for MTR Evaluation

Ten four-inch Sylvania powder metallurgy slugs were lead-dip canned in 45 mil wall cans with 0.350-inch cap and base test in the MTR. Pieces have been closure radiographed and non-destructively tested for can wall penetration in addition to the standard manufacturing tests. All appear to be of high quality.

CANNING DEVELOPMENT

Hot-Press Canning

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Fuel Feasibility Studies

Preliminary studies were initiated in hot-press canning thorium. A thorium wafer was pressed at 550 c/12 tsi/10 minutes between two aluminum plugs. Stripping showed bonding had occurred, but the bond strength was low and the fracture brittle.

Differential Thermal Expansion Canning

Approximately eighteen four-inch simulated slugs and four four-inch nickel-plated uranium slugs were canned by differential thermal expansion techniques. Preliminary evaluation indicates a consistent bond between the components.

DEVELOPMENT EQUIPMENT

Gang Press Prototype for Hot-Press Canning

Operation of a four-unit pilot model gang press for the hot-press canning of slugs was initiated during the month. This press will be utilized to firm the design features of the mechanical components of a 16-unit prototype production-model hot-press, and to obtain operating information concerning temperature distribution and variation within the electrically heated die block. Initial operation revealed no serious mechanical problems that cannot be corrected by modification of operating procedure. Temperature variations of 30 C were obtained over the length of a special thermocouple slug inserted in the press, at a nominal pressing temperature of 600 C.

Fabrication of the 16-unit gang press is proceeding on schedule. Current delivery and fabrication promises indicate that all components for this press will be available by the end of April, and that operation should be initiated in early May.

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Manufacturing Facilities for J and N Slug Canning

A tentative flowsheet for the production canning of J and N slugs in 303-J and 313 Building was issued. Detailed procedure for Iridite treatment of cans was transmitted to the Manufacturing Department. Detailed design of the production die inserts and housings for hot-press canning were reviewed. A study of the loss of U_{235} from J slugs during component preparation was made and submitted to the Accountability Section for recommendations regarding the necessity for recovery of this material.

Pilot Plant

The Phase I construction, building shell, of the Fuel Element Pilot Plant - Project CA-546 is estimated to be 25 per cent complete and essentially on schedule. The original deadline of May 22 for completion of Phase I construction has not been changed. Detailed drawing and specifications for Phase II interior construction were checked, discussed with the Architect-Engineer, and approved. Construction work on the 314 Building (Project CG-563) is 20 per cent complete. The 200 KW Tocco furnace will be moved from 304 Building to 314 Building on an expense work order. The move should be completed by May 1 with the unit being out of service only about four days.

FUEL EXAMINATION

Irradiated Material Examination

A program of fracturing, examination and photography of a large number of irradiated slugs of known exposure, composition, and fabrication history was started. The purpose of this program will be to compare the information thus obtained to similar information prior to irradiation in an effort to determine the effects of irradiation upon embrittlement of uranium and other potential changes.

Examination Facilities

Information obtained during a visit at the General Engineering Laboratory indicates that the four additional slug handling dollys were shipped the latter part of March and it is expected that the routine measurer will be shipped the first part of April. These dates are consistent with present installation plans.

TESTING METHODS

Canning Examination

About 300 empty eight-inch cans were examined with the Al-Si penetration detector to determine the extent of can defects which can be detected with the equipment. The cans examined did not appear to contain any defects large enough to be detected other than minor surface scratches. This does not assure, however, that there might not be flaws in some of the cans that could lead to failures in their use on canned slugs in the piles.

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Equipment for the construction of the second model of MIZ-1 is arriving and design of the new device is nearly completed.

Uranium Ingot Testing

Ultrasonic equipment with sufficient power to penetrate a 6-1/2 inch uranium ingot has been "breadboarded" and tested. The equipment detects internal flaws in the cast ingot by virtue of reduction in transmission of a one megacycle pulse propagated through the ingot along a diameter. Central pipe in a section of 6-1/2 inch ingot is easily detected.

COATINGS AND CORROSION

Alloy Formation During Hot Pressing

One slug having a damaged nickel plate was pressed for ten minutes at 575 C and 12 tsi. During this time considerable UAl_3 was formed at the damaged spot in the plate. This occurrence emphasized the necessity for a barrier layer between uranium and aluminum for any process in which the metals are to be exposed to high temperatures for any considerable length of time. The efficacy of nickel as a barrier layer was demonstrated in this experiment, since no UAl_3 was formed except at the point of the damaged nickel plate.

Electroplating

Several slugs were plated with 0.002 inches of iron and canned by hot pressing or differential thermal expansion. In all cases a brittle compound layer formed, resulting in a weak bond. The effect of heat and temperature on the strength of the bond is being studied.

New electroplating facilities were installed in 3706 Building. Using the present process, 30 slugs per day can be electroplated in this equipment. Studies to increase the current density and consequently increase the capacity of the equipment gave promising results.

Some slugs were nickel-plated using different conditions and were canned by Fabrication Techniques Sub-Unit using differential thermal expansion. The yield was essentially 100 per cent, there were no blisters, and the bonds were very good; it was impossible to strip the can from the slug.

Cleaning of Hot-Pressed Slugs

Further study of methods of cleaning the hot-pressed slugs has shown: (a) if Iridite is used during hot pressing, the slugs may be cleaned efficiently in R-3 dip in 30 minutes; (b) if Iridite is not used, 60 minutes in R-3 dip are required; (c) the slugs may be cleaned by vapor blasting for five minutes. The disadvantage of vapor blasting is the large amount of handling required. No pitting which could be attributed to the cleaning procedure was observed in any of the three methods.

Gas Analyses

The apparatus for determining the amount of hydrogen in uranium was installed in 326 Building. The slugs are being analyzed to determine the amount of gas introduced into the uranium during each step of the plating procedure. Formerly the samples were heated under vacuum for four hours to obtain all the gas, but recent rate studies have shown that an extrapolation after one hour gives results which have an error of less than two per cent. This will result in a great saving of time and make possible the analysis of many more samples.

Corrosion Studies

Samples of aluminum powder metallurgy product were tested in the laboratory; the corrosion rate and solution potentials were approximately the same as for 2S aluminum. Small pits developed during the first few days of exposure but did not develop to any important extent. ALCOA reports that this material is many times stronger at 350 C than is 2S aluminum.

Corrosion-Resistant Films

Samples of aluminum and 1010 steel which were heated in a one per cent solution of chromic acid at 170 C were covered by a thin corrosion-resistant film. This film was very hard to remove, and may be valuable in minimizing corrosion.

Many different types of anodic films have been produced. Most of these films provide some corrosion resistance, but are especially valuable for preventing abrasion during charging. This protection is very important in the case of slugs having thin can walls.

Some glass coatings are being applied to slugs by electrophoresis. These coatings can be applied rapidly and should be resistant to corrosion by water at all temperatures expected in the pile.

H-Loop Test

The test of autoclave and anodic films exposed in-pile at higher temperatures was stopped because of leaks in the apparatus, and the slugs were discharged. Although special precautions were taken in charging and discharging, all slugs except those having an anodic film were severely damaged on the surface. These observations indicate that the thin-walled slugs now being contemplated must have some protection against damage during charging.

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.

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GE McCullough:acj

[redacted]

G. E. McCullough
Manager - Fuel Technology
ENGINEERING DEPARTMENT

MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

C.W. Elston and R. Sheppard, Schenectady, N.Y., H.M. Perry, Seattle, Wash., and G. Clifton, Pasco, Wash., representatives of the General Electric Company, visited here March 2 and 3 to discuss design of turbines and turbine controls.

Charles Palmer, Panellit, Inc., Chicago, Illinois visited here March 11 - 24 to install modified flexowriter to 105-C temperature monitor.

J.H. Drenning, Combustion Engineering, Inc., Seattle, Wash., visited here March 12 to discuss design of heat exchangers.

R.A. Anderson, Panellit, Inc., Chicago, Illinois visited here March 17 - 20 to inspect 105-C temperature monitor and discuss 100-K temperature monitor and confer on delivery of the latter.

N.E. Dillow, Pittsfield, Mass., C.B. Hinton, Spokane, Wash., A.T. Bassett, Seattle, Wash., and G. Clifton, Pasco, Wash., representatives of the General Electric Company, visited here March 19 to discuss transformer design.

H. Nathan, Naval Electronics Laboratory, San Diego, California, visited here March 23 to discuss mercury jet switch problems.

G.F. Melick, Jr., Harrison, N.J., and C. Cummins, Seattle, Wash., representatives of Worthington, Corp., visited here March 25 to discuss design of turbine condensers and pumps.

R.A. Huggins visited the following companies to obtain data on stainless steel valves and piping, and welding fabrication techniques, February 27 - March 12: Crane Company, Chicago, Illinois; Tube-Turns, Inc., Louisville, Ky.; Powell Valve Co., Cincinnati, Ohio; The Lukenheimer Company, Phildelphia, Pa.; Flexitallic Gasket Company, Philadelphia Pa.; A.O. Smith Company, Chicago, Illinois; Grinnell Company, Inc., Providence, R.I.; Stainless Welded Products, Inc., Jersey City, N.J.; and Public Service, New Jersey, Kearny, N.J.

E.See Day, Jr. visited the E.I. duPont de Nemours & Co., Savannah River Plant, Aiken, South Carolina to inspect design of P-10 facilities. He also visited Fisher & Porter Company, Electrical Development Company, and Royson Engineering Company, all of Hatboro, Pa., on equipment and test facilities inspection. (Projects CA-512-R, CA-513, and CG-553). The trip was made February 27 - March 9.

W.P. Ingalls, L.C. Koke and J.F. Fletcher visited the E.I. duPont de Nemours & co., Savannah River Plant, Aiken, South Carolina, March 1 - 3 for P-10 consultation. They also visited the duPont office at Wilmington, Delaware March 4 - 5 for further P-10 consultation.

G.H. Hill visited the General Electric Company, Schenectady, N.Y., to attend a Drafting Supervisors' Conference March 3 and 4.

R.H. Beaton visited San Francisco, California, March 4 to deliver a speech at the National Association of Power Engineers meeting; March 5 he visited the Radiation Laboratory, University of California, Berkeley, California for research and development discussions.

L.L. Zahn attended a meeting of the AIChE in Washington, D.C., March 5 - 11.

J.F. Fletcher visited the Hammel-Dahl Company, Providence, R.I., and Consolidated Vacuum Corp., Rochester, N.Y., March 8 - 9 for P-10 consultation.

R.T. Jaske attended the Industrial Waste Conference, University of Washington, Seattle, Washington, to present talk on "Waste Heat from Atomic Reactors", March 18 - 19.

C.T. Drury visited the Northwest Electronics Inc., Spokane, Washington, March 18 - 19 to discuss engineering details of communication equipment for 105-K.

J.R. Wolcott and J.H. Snyder visited the Argonne National Laboratory, Lamont, Illinois to inspect plant and attended the meeting of The American Power Conference, Chicago, Illinois, March 22 - 26.

D.L. Peterson visited the Western Gear Works, Seattle, Wash., March 22 to witness acceptance tests on metal manipulator.

R.T. Coffman visited the Western Gear Works, Seattle, Wash., March 23 to consult vendor on pulse generator design.

E.J. Barrett visited Bouillon and Griffith Company, Seattle, Wash., March 24 - 26 to review problems on design work being performed by Bouillon and Griffith.

ORGANIZATION AND PERSONNEL

Personnel Statistics:

	February 28			March 31		
	Exempt	Non-Exempt	Total	Exempt	Non-Exempt	Total
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	61	12	73	61	12	73
Design Planning Unit	18	12	30	18	13	31
Design Engineering Sub-Section	86	11	97	87	12	99
Drafting Unit	8	90	98	8	90	98
Total Section Personnel	175	126	301	176	128	304
Technical Graduates (Rotational)	-	6	6	-	2	2
TOTAL	175	132	307	176	130	306

Accessions - 5
Separations - 6

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GENERAL

Design Section engineering effort for the month of March was distributed approximately as follows:

	Man Months Expended	% of Total
1952 Expansion Program	51.1	29.0
Reactor Plant Modification for Increased Production	21.3	12.1
3X Program - 100, 200, and 300 Areas	19.2	10.9
Other Projects and Design Orders	32.3	18.3
Research and Development	52.2	29.7
	176.1*	100.0

* Equivalent man months includes 6.3 months of overtime.

This reflects a gradual decrease in Expansion Program activity and a corresponding increase in other projects and design orders, especially the 3X Program.

Design Section drafting manpower for the month of March was distributed as follows:

	Man Months Expended	% of Total
Design Section	91.9	92.5
Project Section	4.1	4.1
Technical Section	3.2	3.2
Other	0.2	0.2
	99.4*	100.0

* Equivalent man months expended includes 0.8 months of overtime.

The drafting production for the month was 335 new drawings, 17 charts and graphs, and 242 revisions. The drafting room average was 4.7 man days per drawing.

The Design Section Operating Budget for FY 1956 and Revision of FY 1955, including liquidations to research and development, was completed and submitted to the Financial Department for consolidation prior to review and approval by the Engineering Department.

DESIGN DEVELOPMENT

Statistics:

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

	Man Months Expended	% of Total
RDS-D-10 Reactor Design Development	17.9	34.3
RDS-D-11 Water Plant Design Development	5.4	10.3
RDS-D-12 Separations Design Development	10.6	20.3
RDS-D-13 Mechanical Design Development	10.0	19.2
RDS-D-14 Utilities and Services Design Development	2.1	4.0
RDS-D-15 Engineering Standards and Materials Development	6.2	11.9
	52.2	100.0

RDS-D-10 and D-11 - Reactor Plant Development

The scope of activity was reduced appreciably during the month. Work was directed towards the development of complete information on the economic potentialities of a 3000 MW reactor. This information can be used in the selection of parameters for future reactors with regard to items such as power level, lattice spacing, and capacity for special isotope production. Other items being developed are cost information associated with alternate designs as in-pile boiling, new fuel geometries, etc., and mechanical components and materials for application to future reactors. Rough draft reports were prepared covering alternate reactor site locations, determination of flexibility of a power generation system for a variety of conceivable operating conditions, and analysis of the appropriate balance between water plant capacity, coolant temperature, heat exchanger areas, process tube annulus and other critical flow parameters.

RDS-D-12 - Separations Design Development

The scope of a nitric acid fractionator for the Purex Plant which will operate at reduced pressure was completed. Low pressure operation should increase the expected life of the fractionator indefinitely except for the heat transfer surfaces which are removable, relatively inexpensive, and for which a three-fold increase in service life is anticipated.

Scope was completed for a ferrocyanide scavenging system for the Waste Metal Recovery Plant which will reduce the volume of liquid waste which must be stored in underground tanks by 85%, the liquid supernate being cribbed. The application to Redox and Purex wastes is being studied.

The scope of ammonia scrubber installations for the Redox Plant to eliminate the emission of radioactive ammonium nitrate from the ventilation stack was completed. Design development studies were initiated on long range methods for controlling in-canyon contamination in the Redox Plant and stack emission of radioactive particulate matter.

Preparation of detailed drawings for the mock-up of a prototype vertical hydrofluorination furnace for Task II of the 234-5 Building continued, and details of the lift mechanism, condenser, hood, and retort are now complete. Work was initiated on designs for improvements to the process ventilation system in the 234-5 Building aimed at greater air capacity and lower humidity.

RDS-D-13 - Mechanical Design Development

Following furnace repairs, initial hot operation of the prototype fuel element canning machine was started on March 23, 1954. All parts functioned properly, with no evidence of heat distortion. Loading of components was not successful because of extremely rapid freezing of metal on the can-sleeve assembly as it drops into the bath. Corrective action is being taken. The exhaust system successfully eliminated fumes above the bath and minimized heat above the furnace. It is anticipated that full operational testing will start early in April.

Material is being gathered for a study of the factors involved in the application of high frequency induction heating to the welding of fuel elements. Equipment and operating costs of the present system and estimates of the proposed system are being compiled to show the relative merits of the two systems.

The selection of components and the drafting for an in-line alpha monitor was continued and is approximately 85% complete. Arrangements are being made to have a prototype instrument installed in the Hot Semiworks.

RDS-D-14 - Utilities and Services Design Development

The document "Underground Pipe Line and Structure Corrosion Study Program" was issued to inform other interested groups of this activity. The drawings for the test apparatus are essentially complete; material lists are being prepared and requisitions will follow.

A study of the Btu consumption at the various areas for the past 26 months and development of an estimate for the Btu requirements for the next four years are being made to ascertain the possibility of converting from coal to natural gas. The problems involved in converting from coal to gas, and the subsequent use of gas in boilers and stacks that were primarily designed to utilize coal fuel are also being studied.

RDS-D-15 - Engineering Standards and Materials Development

Cost to date for development of engineering standards for the current fiscal year is $39,217.

The following standards and revisions to standards were completed and issued:

D-2-4a - Primary Dead End Assembly
D-6-1a - Street Lighting Dead End Assembly
D-1-13 - Sound Powered Telephone Receptacle - Rev. 1
D-2-3a - Double Crossarm Assembly - Rev. 1
D-2-3b - Single Crossarm Assembly - Rev. 1
D-2-6 - Rack Assemblies - Rev. 1

HW-4900-S - "Standard Specification for Qualifying Welders", Rev. 1

DI-2-W p.1 - "Instructions to Design Engineers for Use of HW-4900-S".

Pages 1 and 7 of Electrical Standards Book

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

a. HWS-5750-S "Electrical Pole Line Hardware and Materials" is a new standard specification which is 70% complete.

b. Twelve new electrical guying standards are approximately 70% complete.

c. A summary in bibliographic form was prepared of the technical information which has been collected to date on the industrial noise reduction study.

DESIGN PROJECTS

Statistics:

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

		Man Months Expended	% of Total
CA-512-R	100-K Reactor	29.3	23.6
CA-512-W	100-K Water Plant	2.2	1.8
CA-513	Purex Separations Facility	11.1	9.0
CA-514	300 Area Expansion	4.5	3.6
CG-551	Expansion of Building 234-5 Facilities	4.0	3.2
CG-558	Reactor Plant Modification	21.3	17.3
CG-562	TBP Plant Modification	1.7	1.4
CG-567	Alum-Activated Silica Water Treatment Facilities	1.0	0.8
CG-573	3X Program - 300 Area	11.8	9.5
CG-574	3X Program - Irradiation	0.8	0.6
CG-575	3X Program - Extraction	6.6	5.3
Major Projects - Other than Expansion Program		23.1	18.7
Minor Projects and Design Orders		6.5	5.3
		123.9*	100.0

* Equivalent man months expended reflects 5.9 man months of overtime.

CA-512 - 100-K Area Facilities

Design activity on 100-K Reactor Facilities was limited to the following items in support of construction: bid review, drawing revisions, review of vendor drawings, the preparation of construction as-builts, and design liaison with the field.

It was decided to use 26 gage thermocouple wire for the KE Reactor in lieu of the 20 gage now provided by the design because this offers reasonable promise of extending the life of the thermocouple. It was also decided that provision be made in the reactor and at the rear face for future addition of the recirculating test facility at an estimated cost of $29,850, work which, if not done until after start-up, would cost an estimated $692,000.

A project proposal (HW-31090) for the First Capacity Increase - 230 KV System was completed and is in the process of being approved. The proposal is concerned chiefly with acquisition of BPA's Midway Benton #2 transmission line for 230 kv, and with its incorporation into the Hanford loop.

CA-513 - Purex Separations Facility

Design of the Hot Semiworks Conversion is 98% complete, an advance of 4% during the month. Of the 147 required drawings, 138 have been approved and seven are out for comment. Design work remaining consists of four electrical drawings, checking of five Technical Section drawings and preparation of 6 acceptance test procedures.

Revisions to the Purex Tank Farm system were scoped to combat expected vapor release surges, and resultant spread of contamination as experienced at the Redox Plant. The scope includes a de-entrainment tank to "knock-out" radioactive liquids and solids; additional condenser capacity through addition of contact condensers; and piping, instrumentation, and a crib. The revisions are estimated to cost approximately $250,000, of which a part might be recovered by cancelling existing work.

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A detailed engineering study of the expected capacity of the Purex Plant was started as a first step in determining what equipment and facilities must be modified or expanded to achieve production rates beyond the nominal design rate. At the same time a final review will be made of possible errors in design.

Work was started on an engineering study to determine the best porposal for the burial of failed equipment. Cost estimates, sketches and a recommendation report will be prepared.

CA-514 - 300 Area Expansion

Detail design of the 300 Area Expansion Program was advanced 5% during the month even though the emphasis continued to be on the 3X Program. However, additional work required on the slug recovery process equipment indicates a net gain of 3% to an over-all 84% complete. The two major items that affect completion of Project CA-514 are design work remaining on CG-573 (3X Program) and the lack of detail information on the major process machines. In order to expedite completion, further work on CG-573 will be delayed until after June 1, 1954. Revisions to the specifications for the component cleaning machines were reviewed and approved during the month. Design drawings on new autoclaves and modifications to the existing autoclaves were revised to accomodate either steam or water.

CG-535 - Redox Capacity Increase - Phase II

Final design for Redox Capacity Increase, Phase II, was advanced 1% during the month to 93% complete. Four drawings were completed and approved during the month.

CG-539 - Redox 241-SX Tank Farm

Over-all design for the 241-SX Tank Farm is approximately 98% complete, an increase of 3% during the month. Two drawings were revised and three drawings were issued for comment. Four additional drawings will be required.

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

Design work on Activation of Task I, Building 234-5, was advanced 10% during the month to 95% complete. Twenty-five drawings were completed and approved during the month making a total of 100 drawings approved to date out of 123 required.

CG-551 - Expansion of Building 234-5 Facilities

Design work on Expansion of Building 234-5 Facilities is approximately 96% complete, an increase of 11% during the month. Of the 258 required drawings 213 have been approved to date, an increase of 13 during the month. The design of the process portions of the project are complete on schedule. Design of the Final Inspection Facilities portion of this project is 85% complete. Field liaison, mock-up and testing, and preparation of acceptance test procedures remain to be completed.

CG-558 - Reactor Plant Modification for Increased Production

Over-all design on Reactor Plant Modification for Increased Production was advanced 2.3% during the month to 11.7% complete. Detail and scope design were increased 2% and 7%, respectively, during the month to 7% and 73% complete.

A rough draft of the drawing schedule was completed and issued for comments. Information was compiled for a preliminary material and equipment list. Design work is progressing on the river pump house of the 100-B and D Areas, the secondary pumps of the 100-B Area, the primary pumps of the 100-B, D, and DR Areas, and the 100-D Area substation.

Certain portions of the D-DR plant design are being expedited to permit additional alteration during the outage for horizontal rod replacement. These include modifications to the effluent system, removal of experimental hole thimbles, and the relocation of 190-DR transformers to a new location which will not interfere with construction of the new 190-DR pumping station.

The venturi-orifice patterns and the Panellit gage sizes were agreed upon based on enrichment of 24 kg U-235 at B, D, DR, F, and H Reactors and 35 kg at C Reactor. Panellit gage settings are based on flows of 71,000 gpm at B, D, and DR; 52,000 gpm at F; 61,000 gpm at H; and 91,000 gpm at C. Gage settings are based on trip before boiling when operating up to 105° C normal outlet temperature.

CG-562 - Waste Metal Recovery Plant Modification

Design of the modifications to the Solvent recovery system of the Waste Metal Recovery Plant is 98% complete, an advance of 13% during the month.

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

Design of the Alum-Activated Silica Water Treatment Facilities was advanced 2% during the month to 100% complete. Twenty-five drawings, two specifications, and fourteen requisitions were required.

CG-573 - Hanford 3X Program - 300 Area

Over-all design of the Hanford 3X Program - 300 Area is approximately 84% complete, an increase of 18% during the month. The scope for the facilities in 313 and 303-J Buildings was changed early in the month. In order to facilitate completion of CA-514, it is planned to delay work on CG-573 until after June 1, 1954. Other equipment to be scoped includes wall-bond test equipment, central can preparation station and recovery of product slurry.

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

Authorization for design of Hanford 3X Program, P-10 Irradiation was received during the month and scope design is 65% complete. Scoping assumes either DR and C Reactors or B, D, DR, and F Reactors will be charged with P-10 loadings, the selection dictated by production requirements, the ability of the slugs to withstand high exposure rates, and the availability of slugs.

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

Scope design of Hanford 3X Program - P-10 Extraction Facilities was advanced 10% during the month to 15% complete. The greatest portion of the operating and technical requirements has been received and scoping is in progress on all phases - flow diagrams, material handling, equipment arrangement and layout, service requirements, shielding, etc. A study was started to determine the most logical way of meeting production commitments.

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CG-578 - Effluent Water Monitoring Improvements - 100-B, D, DR, F, and H Areas

Authorization for design of Effluent Water Monitoring Improvements - 100-B, D, DR, F, and H Areas was received during the month and detail design was started at the end of the month. The work includes the providing of new gamma-type effluent water monitoring systems and the modification or removal of portions of the existing beta-type monitoring systems.

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

Design of a "hot" ball separator for the Ball 3X System was advanced 10% during the month to 92% complete. One field test was held during the month.

D.O. 100549 - Redox Back-Cycle (CG-187-D-II)

Design work was limited to the revision of two column drawings during the month because of more urgent work required on the design of approximately 12 jumpers for 202-S Building operations. Design work remains at approximately 60% complete.

D.O. 100630 - Fuel Element Pilot Plant

Final architect-engineer drawings and specifications for Phase II work were reviewed and approved. A color schedule was prepared and incorporated in the specifications.

D.O. 100688 - Solvent Building

Design was advanced to 80% complete and two drawings were prepared and issued for comment.

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

Design for modifications to the 314 Building was advanced 15% during the month to 75% complete.

D.O. 100742 - Electro-Magnetic Counter System

Design of a pulse counting instrument for determining pulsation rate of pulse columns is 50% complete, an advance of 30% during the month.

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

Preparation of a project proposal for 100-C Reactor Plant alterations was advanced 15% during the month to 95% complete and is scheduled for submittal to the AEC early in April.

D.O. 100752 - FY 1955 and 1956 Plant Equipment Budget

The Engineering Department's presentation of the Plant and Equipment Budget for FY 1956 and Revision of FY 1955, including projects for Improvements, Alterations and Additions to Existing Production, Technical and Associated Facilities at Hanford Plant (Miscellaneous Projects under $100,000), together with construction budget data sheets, was completed and submitted to the Financial Department.

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

Design was continued on the modification of the 189-D Process Tube Mock-Up for high temperature-pressure studies and is approximately 30% complete, an advance of 5% during the month.

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

Design work on a self-concentrator tank and associated piping and accessories for the Hot Semiworks is approximately 45% complete. The magnitude of design work on this job increased from 12 drawings to an estimated 18 drawings based on the receipt of a firm scope from the Project and Technical Sections.

D.O. 100756 - Exhaust Hoods for Fuel Element Pilot Plant (CA-546)

Design work was started during the month on exhaust hood for fuel element pilot plant. Approximately 10 drawings will be required.

D.O. 100757 - "As-Built" Area Maps

Drafting is continuing on the revision of Hanford project maps to bring them up to date. Fourteen electrical drawings and 29 civil drawings are ready for preliminary comment.

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

Design work on a new Redox cell ventilation unit is approximately 60% complete, an advance of 20% during the month. Two civil and one electrical drawings were issued for comment.

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

Detail design of the graphite components for the Prototype Constants Test Reactor was advanced to 65% complete.

D.O. 100781 - Scope Design for Replacement of UO_3 Nitiric Acid Fractionator

Scoping was continued on the design of a replacement nitric acid fractionator for the UO_3 Plant. Equipment to operate at low pressure is being considered. It was recommended that the spare fractionator bottom section be installed at an early date to protect the upper section from corrosion.

D.O. 100783 - Completion of Minor Construction Fabrication Shops (CG-511)

Design of a decontamination slab and dry well was started and one drawing was issued for comment.

D.O. 100791 - Modifications to 115-B Building for "C" Area Gas Supply (CG-431-B)

Design work was started on modifications to the 115-C gas system. Approximately three new drawings and 15 revisions to existing drawings will be required.

D.O. 100796 - P-10 Development Facility

A preliminary project proposal requesting authorization for design scope and the

initiation of detailed design for the P-10 Development Facility was completed and submitted to the AEC in March.

D.O. 100800 - Jumpers for D-12 202-S Building

Design work on five jumpers required for the D-12 vessels installation in the 202-S Building was started and completed during the month. Five drawings were approved and issued.

D.O. 100826 - Television Installation in 105-B Building, Scope

Scope design was started on the television installation in the 105-B Building. One camera will be installed in the discharge area with monitors in the control room and "C" elevator. Two scope drawings and design criteria were prepared and issued for comments.

D.O. 100831 - Redox Oxidizer Off-Gas Treatment

Series gas scrubbing and filtering of the H-4 Oxidizer off-gas in the Redox Plant was rescoped. These revisions are aimed at reducing the possibility of ruthenium emission from the Redox ventilation stack. The new scope specifies two caustic scrubbers operating in series backed by a fiberglass filter with the off-gas directed through the ventilation sand filter.

D.O. 100834 - Particle Problem - Animal Exposure Equipment (CG-572)

Design was started on alterations to the 1705-F Building and information was submitted to drafting.

D.O. 100845 - 300 Area Water Study

An engineering study was started on the problem of the most economical method of providing the 300 Area with an independent water supply.

D.O. 100846 - General Improvements to Laboratory Area Buildings (CG-576)

Design was started and prints were prepared showing details on the installation of new windows, drain trench and sump in the 326 Building. Design is approximately 50% complete.

D.O. 100847 - Convert White Bluffs Ice House to Electrical Distribution Headquarters

Preliminary design was started for project proposal purposes to convert existing building shell of former White Bluffs Ice House to an Electrical Distribution Headquarters. One arrangement drawing was prepared.

D.O. 100849 - Physical Constants Test Reactor Building

Final design work was started for a lump sum construction contract on a building for a prototype physical constants test reactor and is 25% complete. A drawing schedule was prepared and issued and design is scheduled for completion during May.

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DESIGN WORK COMPLETED DURING MARCH

D.O. 100529 Ball Third System - Ball Recovery System
D.O. 100598 Jumper "As-Built", D-12 to D-10; 202-S Building
D.O. 100656 202-S Building, Cell Layout As-Builts
D.O. 100737 Specification Drawings for Agitators, 221-U Building
D.O. 100741 CivilDefense Headquarters
D.O. 100753 Building for Physical Constants Test Reactor - Preliminary Design
D.O. 100760 H-5 Recirculation Jumper - 202-S Building
D.O. 100761 Temperature Traverse Charts, 202-S Building
D.O. 100763 Diversion Box Jumpers, D-8 to 151-U, 200-W Area
D.O. 100769 H-2 Drawing of Evaporator, 224-U Building
D.O. 100770 (CG-569) Replacement of Catch Tanks 311-ER and 302-BR
D.O. 100773 Auxiliary Ventilation Counting Room, 329 Building
D.O. 100774 Portable Mirror for Diversion Box Repairs
D.O. 100776 Redox Recycle Tank
D.O. 100789 Crane Hook for Cell Blocks (221-U)
D.O. 100793 Jumper - 155-TX Diversion Box
D.O. 100794 Jumper - 153-T Diversion Box
D.O. 100802 Jet specification - 200-W Area
D.O. 100804 D-12 to D-10 Overflow Jumper, 202-S Building

INVENTIONS

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

R H Beaton

Manager, Design
ENGINEERING DEPARTMENT

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DESIGN SECTION WORK STATUS

PROCESS ENGINEERING SUB-SECTION
ENGINEERING MAN MONTHS

	Backlog Start Of Mo.	Orders Rec. During Month	Time Spent During Month	% of Total Effort	Backlog End of Month	FY '54 Apr.	FY '54 May	FY '54 June	FY '55 July	FY '55 Aug.	FY '55 Sept.	* Sked. FY '55 Only	Ant.Ft. FY '55 Only	Total FY '55
CA-512	132	-	13.7	18.6	118.3	12	12	11	11	10	9	83.3		83.3
CA-513	15	7.4	4.4	6.0	18.0	4	4	4	3	2	1	6.0		6.0
CG-551	7		1.9	2.6	5.1	2	1	1	-	-	-	1.1		1.1
CG-558	36		5.3	7.2	30.7	5	5	4	3	3	3	16.7		16.7
3X Program	44		5.4	7.4	38.6	5	5	5	6	7	7	23.6		23.6
RDS Program	179		40.6	55.2	138.4**	40	40	41	42	43	46	-	600	600.0
Other Major Projects) Minor Proj. & D.O's.)	9	8	2.2	3.0	14.8	2	3	3	3	3	3	-	36	36.0
Ant. Fut. Work (Major)						-	1	2	4	4	4	-	138	138.0
TOTALS	422	15.4	73.5	100.0	363.9	70	71	71	72	72	73	130.7	774	904.7

DESIGN ENGINEERING SUB-SECTION
ENGINEERING MAN MONTHS

CA-512	101	10	12.7	15.9	98.3	12	10	10	9	9	8	56.3		66.3
CA-513	22	7	4.0	5.0	25.0	4	4	4	4	4	4	13.0		13.0
CA-514	16	25	3.2	4.0	37.8	4	4	4	3	2	3	25.8		25.8
CG-551	5		1.6	2.0	3.4	1	1	1	-	-	-	.4		.4
CG-558	309		14.0	17.5	295.0	15	16	17	18	19	20	247.0		247.0
3X Program	166		12.9	16.1	153.1	14	14	15	15	15	14	110.1		110.1
RDS Program	41		7.5	9.4	33.5**	7	7	8	8	9	9		210	210
Other Major Projects	47	55	17.7	22.1	84.3	18	16	13	12	10	9	37.3		37.3
Minor Proj. & D.O's.	16	8	6.4	8.0	17.6	5	6	6	6	6	5	.6	60	60.6
Ant.Fut. Work (Major)						-	2	3	6	7	9	5.0	281	286.0
TOTALS	723	105	80.0	100.0	748.0	80	80	81	81	81	81	505.5	551	1056.5

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

	Authorized Projects FY 54 & 55	Ant. Future FY 54 & 55	Totals
Arch. & Civil	126	100	226
Mechanical	207	166	373
Electrical	195	138	333
Instrumentation	146	103	249
Standards	74	49	123
TOTALS	748	556	1304

* Includes July, August, and September, 1954
** Fiscal '54 only

Design Section

HW-31267

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MONTHLY NARRATIVE REPORT - MARCH 1954

PROJECT SECTION

I. SUMMARY

A. ORGANIZATION AND PERSONNEL

Assignments were found for all of the 19 expediters who were excess to requirements for handling graphite for 100-K Area. Following is a summary of personnel changes in Projec Section during the month:

	March 1, 1954	March 31, 1954	Net Change
Employees on Payroll	460*	444	-16
Tech. Grad. - Rotational	15*	14	- 1

The end-of-month status involved these changes:

	Project Section Personnel	Tech Grad - Rotational
Payroll Additions	3	
Payroll Removals	2	
Transfers into Section	1	
Transfers from Section	18	1
Transfers within Section	7	

B. SCOPE OF ACTIVITIES

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	Being revised	36%
CA-512	100-K Area Facilities		
	KW - Water Plant	86%	77.5%
	Reactor & Bldg.	78%	65.8%
	KE - Water Plant	56%	50.6%
	Reactor & Bldg.	45%	52.5%
	General Facilities	79%	70.3%
CA-513	Purex Facility, Part "A"	30%**	29.3%
	Part "D"	40%	28%
CA-514	300 Area Expansion	80%***	35%
CG-535	Redox Capacity Increase, Phase II	39%	20%
CA-539	Redox 241-SX Tank Farm	88%	84%
CA-546	Fuel Element Pilot Plant	7%	7%
CG-573	Hanford 3X Program - 300 Area	--	55%****

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

** Schedule revised downward by Blaw-Knox

*** AEC schedule is being revised.

**** Work now authorized, which is a minor portion of proposed projec

[redacted] [redacted]

C. CRAFT LABOR

A walkout by about 500 electricians engaged in a jurisdictional dispute with millwrights stopped work at 100-K from March 2 to March 4. The Carpenters' Union is still unwilling to sign a new contract until the question of isolation pay has been settled. The first formal discussion with the Ironworkers' Union concerning a new contract was held March 30. Negotiations were continued with office workers, technical engineers, and machinists.

D. SAFETY AND SECURITY

There were 12 regular meetings and discussions of safety, security, and health topics which were attended by about 365 personnel. Four regular Monday morning "tool box" meetings were conducted in the field, and two mass safety meetings were held for G.E. and service contractor personnel. Special Hazards disclosures and orientation were given to 92 contractor employees. Five Special Hazards meetings were held. About 3,000 man-days were worked in SWP zones without unusual incident except the loss of one pair of shoes.

E. HIGHLIGHTS

Minor Projects Sub-Section

Work on 43 project items and three informal requests represented an estimated total of $21,402,200. The Sub-Section completed assigned work on two projects, Elevated Storage Tanks - 200-E and Redox Waste Line. Four project proposals were approved by the A&B Committee. Eight authorizations were granted by the A.E.C. Minor Construction work required a 24% increase of service contractor personnel. Swing shifts were added to the machinist and boilermaker crafts during the month. The first shipment of major Recuplex vessels has been made from the Los Angeles plant. The Sub-Section has accepted assigned work on two projects and three engineering requests. Important projects now in progress include Recuplex Installation, 300 Area Expansion Program, Fuel Element Pilot Plant, and Hanford 3X Program - 300 Area.

Project Auxiliaries Sub-Section

Inspection was completed on 202 orders, and 214 new orders which will require inspection were received. At the end of the month there were 1,098 current orders for items which require inspection. Reproduction output was 740,822 square feet for the 24 working days of the period. Estimating completed 38 estimates, including those for 11 project proposals. Field Surveys performed control work for A.E.C. and its contractors, started the semi-annual coal pile inventory, and employed optical instruments and methods to assist Manufacturing Department in aligning existing equipment.

Reactor Projects Sub-Section

All pumps have been set at 181-KW, and one is being used to provide water for testing process pumps at 190-KW. One process water pump at 190-KW has been tested at full load operation for more than 24 hours. Erection of one boiler in 165-KW was completed, and two turbine generator sets have been placed. Piping in the valve pit was essentially completed. Graphite fabrication for KE was completed on March 31. Following completion

of packing 105-KW graphite on March 1, installation work began on top shielding and top plates. Completions were as follows: thermal plates, March 23; seal plates, March 24; and welding of grout seal plates, March 25. Preparations were made for gas leakage acceptance tests. At 105-KE installation of crates was continued. Prepacking and grouti was completed at fifth tier right and left sides, eighth tier front face, and ninth tie rear face. Base cast iron for the process unit was completed March 26. The A.E.C. has scheduled May 12, 1954, as starting date for installation of 105-KE graphite.

Separations Projects Sub-Section

During the month, 110 drawings, three specifications, and 35 requisitions for Purex facility were approved. These totals make design about 98% complete. At 202-A Buildin 11,162 cubic yards of concrete were placed, thus completing 85% of estimated requiremen The roof slab was about 53% complete, and the Hot Pipe Trench was about 90% complete. Installation of the 40-ton auxiliary crane was started. Concrete work for 203-A UNH Storage was completed except for tank bases. Tank pads have been started for 203-A and 211-A Tank Farms. The 216-A-3 Waste Crib was installed, and excavation for the 216-A-5 Waste Crib was completed. The subcontractor for 291-A Stack completed 19 of the 27 lifts required. The 13.8 KV Transmission Line from 251 Sub-station to the 202-A Building area was completed March 22. At the Additional Waste Storage Facilities for Redox, all concrete tank walls have been placed, and the 11th tank dome was being completed. At Redox Capacity Increase, Phase II, construction of the 233-S Building is proceeding under SWP conditions.

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 discoverie 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

March 31, 1954

J. S. McMahon, Manager - Projects

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II. STATISTICAL AND GENERAL

A. SIGNIFICANT ASSIGNMENTS

1. Initial Reporting

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

The Design Section has been assigned responsibility for scoping, preliminary design, and final design. Project Section has been authorized $585,000 for material procurement, and this phase has been scheduled to begin during early April, 1954.

CG-578 - Effluent Water Monitoring Improvements 100-B, D, F, DR and H Areas

The Design Section was assigned responsibility for scoping, detailed design, and design services in the field.

ER A-754 - Review of Real Property Holdings

All interested General Electric Company personnel have been interviewed, and recommendations from Security and Radiological Sciences have been received. A rough draft of the final report is being prepared.

[redacted]A-1212 - Diversion Outlet from Retention Basins, D and F Areas

An informal request is being prepared to provide for the installation of permanent lines from pump houses to present cribs, and for construction of a new crib west of the 107-D South Basin.

ER A-2749 - Sheltered Welding Manifolds - 200 Areas

Preparation of the written job scope was essentially completed, except for 234-5 Building facilities. Approval of this scope by Manufacturing Department is expected in early April, 1954.

HW Laboratory Area

Responsibility for all work on projects connected with the HW Laboratory Area has been transferred to Minor Projects Sub-Section.

2. Final Reporting

CA-455 - Replace Two Elevated Water Tanks in 200-E Area

A final inspection and acceptance was held on March 16, 1954. The A.E.C. has agreed to issue a work order for painting necessary numbers and markings on the tank target. Information is being assembled for issuance of the Physical Completion Notice.

[redacted]538 - Install Underground Waste Line Between "S" Area and "U" Area - 200-W

A final inspection was held during the latter part of March, 1954. The project is being closed out with explanation of reasons for not performing certain portions of the approved

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work. Information is being assembled for issuance of the Physical Completion Notice.

3. Current Projects

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

Completion status remained at design 100%, construction 99%. The X-ray equipment has arrived and was scheduled for installation the week of April 5, 1954, under direction of an engineer from General Electric X-Ray. Relocation of the existing growth chamber has been completed, and relocation of the electron microscope has been scheduled.

The construction contractor has been notified that bench tops supplied by him are neither acid-proof nor impervious to liquids. He has not indicated what action he will take.

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 tanks was prevented because tanks were in use. The activity level in the east tank has increased to a degree that about 15 seconds working time can be permitted.

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

Completion status remained at design 100%, construction 99.9%. Design was completed on modifications to the underwater doors. The seals have been delivered, and work was scheduled to be resumed on April 5. The horizontal rod tips are being fabricated in Seattle, with a proposed delivery date of September, 1954. Other work order assignments were continued.

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

Design had been completed previously; construction progressed 3% to a total of 19%. Revision No. 6 of the project proposal was submitted to the A&B Committee on March 22, 1954. The slow delivery of hydraulic cylinders has delayed some shop work. The cartridge hooks are complete and ready for testing, as is the measurer which is being fabricated by General Engineering Laboratory.

CG-438 - Ball Third Safety System

Design had been completed previously; construction progressed 2% to completion. The project is scheduled for close-out with exceptions on April 1, 1954. All work orders necessary for completion of exceptions have been issued.

CG-496 - Recuplex Installation - 234-5 Building

Design had been completed previously; construction progressed 3% to a total of 36%. Work on the CAW Facility was delayed because the teamsters employed by Kaiser refused to deliver concrete to the lump sum contractor. The contractor completed arrangements on March 31 to obtain concrete from an off-site source to meet immediate requirements.

Since the first shipment of vessels was started from the Los Angeles area, Minor Constructi resumed work at Building 234-5. Small amounts of incidental work are being performed befor the vessels arrive.

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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 9.3% to a total of 77.5%; KE progressed 6.2% to a total of 50.6%; general facilities progressed 4.5% to a total of 70.3%.

The cumulative totals of concrete placed to date were: KW water area 79,345 cubic yards; KE water area 73,909 cubic yards; general facilities 12,115 cubic yards.

All pumps have been set at 181-KW River Pump House, and one is being used to provide water for testing process pumps at 190-KW. Electrical connections and controls are being installed for the other pumps. At 183-KW Filter Plant, the Monorake equipment is being tested. Two sedimentation basins and two filters were used throughout the month. Most of the head house equipment has been placed.

One process water pump set at 190-KW has been tested at full load operation for more than 24 hours. No enlargement of cracks in castings of the water pump was noted. The motor was operated during the test under the supervision of a vendor's representative. Extensive discussions and consultations were held regarding the imperfect castings. Some repairs were attempted, but satisfactory methods have not been agreed upon.

Erection of one boiler in 165-KW was completed, and two turbine generator sets have been placed. Erection of the other two boilers showed good progress. Piping in the valve pit was completed except for some items of welding and instrument installation.

Continued good progress was made on outside facilities, including the 1700 Buildings, the railroads, retention tanks, 230 KV transmission line, and the 151 KW and KE substations.

Construction of corresponding buildings and facilities at 100-KE has continued to follow closely behind the schedule for 100-KW. Erection of boilers and installation of switch gear have continued satisfactorily in 165-KE.

105-KW and 105-KE Reactor Facilities

Design remained at about 99% complete. Construction progress was as follows: KW progressed 4.1% to a total of 65.8%; KE progressed 14.2% to a total of 52.5%.

Cumulative totals of concrete placed to date were: 105-KW, 24,039 cubic yards; 105-KE, 23,686 cubic yards. The corresponding totals of steel placed were: 105-KW, 2,769 tons; 100-KE, 2,725 tons. There have been 15,094 tons of cast iron blocks placed in 105-KW, and this completes the installation of thermal shielding.

Following completion of packing graphite in 105-KW, the top thermal plates were installed. The preliminary air test was held on March 25, 1954, and preparations were made for gas leakage acceptance tests. Extensive miscellaneous work was done on electrical systems, instrumentation, and monitoring equipment. Installation of the 105-KW downcomer entrance ell and expansion joint was about 75% complete.

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The heavy aggregate program for 105-KE was resumed. The shielding crates were prepacked and grouted at fifth tier right and left sides, eighth tier front face, and ninth tier rear face. Base cast iron for the process unit was completed March 26. Preliminary work was completed for installations which must precede packing of graphite. The A.E.C. has scheduled May 12, 1954, as starting date for installation of graphite at KE. Of the process tubes required for 105-KE, 2,000 have been cleaned and dried. Shop work has progressed satisfactorily on cross headers.

Graphite fabrication was completed during the month. Mock-up, tear down, and packaging of the final layers were completed March 31, 1954. The construction contractor has transferred about 80 millwrights and 40 laborers from 2101-M Building to 100-K Area.

CA-513-A - Purex Facility

Design progressed 1.2% to a total of 98%, which is within 1% of schedule. Construction progressed about 8% to a total of 29.3%, which conforms approximately to the schedule as revised by the construction contractor.

About 50 drawings from the architect-engineer remained to be approved, and about 50 more must be prepared for added design items. The flow of vendor's drawings for approval has been heavy. During March, 1954, 110 drawings, three specifications, and 35 requisitions were approved.

At the 202-A Building area, about 11,000 cubic yards of concrete were added. Some of the placement was in miscellaneous small forms, but the major amounts were in the Canyon Section, Hot Pipe Trench, and roof. The Hot Pipe Trench was about 90% complete, and the roof slab was about 53% complete. Of the 44 cell cross walls required, concrete has been placed for 40. The erection of the 40-ton auxiliary crane and installation of the elevator in the east end of the building were started during March.

At the 203-A UNH Storage, concrete work was completed except for tank bases. Pads have been started for tanks at 203-A and 211-A Tank Farms. The 216-A-3 Waste Crib was installed, and excavation for the 216-A-5 Waste Crib was completed.

The contractor for 291-A Stack completed 19 of the 27 lifts required. Excavation for 291-A Fan House was about 25% complete.

Construction of the 13.8 KV Transmission Line from 251 Sub-station to the 202-A Building area was completed March 22. Work progressed satisfactorily at the 283-E Filter Plant Addition and at the 284-E Powerhouse Addition.

The 241-A Waste Storage facility was 19.2% complete, which is about 1% ahead of schedule. Concrete has been placed for all six tank bases, and application of waterproof membrane and grout has progressed rapidly. Welding has been started on the first bottom plate of the tank liners.

Repairs to the 2901 Export Water Line were stopped when the blind flange failed. The contractor has begun additional repairs.

All construction required for remodeling of the 272-E Mock-Up Building was completed exc for minor work in the cell equipment fabrication facility.

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CA-513-D (ER A-747) Hot Semiworks Conversion

Design progressed 1% to a total of 99%; construction progressed 11% to a total of 28%. Four columns have been installed in "B" Cell, and pipe work was begun in "A", "B", and "C" Cells. Shop fabrication of equipment was about 50% complete.

CA-514 - 300 Area Expansion Program - Production Facilities

Design remained at 88% complete; construction progressed 5% to a total of 35%. The revised project proposal was approved by the A.E.C. Review Board on March 18. Present estimated cost of equipment on order, out for bids, or being reviewed is $1,050,000.

In the existing building, Minor Construction has started work on the fan room. Steel for this room and the interior door frames has been received from the vendor.

At 303-F Building, Minor Construction continued the installation of electrical work and piping. The methanol tank has been installed in the tank farm, and the excavation was backfilled.

The subcontractors have continued work on the building struture, roof, and the autoclave pit.

The foundations for the new badge house have been placed, and the siding has been removed from the east end of the 307-L Badge House. Preliminary work was done on the parking lot.

CG-535 - Redox Capacity Increase, Phase II

Design progressed 9% to a total of 84%; construction progressed 9% to a total of 20%. Procurement was 88% complete.

Construction has dropped about 19% behind schedule, chiefly because work on the 233-S Building is proceeding under SWP conditions.

CA-539 - Additional Waste Storage for Redox

Design progressed 6% to completion; construction progressed 12% to a total of 84%. Good progress was made throughout the month. All concrete tank walls have been placed, and concrete for the 11th tank dome is being placed. Cover blocks are being placed on the pipe line encasement from the diversion box. Work progressed satisfactorily on installation of condensers and piping.

Minor Construction began installation of a crust breaker in Tank 101.

CG-550 - Reactivation of P-10 Facilities

Design had been completed previously; construction progressed 3% to a total of 98%. Minor Construction has started assembly of the metal casks. Plant Forces completed installation of "J" cask equipment in the vendor's trailers. The [illegible] were completed.

[redacted]

CG-573 - Hanford 3X Program - 300 Area

Design progressed 25% to a total of 85%; construction on the work now authorized progressed 14% to a total of 55%. Drawings revisions have been made to provide testing equipment in the 303-J Building.

The first press for hot press canning arrived on March 22, 1954. The press is being set up in Minor Construction shops to facilitate design verifications of the turret and furnace support assemblies. Fabrication of vessels and special components has begun in Minor Construction shops.

At 303-J Building, the press pits have been completed. Some painting and clean-up work were started.

At 313 Building, construction of the building addition was 70% complete. The press pits were completed, and installation of electrical service was continued.

B. OTHER ASSIGNMENTS

CG-187-D-II - Redox Production Plant

Design progressed 1% to a total of 49%; construction progressed 1% to a total of 11%. Construction work continued on sample gallery ventilation. Major emphasis was given to completion of Project CG-535.

CA-187-D-III - Redox Cooling Water Disposal Basin

Design had been completed previously; construction work to be performed by the lump sum contractor had been completed previously; Minor Construction work was 56% complete. The flow of Redox cooling water has been diverted to the new underground seepage basin, and backfilling of the Redox swamp was started. Additional funds are being requested because unforeseen high levels of radiation have shortened permissible exposure of heavy equipment operators.

CA-434 - New Bio-Assay Laboratory

Design had been completed previously; Phase I construction progressed 4% to a total of 99%; Phase II construction progressed 22% to a total of 90%.

Revision No. 7 to the project proposal requestingauthority to procure certain laboratory equipment has been approved by the A.E.C. Review Board. The revised Work Authority is being prepared by the A.E.C. The ventilation unit is due for delivery at Hanford about April 1; and installation is to be accomplished immediately, thus essentially completing the project.

CA-441 - Solvent Building

Design progressed 27%. The architectural drawings are ready to be circulated for comment. Mechanical and electrical phases are being checked.

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CA-489 - Positive Ion Accelerator

Design had been completed previously; construction progressed 1% to a total of 99%. Installation of the accelerator equipment started on March 15, 1954, under direction of the installation engineer from High Voltage Engineering Corporation.

CG-511 - Completion of Minor Construction Fabricating Shops

Completion status remained at design 95%, construction 82%.

CA-516 - Gable-Butte Railroad

Design had been completed previously. The bid opening date has been revised to about April 15, 1954, because of ground contamination in the work area. A.E.C. has requested General Electric Company to remove specks of contamination which have fallen from trains to the right of way.

CA-532 - Fiscal Year 1954 Water Tank Replacements

Design had been completed previously. The lump sum contract has been awarded. The materials which were advance-ordered by General Electric have arrived. Plant Forces are scheduled to begin work during early April, 1954.

A-533 - Hanford Works Official Telephone Exchange

Design progressed 40% to a total of 70%. Revision No. 1 of the project proposal is being routed for signatures. The final plans are being reviewed during April, 1954. The A.E.C. has determined that cables, including tip cables, are to be installed by a lump sum contractor.

CA-543 - Replace Sanitary Tile Field 200 West Administration Area

Preliminary design had been completed previously. A Work Authority dated March 16, 1954, authorized $8,000 to G.E. for performance of its portion of work. The total authorized funds were $57,000.

CA-544 - Central Distribution Headquarters

The project proposal was 50% complete. The proposal requests authorization to remodel the White Bluffs Ice House for use as headquarters for Electrical Distribution Unit.

CG-545 - Soil Science Laboratory Facilities

Design had been completed previously; construction was about 50% complete. Shop fabrication of the ductwork has been completed, and installation is to begin during early April, 1954.

CA-546 - Fuel Element Pilot Plant

sign progressed 22% to a total of 79%; construction progressed 5% to a total of 7%. Design of Phase I was completed except for "as-built" drawings. Final comment drawings

and specifications for Phase II were received March 15, 1954. They have been reviewed and returned to the architect-engineer for final corrections and additions.

Erection of structural steel began on March 17, 1954, and was essentially completed. A work release was issued to Minor Construction on March 12 for installation of services to the building area.

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

Design progressed 10% to a total of 95%, construction remained at 6% complete. It has been decided that shielding is to be constructed of lead completely covered with stainle steel. The agitator shaft seal and draft tube were prepared for testing under simulated operating conditions.

CG-551 - Expansion of Building 234-5 Facilities

Design progressed 19% to completion; construction progressed 3% to a total of 12%. All work orders for shop work have been written to Manufacturing Maintenance, excepting for orders for fabrication of all assemblies and equipment in Hoods H-13-A, B, C, H-14-D, C, H-13 and H-28-3. These latter items are being estimated by Maintenance. Fabrication of conveyor parts started the week of March 22, 1954. Effective April 1, 1954, a foreman is being assigned to follow shop fabrication and assembly work. This same foreman is scheduled to handle the moving and installation work in 234-5 Building. Purchase requisitions totaling more than $80,000 have been processed.

CA-555 - Graphite Hot Shop and Storage Building

Preliminary design had been completed previously. No further work was done.

CG-556 - X Level Controlling and Recording Equipment

Design had been completed previously; construction remained at 15% complete because of higher priority work requested by Technical Section. Additional work was tentatively scheduled after April 5, 1954.

CG-558 - Reactor Plant Modification for Increased Production

Requisitions for purchase of horizontal control rod extrusions, tubing, and absorbing rings have been submitted to Purchasing and Stores. Installation of rods was tentativel estimated to begin during August, 1954.

CG-559 - Heat Transfer Laboratory

Design had been completed previously; construction progressed 17% to a total of 25%. The architectural modifications were essentially completed. Shop fabrication of the steam jackets and header details were about 80% complete. Installation of piping and process equipment has been delayed because of late material deliveries and shortage of "Q" cleared pipefitters.

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CG-562 - Waste Metal Recovery Plant Modifications

Design was revised downward to 90% to include additional scope; construction remained at 76% complete. The remainder of the work is to be performed during August or September, 1954, as plant operation permits.

CG-563 - Modifications to 314 Building and Installation of Electroplating Pilot Plant

Design progressed 20% to a total of 70%; construction progressed 13% to a total of 20%. Work was continued on floor repairs. About 75% of the floor has been cleaned and sealed.

CG-564 - Installation of Additional Ball 3X Equipment, 105-C Building

Completion status remained at design 100%, construction 92%. Plans have been made to remove the tube section from Hole No. 21 during the week of April 5, 1954.

CA-566 - Building for Prototype Physical Constants Test Reactor

Scoping had been completed previously. A Work Authority dated March 26, 1954, authorized $20,000 to G.E. for performance of its portion of work.

[redacted]-567 - Alum-Activated Silica Facilities for 100-B, D, F, and H

Construction progressed 22% to a total of 72%. Facilities in the 100-B Area were essentially ready for use at the end of the month. The completion of the 100-H portion awaited the arrival of engineered items. A revised project proposal is being prepared to request additional funds and an extension of the physical completion date.

CG-569 - Replacement of Catch Tanks 311-ER and 302-BR - 200-E and W

Design progressed 22% to completion. Materials which were advance-ordered by G.E. have begun to arrive. Construction is to begin during April, 1954.

CG-572 - Particle Problem Animal Exposure Equipment

Design was 10% complete. The A.E.C. Directive HW-323 dated March 8, 1954, authorized G.E. $22,500. Detailed design was started during March and is expected to be completed during June, 1954.

CG-576 - General Improvements to Laboratory Area - 300 Area

Design was 10% complete; construction was 6% complete. These percentages are based on the $60,000 project only. Revision No. 1 to the project proposal has been approved by the A&B Committee. The total estimated cost has been revised to $265,000 to incorporate the cost of Sprinklaystat extensions for the 329 Building.

[redacted]-116 - Combined Civil Defense and Plant Disaster Control Center

Design had been completed previously; construction progressed 18% to a total of 98%. All radio gear has been installed and tested. The acceptance test for communication

equipment was held on March 26, 1954. Final acceptance was scheduled for April 2, 1954.

IR-159 - Improved Ventilation Facilities - 201-C

Design had been completed previously; construction progressed 10% to a total of 70%. Completion of this work is to be coordinated with other work being done at the site.

IR-162 - Fire Protection Buildings, 272-E and W

Preliminary design had been completed previously; the Comptroller General allowed the low bidder to withdraw his bid because of a gross error in estimating. The contract has been awarded to the second low bidder.

IR-172 - Laboratory Supply Space, 3706 Building

Preliminary design had been completed, and preparation of the project proposal was 90% complete. The proposal is being revised to include rescoping.

* * * * * * * * * * *

The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month.

ER A-727 - 313 Building Roof Repair or Replacement

Preliminary design was completed. The project has been rescoped, and the proposal is being revised.

ER A-742 - Remodeling First Aid Buildings 100-B, D, and F

With preliminary design completed, Manufacturing Department has requested that this request be held open.

ER-2748 - 221-T Building Roof Repair

Scoping was completed. The project proposal was about 30% complete.

C. RELATED FUNCTIONS

Despite the increased work load and attempts to secure more vendor inspectors, the field inspection personnel remained about level. There is a particular need for men in the eastern United States where Purex vessels and equipment are being fabricated. The Manager, Projects and the Head, Inspection and Materials Unit were requested by the Atomic Energy Commission to confer with the top management of Blaw-Knox Company. These conferences, aimed at better coordination between G.E. Inspection and Blaw-Knox Expeditin began in late March and were continued in April, 1954.

Intensive inspection effort was continued on equipment for 100-K Reactor, of which the orders for thermal shielding blocks and aluminum process tubes have been completed.

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The first small shipment of Recuplex vessels was made late in the month. The corrosion testing program remained about level, with 822 samples being processed through the Seattle laboratory.

Following is a resumé of Inspection and Materials Unit activities during the month:

ITEM	NUMBER
Totals orders on hand requiring inspection	1098
Cumulative number of orders assigned to inspectors	1004
Number of orders assigned to inspectors this month	212
New orders received by Inspection during the month	214
Orders completed	202
Total requisitions transmitted for Expansion Program	148
Total orders of engineered equipment placed for Expansion Program	72

At the end of March there had been grand totals of 2,647 Expansion Program requisitions for engineered equipment transmitted, and 2,473 Expansion Program orders placed.

Reproduction output was 740,822 square feet during the 24 regular working days, including 219 hours overtime. This total approached the average monthly production for the shops, and it included orders of 19,378 and 8,856 prints for Purex and 100-K Areas respectively.

Estimating Unit completed 38 estimates during the month. The completed estimates comprised the following: project proposals - 11, comparative - 3, fair cost - 3, high spot - 3, scope - 8, and miscellaneous - 10.

Field Surveys performed control work for A.E.C. and its contractors, started the semi-annual coal pile inventory, and employed optical instruments and methods to assist Manufacturing Department in aligning existing equipment.

D. CRAFT LABOR

Percentages of voluntary terminations from the two major construction contractors almost doubled during March. Kaiser Engineers and associates lost 7.1%; Blaw-Knox and associates lost 12%. Voluntary terminations from J. A. Jones Company dropped from 3.1% to 0.7%.

A jurisdictional dispute between millwrights and electricians caused a walkout by about 500 electricians from 100-K Area on March 2. Following discussions by the international representatives of the unions involved, the craftsmen returned to work on March 4. Conferences and attempts at agreement were continued during the month.

The Carpenters' Union was still unwilling to sign a working agreement until the question of isolation pay has been settled. The carpenters participated in discussion of Schedule "A" wages, isolation pay, and interpretation of the existing agreement. The Ching Panel has recommended that the carpenter-millwright dispute be settled in conformity with the pattern set by the Spokane Associated General Contractors, and that the question of isolation pay be resolved jointly with the Building Trades Council

The first formal discussion of wages with the Ironworkers' Union has held March 30. Agreement was reached on Schedule "A" wages, and there was discussion on adopting the pattern established by Associated General Contractors.

Negotiations were continued with office workers, technical engineers, and machinists. The office workers have asked wage increase of 22¼¢ per hour. They were offered 2¼¢ per hour. A committee is studying the report of a survey of standard scales of the area. The technical engineers have tentatively accepted proposals on wages and on terms of a project-wide agreement. They have also agreed to later discussions of health and insurance plans. The machinists have laid the groundwork for a discussion of wage increases, one portion to be retroactive to January 1, 1954, and the other to become effective July 1, 1954. 74

The construction of Recuplex, CG-496, was delayed during March by refusal of teamsters to deliver concrete to the Cisco Construction Company. This dispute apparently followed earlier altercations involving Cisco. On March 31, Cisco completed arrangements to secure concrete required at that time from an off-site source.

Although there were few instances noted during the month, off-site labor agitation has continued to hamper the construction program. One specific instance was a strike by machinists in the plant which is fabricating equipment for Redox Capacity Increase, Phase II.

REPORT OF VISITORS

To Hanford

Frank Browder, Oak Ridge National Laboratory, Oak Ridge, Tennessee, and Herbert Beeman, Catalytic Construction Company, Oak Ridge, Tennessee, visited H. B. Sargent on March 3 to discuss design of Waste Storage Tank Farms.

S. M. Stoller, Vitro Corporation, New York, New York, visited W. B. Webster on March 16 for general discussion of Purex Facility.

P. Selak, Savannah River Operation, Savannah, Georgia, visited H. H. Hubble and W. B. Webster on March 24, for discussion of Purex plants.

Official Trips to Other Installations

W. W. Walker visited the following companies from March 1 to March 6, 1954, to discuss procedures with vendor inspectors: Graham Manufacturing Company, Buffalo, New York; Steel and Alloy Tank, Newark New Jersey; Tube Turns, Louisville, Kentucky; Wyatt Boiler Works, Dallas, Texas; Stearns-Rogers, Denver, Colorado.

G. P. Kesel visited Savannah River Project, Aiken, South Carolina, from March 1 to March 3, 1954, to discuss Projects CG-574 and CG-575.

G. C. Gabler visited Pacific Coast Engineering Company, San Francisco, California, from March 1 to March 2, 1954, to expedite engineering equipment for Redox.

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T. C. Hamilton visited C. L. Gougler Company, Kent, Ohio, from March 3 to March 6, 1954, to coordinate inspection activities.

G. P. Kesel visited Dupont Company, Wilmington, Delaware, on March 4 and 5, 1954, to discuss Projects CG-574 and CG-575.

D. F. Watson visited The Rucker Company, Oakland, California, on March 4 and 5, 1954, to consult on equipment for CG-573.

R. E. Alexander visited M. Reuter and Sons and Corbin Company, Portland, Oregon, on March 9 and 10, 1954, to discuss design on equipment for 100-K Area.

F. H. Ames visited Canister Company, Phillipsburg, New Jersey, from March 15 to 20, 1954, to approve drawings.

H. C. Copeland visited Hammel Dahl Company, Providence, Rhode Island on March 18 and 19, 1954, to approve drawings, and Panellit Company, Chicago, Illinois, from March 22 to March 24, 1954, for inspection of instrument panels.

R. C. Hollingshead visited Stearns Rogers Manufacturing Company, Denver, Colorado, from March 22 to March 25, 1954, to witness performance tests of generators.

[illegible]. A. Broderson visited Square D Company, Seattle, Washington, on March 17, 1954, to approve drawings, and Fairbanks Morse Company, Beloit, Wisconsin on March 24, 1954, to approve drawings.

D. A. Hoover visited Manning, Maxwell and Moore, Muskegon, Michigan, on March 21 and 22, 1954, to witness crane test and to consult on design, and General Electric Company, Schenectady, New York, on March 23 and 24, 1954, for design consultation.

M. G. Patrick visited General Electric Company, Schenectady, New York, on March 24 and 25, 1954, for engineering inspection and liaison.

M. J. Ludwig visited Beckman Instruments, Incorporated, South Pasadena, California, from March 22 to March 26, 1954, to consult on instruments being fabricated for 100-K Reactors.

E. S. Davis visited Bouillon & Griffith, Seattle, Washington, from March 24 to March 26, 1954, to review drawings by architect-engineer for CA-546.

F. H. Ames visited General Precision Laboratory, Pleasantville, New York, from March 26 to March 30, 1954, for technical consultation with the vendor.

H. E. Hanthorn visited Washington Society of Professional Engineers, Seattle, Washington, of March 25, 1954, to deliver a speech to the Seattle Chapter.

H. P. Shaw visited Udylite Carboloy, Detroit, Michigan, and Ohio Crankshaft, Cleveland, Ohio, from March 29 to March 31, 1954, to consult on engineering items for CA-514.

[redacted]

W. D. Richmond visited the following Seattle companies on March 30, 1954, to discuss possibility of fabricating horizontal rods for CG-558: Western Gear Company, Coates Electric Company, Boeing Aircraft Company.

[redacted]

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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SUMMARY - MARCH 1954

EMPLOYEE RELATIONS SECTION

The number of applicants interviewed in March was 2,091 as compared with 2,163 for February. In addition, 350 new applicants applied by mail. Open, nonexempt, non-technical requisitions increased from 342 at the beginning of the month to 460 at month end. Ninety-three employees were added to the roll and 71 removed during the month. Separations rate for fiscal month of March was .52%, the same as it was for fiscal month of February. However, when converted to an annual basis the rate for February was 6.78% and 5.42% for March. During March 97 new requests for transfer to other type work were received by Employment, and 88 transfers were effected. Attendance recognition awards were distributed to 235 employees in March, including 34 who qualified for four-year awards.

Two employees died during the month and three employees retired. One hundred and thirty-eight visits were made to employees confined to Kadlec Hospital, and 52 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 97.5%, in the Insurance Plan 99%, and the Employees Savings and Stock Bonus Plan 47.8%. At month end there were 738 registered under Selective Service and 75° military reservists were on the roll. Since August 1, 1950, 324 employees have terminated to enter military service, of which 87 have returned, 18 have not claimed reemployment rights, leaving 219 still in military-leave status.

A total of 74 new employees attended orientation meetings. Of this number, 94.6% have signed up to participate in the Pension Plan, 100% in the Insurance Plan, and 86.5% in the Good Neighbor Fund.

Forty-four adopted suggestions were approved for awards in March, resulting in cash awards totaling $785 with a total net savings of $6,000.30.

Thirty applications for GE Scholarships under the Company's Educational Assistance Program have been received during the month.

Training and Development programs and activities were as follows: Conference Leading, HOBSO II, Effective Human Relations, Basic Economics, and Principles and Methods of Supervision. Training representatives attended the Training Institute March 22-26 conducted by the Consultant-Education and Training Services Department, New York Office.

PUBLIC RELATIONS SECTION

The News Bureau issued 45 news releases during the month.

William Von Thurn, representative of John Wiley & Sons, Inc., visited Richland on March 24. At the request of an Executive Editor of his company, Public Relations arranged interviews for Mr. Thurn with a number of GE people at Hanford who are either potential authors of technical books, or are already preparing manuscripts.

PUBLIC RELATIONS SECTION (Continued)

Three signed articles about Hanford technical accomplishments were sent to technical and trade journals during the month.

A free lance writer in England recently requested information about certain phases of the work of Radiological Sciences Department at Hanford. He has now requested additional information and photographs. He plans to do two and possibly three articles for British publications.

Permission was granted to an engineering journal in Norway to reprint R. T. Jaske's article on heat conversion at Hanford from a recent issue of HEATING, PIPING AND AIR CONDITIONING.

Twelve papers were received from Hanford authors for review and clearance during the month. Four speeches were delivered during the month.

The March Community NEWSLETTER was written and distributed to community leaders. A copy of the January-February GE News Digest also was included in this mailing.

Four editions of the Hanford SCIENCE FORUM were written, recorded, edited, and released for broadcast over Radio Station KWIE at 8:00 P.M. on Tuesdays during the month.

Four more editions of the packaged program, "For Better Living," being produced by this Section for Public Health, were assembled, released, and broadcast at 4:45 P.M., on Wednesdays over Radio Station KPKW.

A total of 200 photography assignments were covered during the month of March, and a total of 10,587 prints were produced. Of the total prints, 5,158 were "A" and "B" employee identification badge prints. A total of 5,429 were area and news work.

Motion picture film exposed on three individual motion pictures was as follows: 6,530 feet (black and white) for 100-K Construction project, 1,200 feet for Design Engineering project in the 300 Area, and 200 feet of color for Orientation movie.

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 were curtailed in favor of work described below.

The writing of position analyses and position descriptions was completed except for a few positions which are currently involved in organization changes.

The evaluation of positions was essentially complete insofar as assignment of scores according to the evaluation plan is concerned. The reconciliation of scores between departments and the assignment of tentative salary levels was begun.

The Hanford Operations Office of the A.E.C. completed its audit of records of the Salary Administration Section.

Employee and Public Relations Summary

UNION RELATIONS SECTION

Negotiations with the radiation monitoring Inspectors continued during the month, and substantial agreement has been reached on all items except wages and progression schedules. A survey among the Atomic Energy Commission's prime contractors to ascertain rates paid radiation inspectors or monitors at other projects was completed.

James H. Hughes, guard employee, has been elected to replace A. J. Mayhew as Business Representative for the Hanford Guards Union. Kate Jean Beck has replaced A. L. Rogers as Business Representative for Local No. 201, Building Service Employees International Union.

At the request of the Aircraft Nuclear Propulsion Department management, a representative of the Wage Rates Unit visited the Idaho Falls installation for consultation in connection with the establishment of the nonexempt wage and classification systems for the Arco project. The 1954 edition of the annual General Electric Company Northwest Area Wage Survey was completed.

Revised job definitions for Separations Utility Operator, Separations Process Operator and Dispatcher (Separations) were forwarded to the Hanford Atomic Metal Trades Council for formal acceptance. Clarification of the jurisdictional agreement between the Plumbers and Steamfitters and the Instrument Guild was received from the HAMTC. The Company accepted a proposal from the HAMTC to assign certain work to the instrument personnel.

TECHNICAL PERSONNEL SECTION

Requirements for technical personnel with industrial experience or with advanced education continue to be varied. Accordingly, a flexible position is being maintained and at the same time those needs which appear to be definite are being met.

By college recruiting of B.S.-M.S. candidates we have 18 of the 40 acceptances expected. Spring recruiting visits at the colleges are practically completed. So far our acceptance ratio is substantially higher than it has been at this time in previous years, and further employment offers are being limited accordingly.

There are now 41 trainees on the Rotational Training Program, as compared to 51 at the end of February. Placement of most of the remaining trainees is foreseen during the remainder of fiscal year 1954.

For the spring semester of the School of Nuclear Engineering, 120 students have paid full tuition, about equally divided between graduate and undergraduate courses. New courses in Pile Engineering and in Servomechanisms have attracted sizeable groups of capable engineers, and a new course in Applied Heat-Power Thermodynamics is progressing well. For the current semester 39 students have registered actively with the University of Idaho, and we have further numbers with other universities bringing the total of active university-affiliated students to about 75.

During the month an engineering talk was presented before the senior engineering students at the University of Colorado in their Nuclear Survey Class. Assistance was given to the University of Washington in obtaining a Hanford speaker for their conference on Waste Prevention.

Employee and Public Relations Summary

HEALTH AND SAFETY SECTION

Sickness absenteeism was 1.73% as compared with 2.17% for February, while the rate of total absenteeism was 2.41% as compared with 2.91% for February.

The average daily census of Kadlec Hospital decreased from 89.9 to 78.0 as compared to 101.3 a year ago. The reason for this much lower census is not apparent.

Public Health resumed operation on the mosquito control program on March 18.

No major injuries were reported in March making the total to date three. Three sub-major injuries were reported and treated. Minor injuries increased slightly from 252 (frequency 2.00) to 313 (frequency 2.17). There were no sub-contractor major or sub-major injuries.

Arrangements were completed for a series of Safety Meetings to be conducted in April by Mr. C. R. Powell, Director of Public Relations, Endicott Johnson Corporation.

Notification has been received from the National Safety Council that HAPO has won its highest award--The Award of Honor--for the fifth consecutive time. Since this award has been made only for five years, it represents maximum attainment. Notification has been received from the National Fire Prevention Association that HAPO facilities placed second in the nation in competition with all industry in fire prevention activities. HAPO will receive national recognition during the month of May at the annual meeting of the National Fire Prevention Association which is to be held in Washington, D. C.

COMMUNITY OPERATIONS SECTION

The Community Council was taken on an annual tour of community facilities on March 18. Eight of the nine councilmen participated along with representatives of the press.

The Community Council election was held on Tuesday, March 9, and arrangements were made to tabulate by IBM machine the results of the ballots following the manual count.

Approved directives were received from the Atomic Energy Commission on the following projects on which work is expected to begin in the near future:

Improvements to Existing Streets - George Washington Way: This provides for widening of George Washington Way to four traffic lanes from Symons Street to McMurray Road.

Replacement of Raw Water Line - #5 Well to Lee Boulevard: This provides for replacement of the original, now deteriorated, raw water line that feeds the reservoirs on Lee Boulevard from the well field on Wellsian Way.

Employee and Public Relations Summary

ORGANIZATION AND PERSONNEL

Effective March 1, 1954, the following organization changes took place: A Health and Safety Section, a Community Real Estate Section, and a Community Operations Section were established in the Employee and Public Relations Department.

Total on Roll March 1, 1954	875
Accessions	18
Separations	35
Total on Roll March 31, 1954	858*

*This includes 41 Rotational Trainees

Employee and Public Relations

EMPLOYEE RELATIONS

ACTIVITIES

Personnel Practices

	February, 1954	March, 1954
Applicants interviewed	2,163	2,091

656 of the applicants interviewed during March were individuals who applied for employment with the Company for the first time. In addition, 350 applications were received through the mail.

	February, 1954	March, 1954
Open requisitions		
Exempt	3	2
Nonexempt	342	460

Of the 342 open, nonexempt, nontechnical requisitions at the beginning of the month, 213 were covered by interim commitments. Of the 460 open, nonexempt, nontechnical requisitions at month end, 271 were covered by interim commitments. During March, 115 new requisitions were received requesting the employment of 241 nonexempt, nontechnical employees.

	February, 1954	March, 1954
Employees added to the rolls	83	93
Employees removed from the rolls	56	71
NET GAIN OR LOSS	+ 27	+ 22

Separation Rate:	Fiscal Month February, 1954		Fiscal Month March, 1954	
	Male	Female	Male	Female
	.30%	1.41%	.22%	1.77%

Over-all Separation Rate:	Fiscal Month February, 1954	Fiscal Month March, 1954
	.52%	.52%

During March, 8 employees left voluntarily to accept other employment, 3 left to enter military service, and 1 left to enter business for self.

Employee and Public Relations

EMPLOYEE RELATIONS

Transfer Data

Accumulative total of requests for transfer received since 1-1-54	198
Number of requests for transfer received during March	97
Number interviewed in March, including promotional transfers	101
Transfers effected in March, including promotional transfers	88
Number of stenographers transferred out of steno pool in March	0
Transfer requests active at month end	339

ADDITIONS TO THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
New Hires	2	60	2	64
Re-engaged	-	4	-	4
Reactivations	4	21	-	25
TOTAL ADDITIONS	6	85	2	93

TERMINATIONS FROM THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
Actual Terminations	7	21	-	28
Removal from rolls (deactivations)	-	40	-	40
Transfers	2	1	-	3
TOTAL TERMINATIONS	9	62	-	71

GENERAL

	2-1954	3-1954
Photographs taken	157	151
Fingerprint impressions	253	403

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	2-1954	3-1954
General Electric cases	81	323
Facility cases	9	18
TOTAL	90	341

Employee and Public Relations

EMPLOYEE RELATIONS

INVESTIGATION STATISTICS

	2-1954	3-1954
Cases received during the month	347	375
Cases closed	44	164
Cases found satisfactory for employment	181	390
Cases found unsatisfactory for employment	7	23
Special investigations conducted	9	7
Cases closed before investigation completed	12	55

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	6469
One-year awards made in March for those qualifying in February	66
Total two-year awards to date since January 1, 1950	2113
Two-year awards made in March for those qualifying in February	72
Total three-year awards to date	878
Three-year awards made in March for those qualifying in February	63
Total four-year awards to date	179
Four-year awards made in March for those qualifying in February	34

During March, 14 people whose continuity of service was broken while in an inactive status were so informed by letter.

At the Spring Conference of the Central Washington Social Studies Council held in Ellensburg, Washington, March 6, 1954, which 150 school teachers and professors attended, a talk entitled "Basic Qualities Industry Desires in its New Employees" was given by the Supervisor, Employment, plus the showing of the film "A is for Atom."

Talks on what GE at HAPO has to offer were given to senior students at Benton City High School on March 3, and at Pasco on March 19. These talks were about 45 minutes in length and included briefly: Jobs for which the graduating senior might qualify, our benefit plans, working conditions, and some things we expect of an employee.

Supervisory Selection Program - Test batteries were administered to 71 candidates and their test results were interpreted and submitted to the subjects' evaluators.

Clerical - During March, 20 clerical applicants were tested and the results passed on to interested interviewers to aid in selection in the clerical classifications.

Instrument Trainees - Three prospective trainees were tested, two of which were placed in process.

Employee and Public Relations

EMPLOYEE RELATIONS

Employee Benefits

The following visits were made with employees during the month:

Employee contacts made at Kadlec Hospital	138
Salary checks delivered to employees at Kadlec Hospital	50
Salary checks delivered to employees at home	2

At month end participation in Benefit Plans was as follows:

	February	March
Pension Plan	97.4%	97.5%
Insurance Plan	99.0%	99.0%
Employees Savings and Stock Bonus Plan	47.7%	47.8%

Two employees died during March, namely:

Arthur L. Lyness	W-6800-410	Employee and Public Relations
Charles N. Ganse	M-12643-912	Plant Auxiliary Operations

Sixteen letters were written concerning deceased employees and their families during March, regarding payment of monies from the Company and answering questions.

Seventy-four new employees attended Orientation Programs during the month of March. Of this number, 94.6% have signed up to participate in the Pension Plan, 100% in the Insurance Plan, and 86.5% in the Good Neighbor Fund.

Since September 1, 1946, 141 life insurance claims have been paid totaling $887,013.

Three employees retired, namely:

Leonard E. Barton, W-2069-923, Normal Retirement
Milan Vukovich, W-3665-617, Normal Retirement
Doris B. Hammond, W-2173-523, Optional Retirement

During March, 37 letters were written to retired employees providing them with information of general interest. To date, 285 employees have retired at Hanford, of which 152 are continuing their residence in the vicinity.

One Board of Trustees meeting for the Good Neighbor Fund was attended by a member of this group during March. The present percentage of participation in the Fund as of the end of the month is 66.4%. Red Cross material was obtained and forwarded to all members of the Good Neighbor Fund.

At the time that the people were returned their bonds and dividends which had been purchased under the Stock Bonus Plan, a letter to supervisors was prepared and forwarded enclosing copies of the applications for participation in the Stock Bonus Plan. This was a low pressure campaign to enroll non-participants in the Plan.

Employee and Public Relations

EMPLOYEE RELATIONS

The results of this campaign were very favorable as more than twice as many Payroll Deduction Authorization forms were returned this month as compared with previous months.

Thirty applications for GE Scholarships under the Company's Educational Assistance Program have been received during the month. These applications were the results of interviews conducted by this office during the past six weeks.

A review of deferment experience during the first quarter of 1954, follows: 52 2A's were received from Local Boards, 7 2A's were received from State Appeal Boards, and 8 2A's were received from the National Appeal Board. 24 1A's were received from the Local Boards, 9 1A's were received from the State Appeal Boards, and 1 1A was received from the National Appeal Board.

During the month, a letter was developed for the Department Manager's signature and sent to all scientists and engineers who are subject to draft under the Selective Service Law, explaining to them the position of the Company on this matter, and the changing conditions that we are encountering in attempting to obtain deferments. There was a total of 171 letters sent.

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		759
Number of reservists classified in Category A	111	
Number of reservists classified in Category B	75	
Number of reservists classified in Category C	64	
Number of reservists classified in Category D	509	
Number who returned to active duty to date		137
Number who returned to active duty in March		1
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	
Delays requested (including renewals)		114
Delays granted		106
Delays pending		0
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	222
Employees registered who are non-veterans	516

Employee and Public Relations

EMPLOYEE RELATIONS

Deferments requested to date (including renewals)		1245
Deferments granted		1017
Number of employees for which deferments have been requested		167
Number of employees classified in Category B	0	
Number of employees classified in Category C	1	
Number of employees classified in Category D	166	
Deferments denied and appealed at state levels		13
Deferments denied and appealed at local levels		0
Deferments denied and held pending appeal at national level		1
Deferments denied by local board and not appealed		9
Deferments denied by state board and not appealed		41
Deferments denied at national level (by Gen. Hershey's office)		2
Deferments denied at national level (by President)		5
Deferments requested, employees later reclassified		0
Deferments requested, later withdrawn		1
Deferments pending		24

Military terminations since 8-1-1950 are as follows:

Reservists recalled	115
Selective Service	204
Women employees enlisted	5
TOTAL	324

Employees returned from military service:

Reservists	54
Selective Service	33
TOTAL	87

Known number not claiming reemployment rights 18

Number of employees still in military-leave status 219

Suggestion System, Workmen's Compensation and Liability Insurance

Suggestion System

	February	March	Total Since 7-15-47
Suggestions Received	197	224	13646
Acknowledgments to Suggesters	162	286	
Suggestions Pending Acknowledgment	95	33	
Suggestions Referred to Depts. for Investigation	162	286	

Employee and Public Relations

EMPLOYEE RELATIONS

	February	March
Suggestions Pending Referral to Departments	95	33
Investigations Completed and Suggestions Closed	190	88
Suggestions Adopted - No Award	3	0
Adopted Suggestions Approved by Committee for Award	44	42
Total Net Cash Savings	$ 6,000.30	$ 7,768.78
Total Cash Awards	$ 785.00	1,040.00
Total Suggestions Out to Investigators	774	734

An award of $100 was paid to an employee in the Statistical and Computing Section for his suggestion to use a wax adhesive material to remove applique for further inking or correction on master plates. This suggestion resulted in material and labor savings.

An employee in the Metal Preparation Section received a $100 award for his suggestion to install metal dividers on the autoclave baskets and reduce MS rejects. Savings were in material.

A Metal Fabricator in the Metal Preparation Section received an award of $100 for his suggestion to remove the stacking lugs on autoclave baskets and install a stacking pipe in the center, thereby removing a sharp obstruction that was causing MS rejects. A savings of material resulted from adoption of this suggestion.

Workmen's Compensation

Kline H. Edens, 8001392 -- Date of Injury: 3-12-53; Employer: General Electric Company; Nature of Injury: Lumbar Back Strain.

While helping two fellow workers lift a barrel of cement Mr. Edens experienced pain in his hip and groin. While hospitalized by Dr. Lih he developed an acute psychiatric episode which required treatment by Dr. Sutch. Dr. Sutch advised the Department that in his opinion the claimant's job was the precipitating factor in his psychiatric illness. Mr. Edens was examined by a commission of doctors who advised that he was able to work as far as his physical condition was concerned but that the psychiatric aspect was quite disabling. Dr. Sutch later advised the Department that Mr. Edens had been restored to his normal behavior and that further psychiatric treatment would be of no value. The claim was then closed with allowance for medical treatment only and Mr. Edens appealed alleging that the incident of 3-12-53 had resulted in a ruptured intravertebral disc. He alleged permanent and total disability and requested additional medical treatment and time loss. A conference was held before the Board on March 10, 1954 in Prosser and attended by D. S. Cameron and C. T. Fitz. It was agreed to send the claimant to Seattle for another examination. It was also agreed that the issues would be confined to the alleged back disability and that the psychiatric disturbance was not in issue. Further action will depend upon the findings of the examiners in Seattle.

Employee and Public Relations

EMPLOYEE RELATIONS

I. M. Conner, 8000161 -- Date of Injury: 4-10-47; Employer: General Electric Company; Nature of Injury: Lumbar Back.

Mr. Conner sustained an attack of back pain following an incident at work. His claim was accepted by the Department and he received prolonged medical care as well as surgery during the years following his injury. His case was finally closed on 1-20-54 with a permanent partial disability award of 50% of the maximum allowed for an unspecified disability. On March 24, 1954, Mr. Conner filed an appeal to the Board alleging that his disability exceeded 50% and that he is unable to engage in his usual employment. From the information in the Notice of Appeal Mr. Conner is evidently not represented by counsel.

Liability Insurance

Harry B. Meyer vs. General Electric Company, B-6835762 -- On August 28, 1953, Harry Meyer, 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 plaintiffs were awarded a judgement of $22,666 and General Electric then filed a motion for judgement notwithstanding the verdict and for a new trial. The motion was argued before Judge Hunter on March 5, 1954 and he has taken the matter under advisement.

Bus Collision, 300 Area, Homer Snyder vs. General Electric Company, B-6835621 -- On June 17, 1952, a bus collision occurred involving four government busses and a station wagon near the 300 Area. Four suits were filed by passengers and were settled out of court. A fifth action was started by Homer Snyder, also a passenger, resulting in a judgement against the defendants, General Electric Company and G. H. Fisher, driver of the bus. The judgement was for $42,356.50 (special damages $2,412.50, general damages $39,944). General Electric filed a motion for a new trial upon grounds which summed up to two points, first, that the verdict was so excessive as to unmistakably indicate prejudice and passion on the part of the jury and, secondly, that the verdict was so excessive as to constitute an injustice or work an injustice upon the defendants. The motion was argued before Judge Hamilton on March 22, 1954. The court has since submitted a decision granting a new trial unless the plaintiff consents to a reduction of the verdict from $39,944 to $19,500 leaving the specials as they are. The plaintiff has not yet advised of his position.

John R. Meloy, B-6835755 -- On June 30, 1953 about 8:00 p.m. Mr. John R. Meloy, a transportation employee, was ill at his home and called for an ambulance to take him to Kadlec Hospital. While proceeding to the hospital it was necessary for the ambulance driver to put his brakes on suddenly and Mr. Meloy allegedly was thrown forward from the stretcher he was lying upon and allegedly struck his head upon the end of the ambulance. The matter was referred to the Travelers Insurance Company and subsequent negotiations for settlement of the claim were unsuccessful.

Employee and Public Relations

EMPLOYEE RELATIONS

On March 25, 1954, a Summons and Complaint was served upon the General Electric Company and Mr. David Casey, the driver of the ambulance. The total amount claimed is $20,000 plus costs. The matter has been referred to the Travelers Insurance Company for defense.

Milo Riste, B-6835809 -- In December, 1953, Mr. David E. Williams, Attorney at Law, presented a claim against the General Electric Company on behalf of Milo E. Riste, a General Electric employee. The matter was referred to the Travelers Insurance Company and in March a settlement figure of $10,000 was agreed upon subject to approval of the General Electric Company and the Atomic Energy Commission. The settlement was deemed advisable by General Electric and was referred to the Atomic Energy Commission for their approval. The Commission has not yet approved the settlement.

Life Insurance

Code information which is known only to Home Office Life Underwriters Association has been furnished 77 insurance companies and investigation agencies during the month of March, 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

	February, 1954		March, 1954	
Claims reported to Department of Labor and Industries	Long Forms	Short Forms	Long Forms	Short Forms
	21	300	53	339

Total Since Sept., 1946 - 19,660

	February, 1954	March, 1954
Claims reported to Travelers Insurance Company	9	*7

Total Since Sept., 1946 - 829

*Of the claims reported to Travelers Insurance Company during the month of March, five were property damage claims and two were bodily injury.

Employee and Public Relations

EMPLOYEE RELATIONS

On March 11 and 12 the Supervisor, Suggestion System and Workmen's Compensation, attended a Suggestion Conference in Cincinnati, Ohio, and spent one day at the Evendale Plant to study the suggestion organization. The conference on March 11 was devoted to suggestion policy and considerable time was devoted to the legal aspects of the Suggestion Plan. The study at Evendale was conducted in order to evaluate the decentralized organization as it applies to the Suggestion Plan. Based upon this study a recommendation was made to the Suggestion Board that for the present time the HAPO Suggestion Plan should continue as it is presently constituted. The Board concurred.

A plan to enable supervisors to play a more significant role in the functioning of the Suggestion Plan was announced through a recent Management News bulletin to be followed up by more explanatory details concerning the plan through a letter from the Chairman, Suggestion Board, to all supervisors.

Training and Development

CONFERENCE LEADING was conducted March 2, with 12 supervisory personnel participating. These meetings permit actual practice in leading group discussions.

HOBSO II was presented March 3 and 9 for 25 supervisors. This program covers the effects of war-time economy, governmental controls, and post-war economy.

EFFECTIVE HUMAN RELATIONS Groups #1, 3, 4, 5, 6, and 8 finished their conferences March 3, March 10-11, March 17-18, and March 25, with 88 supervisors completing the three meetings. This 12-hour program 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.

BASIC ECONOMICS was held March 4, with an attendance of 7 exempt personnel. This participation-type meeting emphasizes the basic principles of our economic system and the social, community, business, and governmental aspects of our economy.

PMS REFRESHER was held March 5 at the request of 5 supervisors who attended this meeting. All exempt employees who have completed the full PMS course may enroll in this refresher session for a review of the factors in the art of persuasion.

PRINCIPLES AND METHODS OF SUPERVISION was presented for Groups #65 and 66 during the two weeks of March 8-19, with 31 supervisors completing the course.

Preparations for PMS dinner-meeting to be held Tuesday evening, April 6, for Groups #63, 64, 65, and 66 were completed this month.

Employee and Public Relations

EMPLOYEE RELATIONS

Second quarter 1954 Training program schedules were distributed March 15 to all Department Managers, and Section Managers, including sufficient copies for distribution to all their exempt people.

Dr. C. C. Martin, Industrial Medical Unit, spent Thursday afternoon, March 18, with the Supervisor of Training and Development discussing possible coordination of Training activities with certain Medical objectives.

All Training and Development Unit Training Representatives attended the Training Institute conducted here by the Consultant-Education and Training Services Department, General Electric Company, New York office. The meetings were held Monday through Friday, March 22-26, from 8:00-4:45 and 7:00-10:30 in the evenings.

During the month, there have been 200 exempt people enrolled by their supervisors for Training programs to be held this second quarter.

The following requests from various sections were made in March:

20 second-quarter Training schedule cards

9 Program Attendance Transcripts

8 Training Activities books

5 Business English Reference sources

Supervisor's Handbook Records:

Number issued during the month----------	2
Number returned during the month----------	2
On hand at end of month----------	169

Of the 169 on hand 60 are not usable because of missing pages. The remaining 109 are ready for issuance.

Employee and Public Relations Department

EMPLOYEE RELATIONS

EMPLOYEE COMMUNICATIONS

A plan for capitalizing on employee interest in the return of 1948 bonds purchased under the Employees Savings and Stock Bonus Plan, to promote additional participation in the Plan, was developed by Employee Communications. This low-pressure promotion involved a GE NEWS story and a letter to all supervisors from Employee Benefits.

A plan to have supervisors play a key role in the functioning of the Suggestion System was assisted by Employee Communications through a Management News bulletin item, and through editing and developing information to be sent to supervisors by the Suggestion Board.

A letter requesting AEC reimbursement of the cost of inserting GE publications from time to time in the GE NEWS was written for the signature of the Manager - Employee Relations. AEC approval was received during the month.

A list of suggested type faces to be purchased by Central Printing was recommended at the request of the Supervisor, Central Printing.

Two Management News Bulletins were developed and distributed to all exempt employees.

Map of all Richland voting districts and precincts was published in the GE NEWS at the request of the League of Women Voters to help increase participation in the March 9 election.

A Work Simplification course conducted by Separations Section for exempt personnel was publicized in a GE NEWS photo feature.

Two sports features designed to further reader interest were published in the GE NEWS. One concerned an employee who is a licensed dog handler for show purposes, and the other was devoted to activities of employees and their children in seining Wellsian Lake of scrap fish.

Distribution of 1948 bonds purchased under the GE Employees Savings and Stock Bonus Plan, plus dividend checks, was announced by the GE NEWS. To capitalize on employee interest in the return of 1948 bonds to promote participation in the Plan, the GE NEWS developed a low-pressure follow-up story which touched on highlights of the plan and urged participation.

Lead GE NEWS stories advised employees of changes in the electrical billing procedure to become effective April 1.

The GE Selection Program for Supervisors was reviewed in a full-page GE NEWS feature.

Suggestion System was given promotion in two GE NEWS issues during the month. One story concerned the award winners for the month, and a feature was devoted to four

EMPLOYEE RELATIONS

EMPLOYEE COMMUNICATIONS

employees who had submitted a total of 239 suggestions.

Promotion of the Red Cross drive in the GE NEWS included a story on the distribution of pins and membership cards to members of the Good Neighbor Fund, a photo showing the Company contribution being given to the Red Cross chairman, lead story on Company-wide participation of employees in the Blood Program, use of gamma globulin shots in Richland by Public Health, and a story on new Gallon Club members.

Special safety promotion during the month included: 100-D Area employees looking over their seven-star safety flag, employees of the Outer Areas holding Injury Reduction Award flag, and employees who through quick thinking and action averted a possible major fire. Also, lead news story was devoted to a dramatic-type safety presentation to be given HAPO people during April by a visiting safety expert.

Attendance Award Plan was reviewed by the GE NEWS in a news story announcing presentation of the first four-year pins to be presented under the Attendance Award Plan.

The Hanford safety program was assisted by Special Programs through: editing three GE NEWS lifeline columns and planning a safety cartoon; preparing poster inserts for the February Area Injury Reduction Award winner; preparing, producing and distributing the March safety topic on hand injuries, "Underhanded"; and attending the Safety Program Committee as secretary. In addition, a Special Programs writer chairmaned the March Employee Relations Section safety-health-security meeting.

At the request of Public Relations, "Here's Hanford," a brochure prepared for distribution to the Company's Board of Directors in October, was revised and updated for distribution to Hanford visitors. The booklet has been expanded to twenty-eight pages, and at month's end had been placed in production.

"1953 at Hanford," a classified document and the annual HAPO report, was completed during the month. Due to a management decision, two pages of the report were revised after completion. The revised report was approved by the General Manager, Atomic Products Division, and at month's end awaited distribution to the Atomic Energy Commission.

The health bulletin for March on allergies entitled, "Storm Warning!" was completed and distributed; in addition, the April health bulletin, "What's new in Artificial Respiration," was completed and distribution arranged.

The March issue of "Your Manufacturing Month" was prepared, produced and distributed to Manufacturing Department exempt employees.

The March issue of the GE REVIEW was distributed to approximately 1500 Hanford technical people, and the March MONOGRAM to all exempt employees.

The "Philosophy and Objectives of the Organization and Compensation Plans", written by the General Manager, was edited, produced and distributed to all exempt people.

Scope of a cost reduction program originally planned for the Separation Section has been broadened into a forthcoming plant-wide Suggestion Plan promotion. The program will center around four leaflets, rough drafts of which were prepared by

EMPLOYEE RELATIONS

EMPLOYEE COMMUNICATIONS

Special Programs and approved by the Separations and Suggestion Plan people.

During March, a total of forty-six projection engagements were met with showings to approximately 1030 people (two of these showings were made to private organizations in the Tri-cities at the request of Public Relations); "Allergies," a film obtained to accompany the monthly health bulletin, was shown twenty-eight times to approximately 650 people.

In addition to the weekly Sheldon-Claire employee relations posters, 100 copies each of five Elliott Service Company posters, 75 copies each of two Suggestion posters, 100 copies of one Photo News Service poster and 18 copies of a Credit Union poster were distributed throughout the plant.

Twenty films were borrowed or rented from various off-site sources for use by Hanford plant organizations.

Art services provided to the GE NEWS during the month by the Employee Communications commercial artist included: three photo feature layouts, including a double-page spread on the Engineering Department; one editorial cartoon and one safety cartoon; and photo retouching.

Five photos and three full-color reproductions of plant scenes were matted, framed, and placed in the 705 Building lobby for decorative purposes.

A revised dummy and final art work were provided for the revised "Here's Hanford" booklet. This was a major undertaking in that only a small portion of the original art work could be used without alteration.

A cartoon character was developed for the forthcoming radiation manual to be produced by Special Programs for the Separations Section, and another cartoon character for the forthcoming Suggestion Plan cost reduction program.

Cover design and illustrations for the April health bulletin and safety topic were developed and final art work completed.

Miscellaneous art service included: mounting a visualizer for Training; preparing rough layouts of a Technical Library news letterhead; retouching of an X-ray photo; and mounting twelve photos requested by Community Operations.

Employee and Public Relations

PUBLIC RELATIONS

During the month of March, the News Bureau issued 45 news releases. The breakdown by category, distribution, and content was as follows:

Subject		Distribution	
Pay & Benefits	4	Local	35
Employment Services	10	Daily	4
Goodwill	8	Special	6
Technology & Research	6		
Utilities & Public Works	2	Content	
Safety, Fire, Security	3		
Real Estate	1	Information	2
Recreation	1	Short release	30
Education & Library	6	Long release	12
Health, Medicine	2	Feature	1
Richland	2		
	45		

Seventy-one pictures and cutlines, five previously written feature stories, and a variety of picture and text releases were sent to a representative of Public Relations Services Division in Schenectady. This representative visited Richland and left requests that several different types of background material on Hanford and Richland be sent to him after his departure.

One of the special stories was sent to a prospective author of a book for children on atomic energy. Several previously written news releases and informative booklets were sent with a large group of background pictures.

Eight requests for information on atomic energy were answered this month by sending booklets, fact sheets, and other informative material.

William Von Thurn, representative of John Wiley & Sons, Inc., visited Richland March 24. At the request of an Executive Editor of his company, Public Relations arranged interviews for Mr. Thurn with a number of G-E people at Hanford who are either potential authors of technical books, or are already preparing manuscripts.

D. D. McCracken's paper, "The Monte Carlo Method" was approved this week for publication in SCIENTIFIC AMERICAN.

A paper entitled "A Double Diffracting X-Ray Spectrometer for Study of Irradiated Materials", by W. V. Cummings, D. C. Kaulitz, and M. J. Sanderson, was submitted to REVIEW OF SCIENTIFIC INSTRUMENTS at the request of the authors.

A report of signed article activity in the past year was given to the local AEC Public Information Office. Articles suggested by the AEC's working party from the AEC's committeee on industrial information were emphasized. Favorable comments were received about the number of articles which the report showed have been written, or are being written by Hanford authors for publication in trade and technical periodicals.

"Semac II," an article about computing at Hanford by D. D.McCracken, has been scheduled for the May issue of the General Electric REVIW.

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A paper by I.M.A. Garcia about the design of reactor control circuits will be re-written for the GE REVIEW. The paper was previously submitted to the editors of the REVIEW and they requested that it be revised for publication.

A. H. Bushey, head of the Chemistry Unit, has agreed to prepare a signed article on inline analysis to be submitted to CHEMICAL AND ENGINEERING NEWS. He will also aid in the preparation of news stories for the press on the same subject.

A signed article is being prepared about a new technique developed at Hanford for welding zirconium to glass.

An inquiry from General Mills Corporation about the sealing technique used in construction of the "plastic man" was referred to the Manufacturing Department for reply.

Glossy prints of the photos from Hanford that appeared in the January GE REVIEW were sent East where they will be considered for publication in the Brazilian issue of the REVIEW, after receiving AEC clearance at Washington.

A free lance writer in England recently requested information about certain phases of the work of Radiological Sciences Department at Hanford. He has now requested additional information and photographs. He plans to do two and possibly three articles for British publications.

Permission was granted to an engineering journal in Norway to reprint R. T. Jaske's article on heat conversion at Hanford from a recent issue of HEATING, PIPING AND AIR CONDITIONING.

The following papers were approved this month:

"The Effect of Metering on Domestic Electric Power Consumption in Richland, Washington," by R. J. Mollerus, for presentation before the Richland section of the AIEE, during the last week in March.

"Nature and Source of Radioactive Wastes in Industry," by J. M. Smith, Jr., for presentation at the Sixth Annual Pacific Northwest Industrial Waste Conference in Seattle on March 18 and 19.

"Space Heating from Atomic Reactor Effluent," by R. T. Jaske, for presentation at the Industrial Waste Conference in Seattle on March 19 and for presentation at a meeting of the Western Canada Section, ASHVE, on May 13.

"Gross Metabolism of Water in the Rat as Deduced from Studies with Tritium Oxide," by Roy C. Thompson, for presentation on Marcy 27 at the American Chemical Society meeting in Kansas City, Mo.

"Inter-Related Factors in Process Adjustment for Inert Gas-Shielded Arc Welding," by E. B. Lavelle, for presentation May 4-7 at the American Welding Society meeting in Buffalo, New York.

"Normal Abundance of Radium in Cadavers from the Pacific Northwest," by R. F. Palmer, for presentation at the meeting of the American Chemical Society on March 27 in Kansas City, Missouri.

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"Hanford and the Atomic Energy Program," by T. W. Hauff, to be presented at Whitworth and Whitman Colleges on March 19 and 30 respectively.

"Water Supply at Hanford," by W. R. Conley, for presentation at the National Convention of the American Water Works Association.

"Relative Biological Effectiveness of Ionizing Radiations by a Microbiological Method," by H. A. Kornberg, for presentation May 16-19 at the Second Annual Meeting of the Radiation Research Society in Cleveland, Ohio.

"Report on a Study of Aluminum Joints for Electrical Service," by L. H. Holden, for presentation to the Richland Section of the AIEE. (local approval only)

Abstract of a paper by Leo K. Bustad, entitled "Discussion of the 15th International Veterinary Congress," for presentation at the 6th Annual Conference for Veterinarians on April 9 at Pullman, Washington.

Addendum for a previously cleared paper, "Filtration of Radioactive Aerosols by Glass Fibers," by B. F. Judson, to be given May 3-5, 1954, at the Air Pollution Control Association in Chattanooga, Tennessee.

T. W. Hauff addressed the Pasco Chamber of Commerce at their regular noon meeting on March 29. He gave the same talk he presented at Whitworth and Whitman (listed in the papers approved above) and showed the film "A is for Atom." Radio Station KPKW tape recorded the talk and broadcasted it at 9:00 p.m. on March 29.

H. E. Hanthorn was the featured speaker of the Washington Society of Professional Engineers on March 25 at Seattle. His talk was based on a previously classified report, "Design Features of Plants for Radiochemical Processing," which was subsequently declassified by opinion review at Oak Ridge.

P. A. Bundy, Supervisor of Employment, substituting for G. D. Barr, addressed the Central Valley Social Studies Council at Ellensburg on March 6.

D. W. McLenegan spoke before the University of Colorado nuclear survey class. His talk was based on a paper cleared in March of 1952, "What Do We Mean by 'Nuclear Engineering'?"

The General Manager will address the Spokane Kiwanis Club. A date for this talk is being arranged.

W. J. Dowis of Design Section will speak to the Los Angeles chapter of AIEE on May 25.

A request for a speaker was received from the Yakima Valley Sportsman's Association. They would like to hear about the possible effect of atomic power on the future of dam building in the Northwest.

The March Community Newsletter was written and distributed to community leaders. A copy of the January-February G-E News Digest also was included in this mailing.

Employee and Public Relations

The General Electric educational aids program was shown and explained to the superintendent and assistant superintendent of Kennewick schools at Kennewick, on March 23. The Kennewick schools are using many GE educational aids now, and others will be made available to teachers in Kennewick.

Work was completed this month on two displays Hanford will present at the Inland Empire Science Fair to be held in Spokane on April 7 and 8. One display will be of educational aids materials, and the other will be a four-in-one display and will include an electric train which is activated by a radioactive source, an instrument display showing various types of radiation detection instruments, remote manipulation instruments, and a civil defense display. Arrangements have been made for portions of the fair to be televised, and GE's displays will be included in the televising.

A letter was sent to E. E. Oliver, Transport and Defense Advertising, outlining the contributions that Public Relations can make to the tentative plan made up in the East for establishing the Company as the leader in atomic energy development within industry. As an additional part of this program, texts of recent speeches by A. B. Greninger and W. E. Johnson and a copy of a hot laboratory equipment catalog also were sent to E. E. Oliver to provide him with background material for this special promotional campaign. In the future copies of all important speeches from Hanford will be sent to him.

Based on information gathered from Legal and Administrative Practices it was determined that it is not advisable to use GE stationery to conduct the business of the various technical societies, and this determination was passed along to inquirers.

Special previews of the new HAPO motion picture, "Here's Hanford," were arranged during the month for the many Hanford people who took part in the production. News and feature stories were written during the month to acquaint employees and the public with the purpose of the new motion picture. Releases stressed the value of the new film in the orientation of new employees coming to Hanford. A feature story concerning the overall film program at Hanford, including subject matter on all films produced to date, is being planned for release to trade magazines.

Seven hundred feet of film, taken some time ago for the Fuel Technology Sub-Unit, has been edited into a 450' silent film to be used in a report by that Sub-Unit on the "Hot Press Canning" process. A decision will be made as to the advisability of refilming certain portions of the process and making a sound-on-film finished motion picture.

Filming continued this month on several important phases of the 100-K Design Training Film and the Atomic Energy Commission Expansion Program Film.

The Audio-Visual Unit moved to new quarters located in the 701-B Building, just inside the West Gate. The building is ideal for the activities carried on by the people doing motion picture, slidefilm, TV and radio work. Film editing and projection facilities are now available, which alleviates the disturbances formerly encountered from adjoining offices in the 705 Building.

All feature-length training films produced at HAPO were reviewed by the Non-Technical Review Board in order that present security classifications of the films could be changed in accordance with new regulations. As determined, the films, "Radiation

Hazards Control" and "Operation...Sample" will be classified for "Official Use Only" while "Getting the Job Done" and "No Comedy in Errors"will now bear no security classification. As a guide in preparation of TV footage, the Review Board also gave their opinion regarding security classifications of individual scenes. All footage and accompanying scripts released for TV purposes will be reviewed from a security standpoint before leaving HAPO.

Plans have been formulated to prepare motion picture footage on a forthcoming burial procedure of contaminated equipment. This film, when developed and processed, will be edited here, reviewed by a Security Board, narration written, and if cleared, released to Television Networks in a "package" release of news articles, photographs and television stories.

Editing is in progress for assembly of three five-minute television film "packages" concerning appropriate HAPO subjects. The first of the "pilot" programs will be a "Hanford Style Show" dealing with the varied types of protective clothing required in an atomic plant. Stock footage will be used. When completed, the film and accompanying narrative script will be released for television.

Anticipated in the immediate future is the production of a series of four fifteen-minute television films that will tell the complete Hanford story and be suitable for release to Northwest TV stations. The series will open with a program explaining the purpose of HAPO and progress through a complete survey of plant facilities and activity of interest to the general public. The bulk of the film needed is available from stock footage. The film will be edited here, suitable narration will be prepared and the series sent out to TV stations. This series, once completed, can be used over and over again and should be telecasted by all major Northwest stations. The series will make it possible to utilize footage to provide complete information on the Hanford project to the people of the Northwest and elsewhere.

Four editions of the Hanford SCIENCE FORUM were written, recorded, edited and released for broadcast over Radio Station KWIE at 8:00 p.m. on Tuesdays during the month. Guest panelists this month included an outstanding science student from Kennewick Senior High School, and Dr. R. W. Wager of the Biological Section, Radiological Sciences. Appropriate photographs were taken to publicize these programs and released to local media. An average of ten letters per week requesting answers to scientific questions has been received for use on SCIENCE FORUM.

Four more editions of the packaged programs, "For Better Living," being produced by this Section for Public Health, were assembled, released and broadcast at 4:45 p.m. on Wednesdays over Radio Station KPKW. Subjects covered this month included, "Job Safety," featuring the Chief Supervisor of Safety and Fire Protection Unit with three students from Carmichael Junior High; "Home Safety" with the Chairman of the Jaycee-ettes Committee on Home Safety and three students from the John Ball Grade School; "Care of the Feet" with Dr. T. M. Armstrong and three Sacajawea Grade School students; and "Tetanus" with Dr. R. R. Sachs and three students from Jason Lee School who acted as questioners. The Program Director of KPKW stated that he is very pleased with the quality of this series.

Two hundred still photography assignments were covered during the month of March, producing a total of 10,587 prints of which 5,158 were "A" and "B" employee identification badge prints. A total of 5,429 prints were area and news work.

Employee and Public Relations

Motion picture film exposed on three individual motion pictures is as follows: 6,530 feet (b&w) for 100-K Construction project, 1,200 feet for Design Engineering project in the 300 Area, and 200 feet of color for Orientation movie.

Projection equipment loans during the month were: $3\frac{1}{4}$ x 4" slide projector, ten times; 35mm Golde projector, seven times; screens, six times.

Several color transparencies were made to be submitted for consideration as 1955 G-E calendar painting subjects. Approximately three full days of one photographer's time was used to complete this assignment.

One hundred fifty-two 8"x10" prints were produced for the GE NEWS for a special feature story on Engineering.

J. L. Hascall, Reproduction and Photographic "B" visited the Technical Institute at Stanford University to inquire into, and learn the procedures used there in the production of technical reports requiring photographic illustrations. If a better method is being used that will produce better quality work--at a lower, or the same cost--we intend to use these methods. It has been suspected that there is room for improvement in the methods now used by the Photography Unit to produce photographs for report purposes. Every effort is being made to satisfy the needs of our Technical customers.

An increase of photographic processing and printing for other Units, Sections, and Departments has been noted. Much of the printing required can be done on our Automatic Pako Printer, which is the fastest and lowest price method, and produces the sharpest prints of any other method used at HAPO.

See attached Statistical Report for Photography Unit.

PHOTOGRAPHY UNIT MONTH OF MARCH, 1954	2" X 2"	2" X 4"	4" X 5"	4" X 6"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	N E G.	35mm Color Slides	3¼"X4" (B&W) Slides	3¼"X4" Color Slides	4"X5" Color Transp.
COMMUNITY OPERATIONS & SERVICES													
Commercial Services			34										
Police			124		16	16			66				
Public Library						5			3				
Municipal						41			4				
EMPLOYEE & PUBLIC RELATIONS													
Employment	380								76				
News Bureau		12	28		36	104			19				
Special Programs					14	55			11				
Audio Visual		6				12			11				
Training						21			5				
Works News	6	62	2		23	294	12		143				
Photography Unit						60	2		50				
Medical					35	14			14				
ENGINEERING													
Engineering Administration						152			184				
Radio Met.											7	8	7
Design & Construction			56			62	281		34		1	2	
Applied Research			20				1800			9			
Technical				4	2		233	24	10				
Technical Library						35		23					
Pile Technology			425			46	192		10				
Fuel Technology			87			19	143		43			18	
MANUFACTURING													
Plant Engineers						28			18				
Metal Preparation Section						19			11				
Separations Section					9	4	43		30		2		

-Continued-

PHOTOGRAPHY UNIT MONTH OF MARCH, 1954	2" X 2"	2" X 4"	4" X 5"	4" X 6"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	N E G.	35mm Color Slides	3¼"X4" (B&W) Slides	3¼"X4" Color Slides	4"X5" Color Transp.
RADIOLOGICAL SCIENCE													
Biophysics		60	61				3		10	60	3		
Biology						75	12		1		10		
Aquatic Biology					1			10	20			5	
Radiological Engr.								1			7		
UTILITIES & GENERAL SERVICES													
Graphics						4							4
Finance					3								
Purchasing & Stores			18		26	10			10				
Security	560					2			28				
Applied Mathematics						12			6				
MISCELLANEOUS													
A.E.C. Safety						4			14				
A.E.C. Security	100				29				13				
Kaiser Engineers						9			12				
TOTALS	1,046	140	851	4	194	1,103	2,709	59	856	69	30	33	11

	JANUARY	FEBRUARY	MARCH
Total Assignments	192	185	200
Total Negatives	997	798	856
Total Prints	6,906	7,529	10,587

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 were curtailed in favor of work described below.

2. R.C. Grant returned from an extensive trip in the East on March 29. He reconciled approximately 100 positions with about fifteen different components of the Company and with Salary Administration Services in New York.

3. The writing of position analyses and position descriptions was completed except for a few positions which are currently involved in organization changes.

4. The evaluation of positions was essentially complete insofar as assignment of scores according to the evaluation plan is concerned. The reconciliation of scores between departments and the assignment of tentative salary levels was begun.

5. The Hanford Operations Office of the A.E.C. completed its audit of records of the Salary Administration Section.

6. Mr. Paul E. Mills, Senior Consultant, Organization, from the Management Consulting Services Division, arrived for a visit of one week on March 31.

Employee and Public Relations

UNION RELATIONS

Union Relations - Operations Personnel

Negotiations with the radiation monitoring Inspectors continued during the month and substantial agreement has been reached on all items except wages and progression schedules. The Company has proposed a continuation of the existing classifications and grades with automatic progression from the Inspector B to Inspector A category.

James H. Hughes, guard employee, has been elected to replace A. J. Mayhew as Business Representative for the Hanford Guards Union. He will continue his employment with the Company.

Kate Jean Beck has replaced A. L. Rogers as Business Representative for Local No. 201, Building Service Employees International Union. Mrs. Beck is a former representative of the culinary workers in Salt Lake City, is not employed by the Company, and is married to a construction carpenter.

The Richland Maintenance Company has clarified the holiday provision of their Agreement with the BSEIU, Local No. 201. A supplemental agreement, approved by the BSEIU on March 15, 1954, contains the following wording in the holiday provision:

> "Employees shall receive full compensation for the following holidays not worked, if they occur during the employees' regular working schedule . . ."

The intent apparently was not to pay employees for holidays falling outside their regular schedule although the original words very clearly provided just that.

Grievance Statistics:

A total of 40 grievances were received and four Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

All Departments

	HAMTC	HGU	Total Unit	Total Nonunit
Received this month	32	3	35	5
Received this year	84	8	92	9

Employee and Public Relations

UNION RELATIONS

Grievance Statistics (Contd.):

All Departments

	HAMTC	HGU	Total Unit	Total Nonunit
Step I				
Pending February 28	2	0	2	3
Settled this month*	22	1	23	10
Settled this year	63	4	67	13
Pending March 31	4	1	5	1
Step II				
Pending February 28	25	0	25	0
Settled this month**	8	0	8	0
Settled this year	22	3	25	0
Pending March 31	25	1	26	0
Arbitration				
Pending February 28	1	0	1	
Settled this month	0	0	0	
Settled this year	0	0	0	
Pending March 31**	0	0	0	

By Departments

	Received		Settled Step I*		Settled Step II**	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Manufacturing						
Reactor - Unit	16	36	12	32	2	5
- Nonunit	3	4	4	4	0	0
Separations - Unit	4	12	3	11	3	6
- Nonunit	1	2	1	2	0	0
Metal Preparation - Unit	2	16	0	9	1	4
Plant Auxiliary Operations						
Transportation - Unit	2	3	1	2	0	4
Plant Protection - Unit	9	15	2	5	1	5
Stores - Unit	0	1	1	1	0	0
Employee & Public Relations						
Community - Unit	0	5	0	3	1	1

*Grievances brought to Step II prior to January 1, 1954, but never processed by the Union are, for the purpose of this report, considered settled at Step I.

**Grievances which the Union formally indicated their intention to submit to arbitration but have taken no further action since January 1, 1954, are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION 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
Radiological Sciences - Unit	2	4	4	4	0	0
- Nonunit	1	1	1	1	0	0
Engineering - Nonunit	0	2	4	6	0	0

By Subjects

	Manufacturing		Plant Aux. Operations		Emp. & Pub. Relations		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	6	25	8	10	0	3	1	3		
Health-Safety-Sanitation	1	7	0	1	0	1	0	0		
Hours of Work	2	2	0	0	0	0	0	0		
Overtime Rates	3	4	0	0	0	0	0	0		
Holidays	1	1	0	0	0	0	0	0		
Sick Leave	1	3	0	0	0	1	0	0		
Seniority	1	4	1	2	0	0	1	1		
Grievance Procedure	1	1	0	0	0	0	0	0		
Wage Rates	4	6	2	2	0	0	0	0		
Miscellaneous	2	12	0	3	0	0	0	0		
Nonunit										
Health-Safety-Sanitation	0	0					0	0	0	1
Overtime Rates	3	3					0	0	0	0
Vacation	0	0					1	1	0	0
Seniority	1	1					0	0	0	0
Wage Rates	0	1					0	0	0	0
Work Assignment	0	1					0	0	0	0
Miscellaneous	0	0					0	0	0	1

*Grievances brought to Step II prior to January 1, 1954, but never processed by the Union are, for the purpose of this report, considered settled at Step I.

**Grievances which the Union formally indicated their intention to submit to arbitration but have taken no further action since January 1, 1954, are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION RELATIONS

Construction Liaison

The recommendation of the Ching Panel in the Carpenter-Millwright dispute has been received. In addition to several relatively unimportant working rules, the recommendation included:

1. Wage issue to be settled in conformity with the pattern set by the Spokane Associated General Contractors for eastern Washington and

2. Isolation pay question to be resolved jointly with the Building Trades Council.

A mass meeting of Minor Construction employees (about 300 attended) was held in the Pasco Labor Temple on February 24 to discuss a no-strike pledge on Minor Construction work. J. A. Jones, Project Manager, was present and has expressed satisfaction over the results of the meeting. On March 3, the Executive Board of the Council met and agreement was reached to enter into a no-strike contract. We are informed that a letter to J. A. Jones has been drafted which currently bears the signature of all the local unions with the exception of the Bricklayers and Asbestos Workers who have failed to sign only because of the unavailability of their business representatives.

Approximately 500 electricians on the payroll of Foothill Electric Corporation (Kaiser) walked off the job Tuesday afternoon, March 2, protesting the assignment of the installation of certain motors at 100-K to the Millwrights. Work was resumed on March 4. International representatives of the two crafts were in Richland on March 8 to endeavor to resolve the dispute on a permanent basis. To date no terms of settlement have been announced.

Negotiations on project agreements are currently in progress with the Ironworkers, Machinists, Technical Engineers, and Office Workers.

Wage Rates

Reimbursement Authorization No. 221 was received from the Atomic Energy Commission for the establishment of a new non-bargaining unit classification entitled "Service Manual Writer." This position carries a Grade of 24. It is planned to promote bargaining unit employees who have writing ability plus job knowledge to write maintenance and repair procedures for inclusion in service manuals. Upon completion of this project, these individuals are scheduled to be returned to their crafts.

A survey among the Atomic Energy Commission's prime contractors to ascertain rates paid radiation inspectors or monitors at other projects was completed. This study was made in connection with negotiations being conducted with the recently organized inspectors in the Manufacturing Department and the Radiological Sciences Department.

At the request of the Aircraft Nuclear Propulsion Department management, a representative of the Wage Rates Unit visited the Idaho Falls installation for consultation in connection with the establishment and installation of the nonexempt wage and classification systems for the Arco project.

UNION RELATIONS

Wage Rates (Contd.)

The 1954 edition of the annual General Electric Company Northwest Area Wage Survey was completed and distribution to the participating firms started. The survey results show that the rates paid by the Hanford Atomic Products Operation are considerably above those paid by other area participants in this study.

Revised job definitions for the classifications of Separations Utility Operator, Separations Process Operator and Dispatcher (Separations) were negotiated and forwarded to the Hanford Atomic Metal Trades Council for formal acceptance.

Clarification of the jurisdictional agreement between the Plumbers and Steamfitters and the Instrument Guild was received from the Hanford Atomic Metal Trades Council and distributed to interested supervision.

The Company accepted the Hanford Atomic Metal Trades Council's proposal to assign instrument personnel to service the sensing instruments, seismoscope amplifier and relays to the instrument craft until an acceptable jurisdictional settlement is worked out between the Instrument Guild and the International Brotherhood of Electrical Workers.

Three hundred thirteen (313) automatic increases and one (1) merit increase were processed during March. Requisitions for two hundred eighty-five (285) prospective employees and additions to the payroll for sixty (60) new employees were approved. Review for proper classification, rate, etc., was made for twenty-three (23) reactivations, one hundred fifty-one (151) reclassifications, eighty-four (84) temporary reclassifications, ninety-five (95) transfers, and four (4) transfers from the exempt roll.

Employee and Public Relations
Technical Personnel Section

TECHNICAL RECRUITING

Requirements for technical personnel with industrial experience or with advanced education continue to be varied. Accordingly, we are endeavoring to maintain a flexible position and at the same time meet those needs which appear to be definite.

It now appears that our Ph.D needs are higher than were estimated earlier, including probable replacements as well as some net growth. We are endeavoring to find additional candidates to augment those with whom we already have contact.

As sources of experienced engineers we have interviewed and are contacting further, on a planned basis, employees of several large projects which are being terminated or curtailed for budget reasons. Some of these involve civil service personnel, others industrial employees.

For the college recruiting of B.S.-M.S. candidates we are making good progress toward the authorization of 40 hires which was established early in March Records and trend curves maintained over the last 4 years enable us to regulate somewhat the number of offers to be issued, although we still have to estimate an "acceptance percentage" to reflect changing economic conditions. So far we have 18 of the 40 acceptances expected. Follow-up dinners at a few schools plus a carefully written schedule of follow-up mailings are helpful in gaining a high percentage of acceptances. Spring recruiting visits at the colleges are practically completed. So far our acceptance ratio is substantially higher than it has been at this time in previous years, and we are curtailing employment offers accordingly.

ROTATIONAL TRAINING PROGRAM

With 10 placements during March the number of trainees on our Program has decreased during the month from 51 to 41. Placement of most of the remaining trainees is foreseen during the remainder of FY-1954. During March there have been no resignations from this group and no new additions. We do not expect to lose many trainees by voluntary enlistment.

We are keeping closely in touch with the Selective Service situation through bulletins of the Engineering Manpower Commission, the advise of Mr. Boring, and that of Mr. Paul Allen. We can thereby portray to technical graduates or prospective employees a wider point of view on the Selective Service situation.

Employee and Public Relations
Technical Personnel Section

EDUCATION -- SCHOOL OF NUCLEAR ENGINEERING

For the spring semester 220 students have paid full tuition, about equally divided between graduate and undergraduate courses. New courses in Pile Engineering and in Servomechanisms have attracted sizeable groups of capable engineers, and a new course in Applied Heat-Power Thermodynamics is progressing well. For the current semester 39 students have registered actively with the University of Idaho, and we have further numbers with the other universities bringing the total of active university-affiliated students to about 75.

Following their recent visit, the authorities of the University of Idaho reported very favorably to their administration the current status of our school, and the high percentage of students who are successfully completing our courses.

COUNSELING AND INTERNAL TRANSFERS

Along with a reduced termination rate, the need for counseling and transfer of technical personnel has declined substantially. During the month two intra-company transfers have been arranged to take effect in April. We are also helping a few other technical employees to locate outside positions, at the suggestion of their supervisors. We have also participated in one transfer within HAPO.

UNIVERSITY RELATIONS

During the month an engineering talk was presented before the senior engineering students at the University of Colorado in their Nuclear Survey Class. Assistance was given to the University of Washington in obtaining a Hanford speaker for their conference on Waste Prevention.

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
MARCH 1954

General

As of March 1st the Medical Department became a section of the Employee and Public Relations Department and the Safety and Fire Prevention Unit was transferred to the new section which is called the Health & Safety Section.

Personnel Changes

With the transfer of 19 employees to the Health & Safety Section, there was an increase in the roll from 251 to 268. Without this transfer of personnel there was little change in the roll.

Visits

Dr. Scudder attended a two-day conference on waste disposal at the University of Washington.
Mr. Bakko attended a meeting in Dayton of the Council for Hospitals in Southeastern Washington.
Dr. Sachs, and several of his staff, attended the clinic on "Community Health Problems" in Yakima. A sanitarian attended the institute on milk control at Spokane while another attended a sewage disposal conference at Pullman.
Four nurses attended the Washington State Nursing Association's annual meeting in Seattle.
The Public Health unit had out of town visitors representing (1) National Foundation of Infantile Paralysis, (2) Public Health Nursing - State Health Department, (3) State Department of Rehabilitation..
Dr. E. E. Osgood, from the University of Oregon, discussed his research findings in Leukemia with members of Industrial Medicine and Biology.

Employee Relations

Employee attendance at 26 meetings was 191.

Industrial Medicine

Medical examinations increased from 684 to 880. Dispensary treatments also increased from 4136 to 4801.
The health topic was "Artificial Respiration."
Sickness absenteeism was 1.73% as compared with 2.17% for February while the rate of total absenteeism was 2.41% as compared with 2.91% for February.

Safety and Fire Prevention

No major injuries were reported, making the total to date three. Three sub-major injuries were reported and treated. Minor injuries increased slightly from 252 (freq. 2.00) to 313 (freq. 2.17). There were no contractor major or sub-major injuries.
Arrangements were completed for a series of Safety Meetings to be conducted in April by Mr. C. R. Powell, Director of Public Relations, Endicott Johnson Corporation. Mr. Powell uses tricks of magic to highlight his safety message which emphasizes split second safety thinking to prevent accidents.
We have been notified by the National Safety Council that H.A.P.O. has won its highest award - The Award of Honor - for the fifth consecutive time. Since this award has only been made for five years, it represents maximum attainment in this respect and we will try to learn how many other plants share this honor.

General (Continued)

Safety and Fire Prevention (Continued)

We have been notified by the National Fire Prevention Association that the H.A.P.O. facilities placed second in the nation in competition with all industry in fire prevention activities. We are to receive national recognition during the month of May at the annual meeting of the National Fire Prevention Association which is to be held in Washington, D. C.

Kadlec Hospital

The average daily census decreased from 89.9 to 78.0 as compared to 101.3 a year ago. The reason for this much lower census is not apparent.

The occupancy percentage of the mixed service was 75.3. Nursing hours per patient day were 3.78 on the mixed service.

Public Health

A decrease in communicable diseases reported resulted from a decline in the incidence of measles. Nearly twelve hundred cases of measles have been reported. Since this includes most of the susceptibles, only a few more cases are expected.

The Social Service counselors had 179 contacts with individuals having problems in family relationships and 66 contacts in which help was given to children and adults whose personal problems were causing conflict. In addition to these there were 15 contacts dealing with a variety of social problems such as illness, economic need and foster child care.

Four cases involving difficulties between parents and children were successfully concluded, as were two cases of marital conflict.

The mosquito control program resumed operation on March 18th.

Costs-February

	January	February	February Budget
Industrial Medicine (Oper.)	$41,262	$40,421	$42,248
Public Health (Oper.)	10,424	9,241	10,564
Kadlec Hospital (Net)	20,062	18,088	21,092
Hospital Expense Credits	1,430	1,519	2,500
Sub-total-Medical Department (Oper.)	73,178	69,269	76,404
Construction Medical (Industrial and Public Health)	1,080	1,074	1,660
Total-Operations & Construction	$74,258	$70,343	$78,064

The net cost of operating the Health & Safety Section before charges were assessed to various departments was $70,343, about $4,000 less than January and some $7,700 below the budget.

The relatively favorable position resulted from reduced salaries and continuity of service expense due to a shorter month while hospital revenue remained about the same as for the previous month.

HEALTH & SAFETY SECTION

MARCH 1954

Industrial Medical Services

The total number of examinations increased from 684 to 880. Dispensary visits also increased from 4,136 to 4,801, bringing the year to date figure to 13,254. The increases were fairly uniform in all areas except 200-W and 300 which remained about the same. General Electric employees sustained no major injuries but there were three sub-majors. Contractor employees sustained no major and no sub-major injuries. Industrial nurses on the active roll were 24.

Dr. Galen Hover resigned from the staff on March 19th to accept a position with the du Pont Indiana plant. One physician vacancy still remains on the staff. Dr. Schilling from Madison, Wisconsin, was interviewed during the month and made an offer for employment which has not yet been accepted or declined. One information meeting for industrial physicians was held during the month.

Dr. E. E. Osgood from the Division of Experimental Medicine, University of Oregon Medical School, was a visitor during the month and met with the Industrial Medical staff for discussion of leukemia.

Special examination and evaluation of 100 Area power operators was completed during the month in regard to hearing loss. There were 17 cases with a nerve type deafness in the vicinity of a 20% loss. Earmuffs were ordered for these people and use by those remaining in high noise level areas will be mandatory. The 200 Area operators are still in the process of examination and it is anticipated that about four out of this group will have a significant nerve type deafness.

Dr. Scudder attended a University of Washington conference on waste disposal problems in Seattle on March 18th and 19th.

The Health Activities Committee met on March 17th and the health topic on "Artificial Respiration" was presented. Material on the back-pressure arm-lift method was prepared for distribution throughout the plant and arrangments made to demonstrate this newer method of artificial respiration to groups of employees. The topic was selected because of a company-wide effort to prevent and deal with electric shock. The sickness absenteeism was 1.73% as compared with 2.17% for February.

Net costs incurred during February amounted to $33,277 as compared with an expenditure of $33,895 in the previous month. The decrease of $618, or 2%, resulted from a reduction in salaries and related continuity of service expense totalling nearly $1,700. An increase of approximately $1,000 occurred in supplies and other miscellaneous costs which partially offset the decrease in salaries.

Costs Operations

	February	January	Increase (Decrease)
Salaries	$29,596	$31,104	$(1,508)
Continuity of Service	2,960	3,110	(150)
Laundry	268	227	41
Utilities, Transportation, Maintenance	3,419	3,807	(388)
Supplies and Other	5,138	4,093	1,045
Total Gross Costs	41,381	42,341	(960)
Less: Revenue	960	1,079	(119)
Expense Credits	7,144	7,367	(223)
Net Cost of Operation	$33,277	$33,895	$ (618)

Industrial Medical Services (Continued)

At the end of eight months' operation, net costs are approximately $24,000, or 8%, less than anticipated at the time the budget was prepared. Charges to other departments for services rendered to them have been much greater than expected.

HEALTH & SAFETY SECTION

MARCH 1954

Industrial Medical Services (Continued)	February	March	Year to Date
Physical Examinations			
Operations			
Pre-employment	65	73	187
Rehire	26	24	71
Annual	300	442	1203
Interim	5	14	35
A.E.C.	33	33	91
Re-examination and recheck	205	229	623
Termination	50	65	169
Sub-total	684	880	2379
Contractors			
Annual	12	13	44
Pre-employment	58	93	177
Recheck	33	41	82
Termination and Transfer	15	23	51
Sub-total	118	170	354
Total Physical Examinations	802	1050	2733
Laboratory Examinations			
Clinical Laboratory			
Government	156	136	409
Pre-employment, Termination, Transfer	1227	1527	3692
Annual	1631	2407	6512
Recheck (Area)	63	109	277
First Aid	10	23	42
Clinic	291	473	1171
Hospital	4471	4481	13642
Total	7849	9156	25745
X-Ray			
Government	16	19	52
Pre-employment, Termination, Transfer	183	292	598
Annual	328	502	1368
First Aid	80	118	292
Clinic	200	232	634
Hospital	312	308	919
Public Health	13	4	33
Total	1132	1475	3896
Electrocardiographs			
Industrial	67	70	247
Clinic	1	0	2
Hospital	40	25	112
Total	108	95	361

HEALTH & SAFETY SECTION

MARCH 1954

Industrial Medical Services (Continued)	February	March	Year to Date
First Aid Treatments			
Operations			
New Occupational Cases	291	342	969
Occupational Case Retreatments	1092	1304	3496
Non-occupational Treatments	2564	2795	8092
Sub-total	3947	4441	12557
Construction			
New Occupational Cases	38	71	145
Occupational Case Retreatments	79	181	326
Non-occupational Treatments	37	62	109
Sub-total	154	314	580
Facility Operators	35	46	117
Total First Aid Treatments	4136	4801	13254
Major Injuries			
General Electric	1	0	3
Contractors	0	0	0
Total	1	0	3
Sub-Major Injuries			
General Electric	2	3	6
Contractors	1	0	1
Total	3	3	7
Absenteeism Investigation			
Calls Made	5	5	20
Employee Personal Illness	4	3	16
No. absent due to illness in family	0	1	1
No. not at home when call was made	1	1	3

HEALTH & SAFETY SECTION

MARCH 1954

Kadlec Hospital

The average daily adult census decreased from 89.9 to 78.0 as compared to 101.3 a year ago. This represents an occupancy percentage of 71.6, broken down as follows: Mixed Service (Medical, Surgical, Pediatrics) 75.3; Obstetrical Service 55.7. The minimum and maximum daily census ranged as follows:

	Minimum	Maximum
Mixed Service	47	83
Obstetrical Service	5	17
Total Adult	59	98

The average daily newborn census decreased slightly from 11.7 to 11.6, as compared to 12.9 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.78
Obstetrical	4.92
Newborn	3.10

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of February was 1.86. When newborn infants are included, the ratio is 1.65.

The net expense for the operation of Kadlec Hospital for February was $18,088, as compared to $20,062 for January. Summary is as follows:

Kadlec Hospital net expense $18,088
This is a decrease of approximately $1,950.
Gross expenses decreased about $2,250 and expense credits increased approximately $100, but revenue decreased $400.

Mrs. Bernadine Bieker, R.N. and Mrs. Ferne Jones, R.N. attended the annual meeting of the Washington State Nurses Association in Seattle as delegates from District #24.

Mr. Bakko attended a meeting of the Southeastern Washington Hospitals Council in Dayton.

HEALTH & SAFETY SECTION

MARCH 1954

Hospital Unit (Continued)	February	March	Year to Date
Kadlec Hospital			
Average Daily Adult Census	89.9	78.0	81.7
Medical	28.3	18.3	23.9
Surgical	34.7	35.8	33.6
Pediatrics	15.2	12.2	13.1
Mixed	78.2	66.3	70.6
Obstetrical	11.7	10.7	11.1
Average Daily Newborn Census	11.7	11.6	11.3
Maximum Daily Census:			
Mixed Services	97	83	97
Obstetrical	18	17	18
Total Adult Census	115	98	115
Minimum Daily Census:			
Mixed Services	53	47	44
Obstetrical Service	4	5	4
Total Adult Census	61	59	55
Admissions: Adults	524	572	1654
Discharges: Adults	530	572	1637
Medical	156	155	457
Surgical	206	254	686
Pediatrics	88	76	254
Mixed	450	485	1397
Obstetrical	80	87	240
Newborn	71	76	216
Patient Days: Adult	2518	2418	7352
Medical	792	568	2148
Surgical	972	1110	3024
Pediatrics	426	377	1183
Mixed	2190	2055	6355
Obstetrical	328	363	997
Newborn	328	360	1017
Average Length of Stay: Adults	4.8	4.4	4.5
Medical	5.1	3.7	4.7
Surgical	4.7	4.4	4.4
Pediatrics	4.8	5.0	4.7
Mixed	4.9	4.2	4.5
Obstetrical	4.1	4.2	4.2
Newborn	4.6	4.7	4.7
Occupancy Percentage: Adults	82.5	71.6	75.0
Medical	76.5	49.5	64.6
Surgical	108.4	111.9	105.0
Pediatrics	80.0	64.2	68.9
Mixed	88.9	75.3	80.2
Obstetrical	55.7	55.7	52.9
Newborn	45.0	44.7	43.5

(Occupancy Percentage based on 109 adult beds and 26 bassinets.)

Hospital Unit (Continued)	February	March	Year to Date
Kadlec Hospital (Continued)			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.32	3.78	
Obstetrics	5.26	4.92	
Newborn	3.08	3.10	
Avg. No. Employees per Patient (excluding newborn)	1.86		
Operations: Major	83	89	249
Minor	84	99	285
E.E.N.T.	49	79	195
Dental	2	4	9
Births: Live	68	82	217
Still	2	0	2
Deaths	5	6	17
Hospital Net Death Rate	.33%	.30%	.43%
Net Autopsy Rate	60.0	50.0	52.9
Discharged against advice	2	1	3
One Day Cases	126	150	410
Admission Sources:			
Richland	74.4	75.5	74.2
North Richland	13.0	10.8	12.5
Other	12.6	13.7	13.3
Admissions by Employment:			
General Electric	69.7	69.8	69.9
Government	3.4	3.5	3.0
Facility	4.4	6.4	4.8
Contractors	18.1	16.1	17.7
Schools	.4	.9	.7
Others	4.0	3.3	3.9
Hospital Outpatients Treated-F.A.	502	603	1609
Recovery Bed Patients-F.A.	20	26	70
Physical Therapy Treatments			
Clinic	352	383	1026
Hospital	80	116	316
Industrial: Plant	182	219	568
Total	614	718	1910
Pharmacy			
No. of Prescriptions Filled	2525	2538	7485
No. of Store Orders Filled	458	577	1524

HEALTH & SAFETY SECTION

MARCH 1954

Hospital Unit (Continued)	February	March	Year to Date
Kadlec Hospital (Continued)			
Patient Meals			
Regulars	3957	3787	11146
Children under 8	298	586	1347
Specials	1427	948	3845
Softs	1012	882	2821
Tonsils	88	129	386
Liquids	180	227	573
Surgical Liquids	70	87	242
Total	7032	6646	20360
Cafeteria Meals			
Noon	1740	2003	5775
Night	285	291	884
Total	2025	2294	6659

HEALTH & SAFETY SECTION

MARCH 1954

Public Health Unit

A decline in the incidence of communicable diseases reported was noted, due chiefly to a slowdown in the spread of measles. We are approaching the anticipated 1200 cases we expected with over 1100 reported, and from now on the incidence of the disease will be definitely on the downgrade, since a majority of the susceptibles have experienced the disease.

There has been approximately a 20% drop in all nursing visits due to the slowing up of communicable disease extension and a shortage of two staff nurses.

A visit was made to the unit by Mr. Sheldon Price of the National Foundation for Infantile Paralysis. He was concerned with the services rendered in local areas by county chapters. He was impressed by the cooperation between the local chapters and the activities of the hospital and health unit.

Sanitarians attended the institute on milk control at Spokane and sewage disposal at Pullman.

Miss Julie Anderson, assistant professor of public health nursing in the State Health Department, visited our unit in regard to field training for two students commencing April 19.

The health officer, health educator and staff nurses attended the clinic on "Community Health Problems" in Yakima. Members of the staff participated in discussions and group sessions regarding problems on home safety, hospital insurance, mental health, community team work, fluoridation of water supply, teenage problems and new communities.

Miss Lillian O'Callahan, consulting nurse of the State Department of Health, visited in regard to nursing activities.

Dr. C. Farner, Mrs. Marian Seaman, Miss D. Bostron and Mr. Thern Mathews of the State Department of Rehabilitation, attended a conference with the Social Service members of the health unit with regard to residents of the area who are receiving vocational rehabilitation services.

Two staff nurses attended the Washington State Nursing Association's annual meeting in Seattle.

During March the Social Service counselors had 179 contacts with individuals having problems in family relationships, and 66 contacts in which help was given to children and adults whose personal problems were causing conflict. In addition to these, there were 15 contacts dealing with a variety of social problems such as illness, economic need, and foster child care.

Four cases involving difficulties between parents and children were successfully concluded, as were two cases of marital conflict.

Public Health Unit (Continued)

Regular monthly inspection of food handling establishments indicate most to be operating satisfactorily. Due to an increased turnover in a number of establishments, considerable time was spent showing proper food handling techniques. Improper cleaning of garbage cans was the major violation found.

An improvement was noted in sanitation of one bakery. This was largely due to the attitude of the new manager.

Due to Saturday pickup of trash wagons in commercial areas, a considerable improvement was noted in sanitation of alleys, etc. It is felt that this will help prevent a recurrence of the rodent problem in the uptown shopping area which existed last year.

Thirty-seven Grade A dairy farms were inspected. One producer was degraded because of continued high bacteria count. Bacteriological results of pasteurized milk samples were excellent.

Mosquito control program commenced March 18, 1954. Two new men have been oriented as to proper burning and clearing techniques. Thus far a total of 1200 lineal feet of ditch has been cleaned and 250 areas of land burned.

HEALTH & SAFETY SECTION

MARCH 1954

Public Health (Continued)	February	March	Year to Date
Education			
Pamphlets distributed	11,032	12,987	33,057
News Releases	12	14	31
Staff Meetings	1	2	4
Classes	16	39	67
Attendance	1,319	846	2,165
Lectures and Talks	8	11	23
Attendance	235	474	1,476
Films Shown	13	6	26
Attendance	438	209	798
Community Conferences & Meetings	28	16	85
Radio Broadcasts	12	12	32
Immunizations			
Diphtheria	1	1	8
Diphtheria Booster	1	1	3
Tetanus	1	1	9
Tetanus Booster	1	1	2
Pertussis	1	1	7
Pertussis Booster	1	1	2
Smallpox	3	5	12
Smallpox Revaccination	81	1	85
Tuberculin Test	5	0	5
Immune Globulin	229	267	531
Other	0	4	4
Social Service			
Cases carried over	85	94	265
Cases admitted	23	18	59
Cases closed	14	18	51
Remaining case load	94	94	273
Activities:			
Home Visits	7	9	23
Office Interviews	280	341	885
Conferences	60	39	156
Meetings	8	9	23
Sanitation			
Inspections made	146	153	399
Conferences held	30	15	53
Bacteriological Laboratory			
Treated Water Samples	176	206	550
Milk Samples (Inc. cream & ice cream)	40	39	115
Other bacteriological tests	727	534	1,779
Total	943	779	2,444

HEALTH & SAFETY SECTION

MARCH 1954

Public Health (Continued	February	March	Year to Date
Communicable Diseases			
Chickenpox	55	45	118
German Measles	8	7	21
Impetigo	0	2	3
Influenza (U.R.I.)	1	0	1
Measles	560	443	1,085
Mumps	4	2	9
Ringworm	2	2	6
Roseola	1	2	3
Scabies	0	0	1
Scarlet Fever	20	5	43
Streptococcal Infections-Throat	1	0	3
Tuberculosis	1	0	1
Whooping Cough	2	8	10
Total	655	518	1,306
Total No. Nursing Field Visits	758	687	2,390
Total No. Nursing Office Visits	109	123	335

COMMUNITY OPERATIONS SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
MARCH 1954

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees beginning of month	5	15
Transfers in	0	1
Transfers out	0	0
Terminations	0	0
Total end of month	5	16

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set and transferred	8
Anchors set and guys installed	2
Street lights repaired and steel mast arms installed	6
Street lights relamped - Mercury Vapor	1
Street lights relamped - 6000L and 4000L, 1100 Area	91
Street lights relamped - 6000L and 4000L, 700 Area	9
Flood lights relamped, 1100 Area	3
Flood lights relamped, 700 Area	0
Stack lights relamped, 700 Area	0
Primary line footage added	0
Primary line footage removed	0
Transformer KVA added	15
Transformer KVA removed	53
Net transformer KVA installed	0
New services installed - residential	0
New services installed - commercial	8
Temporary services installed and removed	0
Scheduled outages - primary	3
Scheduled outages - secondary	3
Unscheduled outages - primary	0
Unscheduled outages - secondary	2
Standby and escort	1
High voltage tree trimming	30
Low voltage tree trimming	21

TRAFFIC SIGNALS

Relamping	1
Operational failures	1
Installations	0
Removals	0
Routine maintenance checks	23
Routine check R. R. signal at Van Giesen	4

RICHLAND ELECTRICAL UNIT

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	16
Electrical motors checked and serviced - water	41
Electrical motors checked and serviced - sewage	55

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	3
Outside circuit checks	3
Inside faults repaired	0
Outside faults repaired	4
New circuits placed in operation	0
New boxes placed in operation	0

SUBSTATIONS

Main feeder and tie breaker checks - BB1S1	5
Main feeder and tie breaker checks - BB1S2	8
Secondary and pad located stations - Checked jumpers, cutouts, grounds and general condition	27

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Radio interference checks	5
Voltage and load checks	4
Meters tested - customers' requests	5
New meters shop tested	12
Faulty meters replaced	4
Damaged meters and covers	2
Residential read-ins	134
Residential read-outs	116
Residential disconnects	6
Residential reconnects	2
Meters resealed	0
Meters changed out due to excessive load(Residential)	0

Note: Consumption and revenue reports, under IBM operation, are not available until 18th of following month.

RICHLAND ELECTRICAL UNIT

Consumption and revenue:

	No. of Meters	KWH	Revenue
Schedule 1 - Residential	7048	7,614,892	$72,420.84
Schedule 2 - Commercial			
Class 1 - (In Lease)	61	707,498	6,543.11
Class 2 - (Metered Basis)	224	820,815	9,350.38
Class 3 - (Plant Adm.)	22	1,439,074	9,154.22
	Total	10,582,279	$97,468.55

COMMENTS

Installed four new 15 amp, 3 phase meters to McVickers #1 Building, and eight of same type to McVickers #4 Building to separate and properly allocate to individual consumers.

Installed meter loop and meter to sewage treatment plant on GW Way and Abbot.

Overhauled irrigation pump motors 6-2 and 6-1 in #6 station. Checked contactors, and replaced inboard bearings in each.

Overhauled irrigation pump motors 3-2 and 3-1 in #3 station. Replaced inboard bearings in each.

Overhauled irrigation pump motors 4-1, 4-2, and 4-3 in #4 station. Replaced both bearings in 4-2.

Overhauled irrigation pump motors 2-1, 2-2, and 2-3 in #2 station. Replaced both bearings in 2-3.

On March 13, 1954, due to flooding of #3 irrigation well house, it was necessary to dry out and swab conduit, pull in some new wire and remove motors to send to 200 W for drying out windings. Two days later the well house was flooded the second time making it necessary to perform work over again except motors which were still out to 200 W. After drying-out period motors were received from 200 W and #3 station was restored to normal.

Installed mercury vapor lights to light up hazardous intersections: GW Way north of Swift, north side of McMurray at GW Way, at west entrance to 700 Area, Stevens Drive near Skating Rink, Comstock and GW Way, Benham and GW Way, Jadwin at west side Uptown Commercial Area, and Lockwood and Goethals.

Removed three poles and secondary wiring account of removal of 712 huts south side of 703 Building. Removed 500 ft. of cable, messenger and guys for Telephone Unit in same area.

Removed 50 Kva transformer, a 3 Kva transformer, and installed a 15 Kva transformer to meet changed conditions at Columbian Club.

RICHLAND ELECTRICAL UNIT

Removed electrical service to four prefabricated houses: 1404 Kuhn, 412 Robert, 1801 Thompson, and 617 Winslow.

Replaced seven rotted street light poles and one primary pole on Wilson, Stevens to Perkins.

Replaced 37.5 Kva transformer at 1412 Mahan, account of burned off wire in transformer. Old one will be serviced and returned to spare parts.

Rerouted eight spans of 2/0 primary line from rear of Jason Lee School to south side of Van Giesen between Perkins and Wright. This work was completed with a minimum of residential outages, and no outage to Jason Lee School, but with a complicated line switching schedule.

Replaced telephone pole broken by auto at Spengler Road and Stevens Drive on Work Order.

Disconnected service to 341 Cottonwood on March 18 for failure to pay; reconnected on March 19.

Completed cutover to fire alarm reporting circuit between Jadwin and Stevens intersection and Central Stores, as recently installed by AEC contractor. Close proximity to 7200 volt circuit caused induced voltage of 600 volts in new circuit, which was reduced by installation of condenser installation. New circuit is now in operation. AEC was informed of condition by letter.

Completed lighting to children's room as requested by Public Library operation.

Work is progressing on 120 volt service installations to television amplifiers as requested by television company. Connections were started March 24, 1954, when approved list was submitted by Richland Television Company.

Station overhaul work is in progress at 115 kv stations BB1S1 and BB1S2 where inspection and servicing has been completed to following 1200 Amp circuit breakers: OCB - Spare, OCB 11, OCB 24, OCB 12, OCB 34.

Scheduled outages:

To distribution transformer rear of 1609 Van Giesen to remove unused span of primary and rerun jumpers. One hour on March 19.

To line 41 at Perkins and Van Giesen to make primary deadend installation and connection to line 32. From 8:30 to 11:30 on March 23.

To line 32 rear of Jason Lee School to remove primary line across school property. From 12:50 to 3:18 P.M. on March 24.

To change out 37.5 Kva transformer with burned wire inside at 1412 Marshall. From 1:00 to 2:30 P.M. on March 17.

To Richland Baptist Church at GW Way and Wordrop to enlarge transformer station and add third primary wire. From 1:00 to 3:00 P.M. on March 2, 1954.

RICHLAND ELECTRICAL UNIT

To transformer 1544 on Thayer north of Van Giesen, to connect to series circuit. From 1:00 to 2:30 P.M. on 3-4-54.

Unscheduled outages:

Call-Out - Primary fused cutout arcing in rear of 511 Cullum. Found porcelain frame broken by rocks. Three men on 2-28-54.

Primary wire burned off in transformer at 1412 Marshall. Two men from 9:30 to 12:30 on 3-8-54.

Call-out - Fire alarm, open circuit in #1 circuit. One man called, found high resistance in cable - repaired following day. From 8:30 to 10:30 on 3-7-54.

Call-out - Fire alarm outage on #2 circuit, found sticking relay in panel. One man from 6:30 to 8:40 P.M. on 3-8-54.

Call-out - Irrigation well house #3 on Hains flooded because wrong valve was left open. Disconnected station from power. Two men from 5:00 to 5:45 P.M. on 3-13-54.

Unusual Incident:

Occurred in executing planned outage to a section of line 32 between switch X 109 at Perkins and Symons and station OCB by failure to close parallel switch X 194, thus dropping from service that portion of line 32 south of Symons to Swift and west of Wright to Willard, for a period of 15 minutes, at which time error was discovered and corrected. Steps have been taken to prevent a recurrence.

COMMUNITY OPERATIONS SECTION
PUBLIC WORKS UNIT
MONTHLY REPORT
MARCH 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	11	53
Transfers Out	1	1
Transfers In	0	3
New Employees	0	1
Terminations (and deactivation)	0	2
Total End of Month	10	54

SANITATION

Total weight of waste material collected and disposed of during March was 1376 tons.

The increased amount of trash being placed in trash trailers at commercial facilities which are open on Friday evenings and all day Saturdays, made it necessary to again provide trash trailer towing service on Saturdays effective 3-13-54. Such service had been discontinued on 6-27-53 after having been provided for several years.

ROADS AND STREETS

Patching of holes in street surfacing caused by frost or settlement during winter months has been in progress on the arterial streets and will be continued into the residential areas.

Burning of weeds along road shoulders, and drainage ditches into which street drainage empties, was completed.

Shoulder and gutter maintenance, including grading and laying in of necessary materials was completed in the 1400 through 2000 blocks of Putnam; 1400 through 1600 blocks of Roberdeau; and the 1100 and 1200 blocks of Potter.

Crushed rock materials necessary for street maintenance and other uses during the coming year are now being processed at the material yard south of the By-Pass Highway.

Approximately 75 cubic yards of pit run gravel were hauled and placed adjacent to the new spillway at the North Richland well field to control water erosion at this location.

About 25 cubic yards of 1 1/2" rock was placed at the water inlet to the Wellsian Lake Fish Pond to hold trash fish in the canal from entering the Fish Pond.

Routine seasonal repair and maintenance of streets, street signs, drainage systems, municipal parking lots and sidewalks were continued.

PARKS AND PUBLIC GROUNDS

A project proposal for the construction of a concrete comfort station at Riverside Park, to replace an existing wooden structure which must be removed due to its location below the control contour for McNary Pool, was approved by the General Electric A&B Committee on 3-29-54 and has been forwarded to the AEC for their approval. This Comfort Station will incorporate chlorination equipment for the wading pool, and a sewage lift pump presently housed in a separate wooden shack.

Sixty three good shade trees were transplanted from the nursery to the undeveloped part of Riverside Park north of Lee Boulevard. To provide for watering of these trees, the existing pipe grid in this area, which has had no water supply since the wooden irrigation main on Lee Boulevard was abandoned in 1952, was activated through tapping into the 6" domestic main on Lee Boulevard.

Annual fertilizing of lawn grass areas has been completed, and distribution of hose and sprinklers to areas using this type of irrigation is now in process.

Spray equipment and materials are in readiness for starting of pollen control activities, but the unseasonably cold weather has held back germination. Inspection of weed growth indicates that this program may commence about the second week in April.

All ball diamonds have been put in condition for play.

Rye grass was sown along the drain ditch south of McMurray where shaping of banks had caused a dust nuisance.

Routine maintenance of Parks properties, shelterbelts and public areas was continued.

DOMESTIC WATER

Average daily water consumption for March was 7,428,200 gallons. Peak daily consumption was 8,756,000 gallons on March 30, 1954.

Recharge water was turned into 3000 Area percolation basin on March 3. Some difficulty was encountered with the new inlet weir box installed by construction on the flume to the recharge basin and it was necessary

to install a baffle in the weir box to break the rapid flow of water and prevent over splash and washing of soil around weir box and channel.

On March 16, recharge water was turned into the Columbia field recharge basin.

On March 16 the 24" water main on Stevens Drive was shut down for construction to make a water service connection to the new Transportation Area. The connection was completed and the line returned to service on 3-22-54.

On March 22 and 23 wells H, J, K, L, and E at 3000 area were surged, test pumped and put in service. At that time it was not possible to pump the wells at rated capacity without depleting the water table and pumping air. Another test will be run on these wells when the water table has built up further through recharge. At present these pumps are being operated at reduced ratings, and indications are that further developing may be necessary to bring these wells up to rated capacity.

The new Roto Converters for controlling chlorine fed into the well discharge headers at 3000 area well field have been received and are in the process of being installed.

DOMESTIC WATER

	Well Production Million Gallons	Average Daily Production	Total Consumption Million Gallons	Average Daily Consumption
Richland	50.7900	1.6384	134.0057	4.3228
North Richland	110.8000	3.5742	52.0654	1.6795
Columbia Field	68.5512	2.2113		
300 Area			44.2026	1.4259
TOTAL	230.1412	7.4239	230.2737	7.4282

SEWERAGE SYSTEM

The cleaning and flushing program on sewage collection system was completed during the month. Several sections of the collection system in the south end of town were found to have open pipe joints, allowing the liquid to seep out and sewage solids to build up and create stoppages. Methods for correction of these conditions are presently being studied.

Several sewage collection system stoppages occurred during the month and were repaired.

Approximately 140,000 gallons of sludge were pumped to drying beds during the month.

A circular spray device was installed on the center of the secondary clarifier at #2 Treatment Plant to control an excessive foaming condition which is apparently due to the use of detergents in the sewage coming to the plant.

SEWAGE

	Total Flow Million Gallons	Average Daily Flow Million Gallons
Plant No. 1	32.430	1.046
Plant No. 2	68.635	2.214
TOTAL	101.065	3.260

IRRIGATION SYSTEM

Water was turned into the irrigation canal on March 1, 1954 and through to the 3000 Area percolation basin on March 3.

The regular cleaning and weed burning program was completed on that portion of the canal from the penstock through town during the month. Water was turned through the canal system into Columbia field percolation basin on March 12.

The #3 irrigation pumping station was flooded with water from the canal system on March 14. It was necessary to remove the pump motors and dry out the motor windings. This was completed and the motors for all irrigation pumps have been inspected, cleaned, and lubricated, and are ready for service.

Maintenance and repairs to irrigation pumps will be completed by about April 15.

COMMUNITY OPERATIONS SECTION
RECREATION AND CIVIC AFFAIRS UNIT
MONTHLY REPORT
MARCH 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Beginning of Month	3	3-1/2
New Hires	0	0
Terminations	0	1
Transfers - In	0	0
- Out	0	0
End of Month	3	2-1/2

SCHOOLS

The following is a tabulation of full-time paid School District #400 personnel as of March 31, 1954:-

Administration	7
Principals and Supervisors	14
Clerical	25
Teachers	306
Health Audiometer	0
Cooks	44
Bus Drivers	1
Maintenance	21
Operations	47
	465

CLUBS AND ORGANIZATIONS

As of March 31, 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

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
Recreation 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 Parks and Recreation Board held its regular meeting on Thursday, March 4, 1954. The Board was advised that the north boundary line of the park area south of the Bus Depot would be considered to be that line where the sidewalk along Geo. Wash. Way in front of the Bus Depot terminates at the South point. The Board was also advised that the Richland Rod and Gun Club with the assistance of the Public Works Unit and the Recreation Unit, seined all fish from Wellsian Lake on February 27, 1954. The next regular meeting of the Board is scheduled for April 7, 1954.

The last session of the Fall and Winter Adult-Co-Recreation Program was held on March 29, at the Spalding School.

Three members of the staff of the Unit attended the National Recreation Assn. Northwest Reginal Conference held at Spokane March 29, 30, and 31st.

An Adult Table Tennis Tournament was sponsored by the Unit on March 22, 23 and 24th. "Loving Cups" were presented to the First and Second place winners, for both the singles and doubles events.

RECREATIONS AND CIVIC AFFAIRS UNIT March 1954

Attendance Statistics - March, 1954

	No. of Sessions	Youth	Adults	Spectators	Sub-Total
A. Community House					
I. Rec. Unit Supervised Programs					
Games Room Activities	26	1724	322		2046
Crafts	10	112	7		119
Tumbling	3	67	11		78
Ballroom Dancing	5	96	8		104
Movies	4	401	36		437
Photography	4	5	2		7
Square Dancing Elementary	4	536	47		583
Square Dancing Juniors	4	134	20		154
Adult Table Tennis League	3		66		66
Physical Activities - (Spalding)	3		50		50
Kite Making Instructions	1	35	2		37
II. Affiliated Program					
Hi-Spot Club (Teen Age)	8	2640	26		2666
Rec-A-Teers (Young Adults)	4		215		215
Fencing	5		49		49
Jr. Stamp Club	3	57	6		63
Int'l. Folk Dancers	8	13	118		131
G.E. Women's Club	0		0		0
Rich. Rod & Gun Club	2	15	92		107
Y.W.C.A. Supper Club	4		167		167
Jr. Symphony	6	145	46		191
Jr. Sportsman Club	1	21	2		23
III. Rec. Unit Special Events					
Table Tennis Tournament	3		130	30	160
IV. Non-Unit Special Events					
None					
V. Other Comm. House Bookings	46	811	1147	—	1958
Sub-Totals	157	6812	2569	30	9411
B. Parks and Playgrounds					
I. Rec. Unit Supervised Programs					
General Play-Columbia	18	6750	50		6800
II. Affiliated Programs					
None					

RECREATION AND CIVIC AFFAIRS UNIT March, 1954

	No. of Sessions	Youth	Adults	Spectators	Sub-Total
III. Rec. Unit Special Events					
Kite Flying Tournament	1	25	2	60	87
IV. Non-Unit Speical Events					
None					
V. Baseball & Softball Bookings	84	2025	75		2100
VI. Estimated Use of Non-Supervised playgrounds					
None	—	—	—	—	—
Sub-Totals	103	8800	127	60	8987

SUMMARY OF STATISTICS

	No. of Sessions	Youth	Adults	Spectators	Sub Total
Community House	157	6812	2569	30	9411
Parks & Playgrounds	103	8800	127	60	8987
Total March Attendance	260	15612	2696	90	18398

Grand Total for March 18,398
Cal. Year Total-To-Date 35,948

COMMUNITY OPERATIONS SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
March 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees - Beginning of Month	4	8
Transfers In	0	0
Transfers Out	0	0
New Hires	0	1
Terminations	1	1
End of Month	3	8

GENERAL

Circulation

Books	22,175
Magazines	547
Pamphlets	91
Records	1,441
Interlibrary Loan	46
Grand Total	24,300

Current Book Stock

Books added this month	614 (458-A; 156-J)
Books withdrawn this month	36
Grand Total	28,723

Registration

Adult	192
Juvenile	77
Total	269
Total Registered Borrowers	15,754
Children's Story Hour Attendance	261
Meetings in North Hall	29

The sidewalk from the North Hall door of the library to the library parking lot was completed this month.

The following art exhibits sponsored by the Allied Arts Association have been on display in the North Hall this month: Works of members of the Washington Art Association; Watercolors by Walter Hook, Richland artist.

A new American Heritage Discussion Group on the topic of "Are You Living Up To Your Freedoms", was started on March 25th with seventeen participants. The discussion leader for the group is Rev. Robert Uphoff.

Miss Toni Hoyler, Children's Librarian, resigned effective March 31st, to travel in Europe.

COMMUNITY OPERATIONS SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
MARCH 1954

ORGANIZATION

	Exempt	Non-Exempt
Employees - Beginning of Month	17	32
Transfers In	0	0
Transfers Out	0	1
New Hires	0	1
Terminations	0	0
Total - End of Month	17	32

GENERAL

Effective March 12, our officers discontinued using the Army Firing Range for firearms training. Officers are now using the General Electric Firing Range near Hanford for routine arms training.

Eight Boy and Girl Scout troops were escorted on a tour of Police Headquarters during the month.

A complete inventory of police equipment was taken during the month of March.

A study of the functions and costs of the Richland Police Department was prepared for the League of Women Voters this month.

A survey of needed street striping, crosswalks, curbs and street stencils was made this month in preparation for the spring painting program.

A recommendation was made to install mercury vapor lights at ten locations, following a survey of street lighting needs.

Compilation of the Richland Police Department's Inventory of Traffic Safety Activities for the National Safety Council contest was completed during the month of March, and forwarded to the National Safety Council headquarters.

As a result of recommendations submitted to improve traffic safety conditions throughout the city, eight mercury vapor lights were installed at hazardous intersections during the month.

TRAFFIC	1954 Feb.	1954 Mar.	1953 Feb.	1953 Mar.	1954 Total To Date	1953 Total Same Period
Reportable accidents	25	14	21	20	71	62
Property damage accidents	22	10	20	18	61	57
Injury accidents	3	4	1	2	10	4
Total persons injured	3	4	1	3	10	5
Fatal accidents	0	0	0	0	0	1
Accidents-Daylight hours	16	11	13	12	47	38
Darkness	9	3	8	8	24	24
Accidents-Business district	7	3	11	4	18	23
Residential "	13	9	5	15	42	27
Other "	5	2	5	1	11	12
Accidents investigated	11	9	14	13	36	36
Criminal complaints filed	6	5	11	8	20	26
Violations contributing to accidents:						
Negligent driving	7	3	1	3	13	6
Fail.to yield r.o.w.	7	3	10	3	14	25
Following too closely	4	3	4	5	15	12
Drunk driving	0	0	0	0	0	0
Pedestrian violation	0	0	0	1	0	1
Inattention to driving	2	0	0	0	2	0
Reckless driving	1	1	1	1	2	2
Speeding	1	0	2	0	1	2
Unsafe speed	3	0	0	0	19	0
Improper backing	0	3	1	3	3	6
Disregarding stop sign	0	0	0	2	0	4
Hit and run	0	0	0	1	0	1
Improper passing	0	0	1	1	0	2
Improper turn	0	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
Bicycle violation	0	1	0	0	1	0
North Richland:						
Reportable accidents	7	7	9	10	24	25
Property damage accidents	6	6	9	8	21	22
Injury accidents	1	1	0	2	3	3

Richland	1954 February	1954 March	Ave.Per Accident 1954 February	Ave.Per Accident 1954 March	Ave.Per Accident 1953 February	Ave.Per Accident 1953 March
Accident property damage	$5,566.48	$3,255.00	$222.66	$232.50	$257.14	$165.51

TRAINING

Advance training for Richland Police members at the Small Arms Range for the period in Field Instruction was as follows:

Sub. Machine gun and riot gun	½ Hour	Firing was for practice, with no score except the following:					
Total number of men reporting at the range	21	Expert	1	25%	Marksman	1	25%
Number of men fired over the Army-L Course	21	Sharpshooter	1	25%	Unqualified	1	25%

ACTIVITIES AND SERVICES	February		March	
	Richland	North Richland	Richland	North Richland
Bank escorts and details	3	6	2	6
Bicycles impounded	0	2	2	0
Bicycles, violations	0	0	0	1
Bicycles registered	31	0	40	0
Children lost or found	13	3	9	4
Complaints investigated (no enforcement action)	26	4	45	19
Deaths reported	0	0	0	1
Dog, cat, loose stock complaints	1	0	3	0
Dogs, cats, reported lost or found	7	0	17	0
Doors, windows found open in facilities	29	8	44	5
Emergency messages delivered	24	73	22	106
Fires investigated	5	1	9	8
Guns registered	10	0	9	0
Law enforcement agencies assisted	9	0	3	0
Letters of inquiry	75	0	91	0
Miscellaneous escorts	1	2	6	8
Persons injured by dogs	0	0	2	0
Plant departments assisted	15	1	13	1
Prisoners processed through Jail	27*	12	10	15
Private individuals assisted	8	1	10	6
Property lost or found	14	3	34	1
Records inquiries	148	0	160	0
Reports processed through Records	304	467	260	210
Street lights out reported to Electrical	107	22	176	31
Traffic safety meetings (March attendance 920)	17	0	13	0
Total	874	605	980	422

NOTE: *Three prisoners handled for Security Patrol for February.

MONTHLY REPORT
RICHLAND POLICE DEPARTMENT
(RICHLAND - NO. RICHLAND)
MARCH 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. Mans.								
b. Mans. by Negligence								
2. Rape								
3. Robbery								
4. Aggravated Assault								
5. Burg.-Break. & Entry	2	-	-	-	-	-	1	-
6. Larceny Over $50.00	3	-	-	-	-	-	2**	-
Under $50.00	17	8	2	1	4	1	1	1
7. Auto Theft	2	2	-	-	1	2	-	-
TOTAL PART I CASES	24	10	2	1	5	3	4	1
PART II								
8. Other Assaults	4	1	-	-	-	-	3	1
9. Forgery & Counterfeit	-	1	-	-	-	1	-	-
10. Embezzlement & Fraud	7	1	-	-	-	-	4	1
11. Stolen Prop:Buy:Rec.	-	-	-	-	-	-	-	-
12. Weapons: Carry: Poss.	-	-	-	-	-	-	-	-
13. Prostitution	-	-	-	-	-	-	-	-
14. Sex Offenses	5	5	1	-	1	-	3	5
15. Offenses Ag.Fam.& Child	-	-	-	-	-	-	-	-
16. Narcotics	-	-	-	-	-	-	-	-
17. Liquor Laws	-	-	-	-	-	-	-	-
18. Drunkenness	7	10	-	-	-	-	7	10
19. Disorderly Conduct	-	2	-	-	-	-	-	2
20. Vagrancy	-	-	-	-	-	-	-	-
21. Gambling	-	-	-	-	-	-	-	-
22. Driving While Intoxicated	2	4	-	-	-	-	2	4
23. Viol. Rd. & Dr. Laws:								
Fail. to Stop & Identify	2	3	-	-	-	-	-	3
Speeding	13	6	-	-	-	-	13	6
Stop Sign	11	12	-	-	-	-	11	12

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART II								
Reckless Driving	5	2	-	-	-	-	5	2
Right of Way	4	4	-	-	-	-	4	4
Negligent Driving	14	7	-	-	-	-	14	7
Defective Equipment	1	1	-	-	-	-	1	1
Illegal Passing	-	2	-	-	-	-	-	2
24. Parking	36	102	-	-	-	2	36	100
25. All Other Traffic Viol.	8	12	-	-	-	-	8	12
26. All Other Offenses:								
Malicious Mischief	6	-	-	-	1	-	-	-
Vandalism	6	1	-	-	-	-	-	-
Bike Violations	1	1	-	-	1	1	-	-
Family Disturbance	-	2	-	-	-	2	-	-
Dog Poisoning	1	-	-	-	-	-	-	-
Public Nuisance	1	-	-	-	-	-	1	-
Investigation	6	1	-	-	4	-	1	-
Prowler	5	5	-	-	-	-	-	-
Disturbance	3	-	-	-	3	-	-	-
Molesting	2	1	-	-	-	-	-	1
Illegal Shooting	-	2	-	-	-	-	-	1
Viol. of Dog Ordinance	1	-	-	-	-	-	1	-
Pickup for Outside Agency	1	-	-	-	-	-	1	-
Damage to Property	1	2	-	-	1	1	-	-
Conspiracy	-	1	-	-	-	-	-	1
27. Suspicion	2	-	-	-	1	-	-	-
TOTAL PART II	155	191	1	-	12	7	115	175
PART III								
28. Missing Persons	7	-	-	-	7	-	-	-
Lost Persons	11	2	-	-	11	2	-	-
Lost Animals	13	-	-	-	4	-	-	-
Lost Property	32	3	-	1	24	-	-	-
29. Found Persons	-	-	-	-	-	-	-	-
Found Animals	7	-	-	-	2	-	-	-
Found Property	33	-	-	-	20	-	-	-
TOTAL PART III	103	5	-	1	68	2	-	-

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART IV								
30. Fat.M.V.Tr. Acc.	-	-						
31. Pers.Inj.M.V.Tra.Acc.	4	1						
32. Prop.Dam.M.V.Acc.	10	6						
33. Other Traffic Acc.								
34. Public Accident)								
35. Home Accidents)	No Accurate Statistics Kept							
36. Occupational Acc.)								
37. Firearms Accidents								
38. Dog Bites	2							
39. Suicides								
40. Suicide Attempts								
41. Sud. Death & Bod. Found		1						
42. Sick Cared For								
43. Mental Cases								
TOTAL PART IV	16	8						
COMPOSITE TOTALS								
PART I,II,III,IV CASES	298	214	3	2	85	12	119	176

*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 Grand Larceny cleared by arrest for the previous month.

Property reported stolen	Richland	$2,506.07
Property reported stolen	No. Rich.	$1,729.50
Property recovered	Richland	$ 786.93
Property recovered	No. Rich.	$1,643.50

RICHLAND POLICE DEPARTMENT
(COMMUNITY OF RICHLAND)

Number of offenses known to police per 25,000 inhabitants in cities of 25,000 persons:

Wash.Oreg. & Calif. Six Months (Jan.-June 1953)		One Month Average	1953 Jan. - June	1954 February	1954 March
Murder	.383	.064	-	-	-
Robbery	11.925	1.988	-	-	-
Agg. Assault	9.95	1.659	-	-	-
Burglary	73.55	12.259	19	3	2
Larceny	210.53	35.089	116	9	20
Auto Theft	39.23	6.538	4	2	2

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 February	1954 March
Murder	.371	.062	-	-	-
Robbery	8.43	1.403	-	-	-
Agg. Assault	2.03	.338	-	-	-
Burglary	62.28	10.38	19	3	2
Larceny	188.38	31.397	116	9	20
Auto Theft	34.0	5.667	4	2	2

The percentage of offenses committed by persons under the age of 25 years is shown:

	Richland 1953 Jan. - June	Richland February 1954	Richland March 1954
Robbery	-	-	-
Burglary	28%	33%	50%
Larceny	16%	-	20%
Auto Theft	17%	-	-

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 DEPARTMENT
(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 February	1954 March
Murder	.153	.026	-	-	-
Robbery	4.77	.795	-	-	-
Agg. Assault	3.98	.663	1	-	-
Burglary	29.42	4.903	4	-	-
Larceny	84.21	14.035	52	7	8
Auto Theft	15.69	2.615	5	9	2

Number of offenses known to police per 10,000 inhabitants regardless of whether offenses occurred in cities of rural dist.

State of Washington Six Months (Jan.-June 1953)		One Month Average	1953 Jan.- June	1954 February	1954 March
Murder	.153	.026	-	-	-
Robbery	3.37	.562	-	-	-
Agg. Assault	.81	.135	1	-	-
Burglary	24.91	4.152	4	-	-
Larceny	75.35	12.588	52	7	8
Auto Theft	13.60	2.267	5	9	2

The percentage of offenses committed by persons under the age of 25 years is shown:

	No. Richland 1953 Jan. - June	No. Richland 1954 February	1954 March
Robbery	-	-	-
Burglary	-	-	-
Larceny	12%	14%	13%
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 MARCH

OFFENSES	NO. CASES	JUVENILES	SEX	6	7	9	10	11	12	13	16	17
RICHLAND												
Investigation	1	3	M		1	1	1					
Mischief	1	2	M	1		1						
Fire	1	4	M				2	2				
Breaking & Entering	1	2	M								1	1
Larceny	6	4 4	M F							1	2 4	1
Disturbance	1	3	M				2	1				
TOTALS	11	22		1	1	2	5	3		1	7	2
NORTH RICHLAND												
Larceny	1	2	M						2			
Damage to Property	1	1	M	1								
TOTALS	2	3		1					2			

RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
MARCH 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	4	3	1							1		$ 7.50	$ 15.00	$ 15.00
DRUNK DRIVING	2	2							2				105.00	
F.T.Y.R.O.W.	6	5		1									47.50	10.00
FOLLOWING TOO CLOSE	2	1	1							1		25.00	7.50	
ILLEGAL PARKING	31	7	15	8	1					1		49.00	24.50	14.00
IMPROPER TURN	2		1	1									7.50	
INVALID DRIVERS LICENSE	29	11	9	3	6					10		62.00	51.50	28.50
INVALID LICENSE PLATES	28	11	10	1	6					14		87.50	75.00	25.00
NEGLIGENT DRIVING	15	11	4				2	1				175.00	145.00	55.00
NO REGISTRATION	2	1		1			1			1				
RECKLESS DRIVING	3	3							3				155.00	25.00
SPEEDING	17	5	11	1						3		110.00	42.50	7.50
STOP SIGN	16	9	6	1						2		57.50	67.50	15.00
VIOLATION OF S.R. ACT	1			1										
CONT. TO DEL. OF A MINOR	1	1					1	1						
DOG ORDINANCE	1	1											12.50	12.50
LARCENY BY CHECK	3	3					3	2						
PETIT LARCENY	2	1			1		1	1						
PUBLIC INTOXICATION	7	4	3				1					37.50	37.50	5.00
PUBLIC NUISANCE	1	1											15.00	10.00
THIRD DEG. ASSAULT	2	2					2	2						
TOTAL	175	82	61	18	14		11	7	5	33		$611.00	$808.50	$222.50

ONE RECKLESS DRIVING CASE AMENDED TO NEGLIGENT DRIVING.
ONE INDECENT LIBERTIES CASE AMENDED TO CONTRIBUTING TO THE DELINQUENCY OF A MINOR.

RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
MARCH 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	2	2								1		$	$ 12.50	$ 7.50
DRUNK DRIVING	2	1			1				1				52.50	
F.T.S. & I.	1	1											27.50	
F.T.Y.R.O.W.	3	2		1									22.50	
ILLEGAL PARKING	100	11	59	30						4		206.50	45.50	14.00
ILLEGAL PASSING	2	1		1									7.50	
INVALID DRIVERS LICENSE	24	5	11	1	7					6		55.00	28.50	10.00
INVALID LICENSE PLATES	32	9	11	2	10					11		103.50	50.00	15.00
NEGLIGENT DRIVING	8	6	1	1					1	1		35.00	87.50	
NO REGISTRATION	1	1								1			5.00	
RECKLESS DRIVING	4	4							4				260.00	
SPEEDING	12	2	10							2		91.00	17.50	7.50
STOP SIGN	16	7	7	2						1		53.50	52.50	7.50
CONSPIRACY	1	1					1	1						
DISORDERLY CONDUCT	1	1					1	1						
PUBLIC INTOXICATION	6	4	2									25.00	50.00	
THIRD DEG. ASSAULT	1		1										50.00	
TOTAL	216	58	102	38	18		2	2	6	27		$569.50	$769.00	$61.50

TWO DRUNK DRIVING CASES AMENDED TO RECKLESS DRIVING.
ONE DRUNK DRIVING CASE AMENDED TO NEGLIGENT DRIVING, LIQUOR INVOLVED.

POLICE DEPARTMENT - TRAFFIC CONTROL STATISTICS
MARCH - 1954

MOTOR VEHICLE ACCIDENTS REPORTABLE:

	Total Number		Fatalities		Major Injuries		Minor Injuries	
	Feb.	March	Feb.	March	Feb.	March	Feb.	March
Richland	25	14	0	0	0	0	3	4
North Richland	7	6	0	0	0	0	1	1

ACCIDENT CAUSES:

	Negligent Driving		Failure to Yield Right of Way		Reckless & Drunken		Other Causes	
	Feb.	March	Feb.	March	Feb.	March	Feb.	March
Richland	7	3	7	3	1	1	10	7
North Richland	1	1	1	2	0	0	4	3

PLANT WARNING TRAFFIC TICKETS ISSUED:

	Speeding		Stop Sign		Parking		Imp. License		Def. Equipment		Other V.		Totals	
	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.
Richland	0	0	0	0	0	0	0	0	2	0	2	0	4	0
No Richland	0	0	0	0	80	2	0	0	1	0	0	0	81	2

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	
	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.	Feb.	Mar.
Richland	19	14	13	14	5	2	2	4	1	6	11	14	27	30	98	41	176	125
N.Richland	11	10	6	15	4	4	2	2	2	3	6	7	206	96	121	42	352	179

TRAFFIC VOLUME COUNT: 24 Hour Traffic Volume Count on Jadwin south of Williams, March 31, 1954 was 13,844.

NOTE: TRAFFIC CONTROL STATISTICS SHOW ORIGINAL CHARGES ONLY

COMMUNITY OPERATIONS SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT
MARCH 1954

Organization and Personnel	Exempt	Non-Exempt
Employees - Beginning of Month	67	0
Transfers In	1	0
Transfers Out	1	0
Terminations	0	0
New Hires	1	0
End of Month	68	0

Fire Protection		Richland	North Richland
Fire Loss (Estimated):	Government	$95.00	$ 0.00
	Personal	18.50	145.00
	March Total	$113.50	$145.00
	Year's Total	$446.00	$3,781.00
Response To Fire Alarms		25	27
Investigation of Minor Fires & Incidents		7	1
Ambulance Responses		30	
Inside Schools or Drills		29	8
Outside Drills		37	20
Safety Meetings		7	4
Security Meetings		4	2
Fire Alarm Boxes Tested		218	120
AEC Airport Standbys		2	

Four juvenile groups, totalling 38 boys and girls, accompanied by 6 adult leaders, visited the Central Fire Station during March.

Fire Prevention

A total of 205 Richland and 54 North Richland fire hazard inspections during March resulted in 16 hazard reports. Four hundred thirty fire extinguishers were inspected, 11 repaired, 9 recharged, 9 removed and 20 installed. A hundred and twenty one fire hose standpipes were also inspected.

Several meetings were held with Chamber of Commerce and Junior Chamber of Commerce committees, and with Plant Fire Protection supervision, relative to Clean-Up Week scheduled for April 18-24 inclusive. Publicity and campaign material was received and readied for the campaign.

Assistance was given public school maintenance personnel in testing auxiliary fire alarm systems in all schools. Repeated failure experienced with the Chief Joseph Junior High system resulted in efforts to bring about revision of the system in order to make it operative.

One service station was advised of code provisions for the sale of white gasoline in drums.

Recommendations were submitted for changing the west parking lot at Kadlec Hospital to provide a direct lane between a fire hydrant and the building.

Reports of exit code violations during public events in the schools were submitted to school officials.

Arrangements were made for distribution to all merchants through the Chamber of Commerce of the March Safety Topic pamphlets.

Following continued difficulty with hazardous trash accumulations weekends around mercantile firms, Saturday morning trash pickups were instigated and improved conditions noticed.

Automatic sprinkler system plans for the new Richland Baptist Church were reviewed with Community Engineering.

COMMUNITY OPERATIONS SECTION
ENGINEERING UNIT
MONTHLY REPORT
MARCH 1954

PERSONNEL:	Exempt	Non-Exempt	Total
Employees - Beginning of Month	6	3	9
Employees - End of Month	6	3	9

BUILDING PERMITS ISSUED IN MARCH:

1. Alteration Permit, Desert Inn, Additional Toilet Facilities.

NEW MUNICIPAL CONSTRUCTION STARTED IN MARCH:

1. Additional Tree Planting in Riverside Park

NEW PRIVATE CONSTRUCTION STARTED IN MARCH:

None

ENGINEERING JOBS COMPLETED DURING MARCH:

Project K-753 - Flow Control Valve, Sewage Treatment Wet Well - Completion notice 3-8-54.

ESR I 90164 - Plans, Specs., Inspections, Veterinary Hospital.

ESR I 90174 - Plans, Specs., Inspections, Diana Langevin Building.

ESR I 90284 - Removal of Irrigation System (Estimates).

ESR I 90294 - Replace Water Line #5 Well to Lee Boulevard Reservoirs - ESR closed into Project CA-570.

ESR I 90304 - Street Construction, FY 1954 (Project Proposal) - ESR closed into Project CA-577.

ESR I 90344 - Installation of Bar Screens at Sewage Lift Station - ESR closed into Project IR-171

ESR I 90364 - Legal Description, Desert Inn (Vance Properties, Inc.)

ESR I 90384 - Field work and drawings to resurface Easement North of Public Health Building - ESR closed into Project L-384

ESR I 90394 - Installation of Cyclone Fence at Tennis Courts, Riverside Park - ESR closed into Project L-394.

ESR I 90484 - Revised Legal Description, Automatic Laundry Co. (formerly Richland Realty).

ENGINEERING UNIT (Cont.)

COMPLETED JOBS In MARCH (Cont.)

ESR I 90544 - Sidewalk Survey

ESR I 90664 - Traffic Light, Symons and Jadwin - See Project K-644 now assigned to Electrical Distribution Unit.

ESR I 90694 - Study of plots of vacant lands.

ESR I 90744 - Coal Stockpile Survey

STATUS OF ENGINEERING UNIT JOBS TO BE COMPLETED:

PROJECTS:

CA 577 -Improvements to Existing Streets, George Washington Way, FY 1954 - Preliminary Survey completed.

CA 570 Replace Raw Water Line, #5 Well to Lee Boulevard - Detail design started 3-31-54. 1% complete.

K-811 Extend Sewer to New Commercial Building, Hartford and 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-384 Improvements to Medical Arts Building, Service Drive - Preliminary survey completed.

L-394 Replace Tennis Court Fences, Riverside Park - Design 100% complete. Bid package to AEC Contract on March 31, 1954.

S-722 (IR-167) - Erosion Control & Development, FY 1953, Part I - Design complete, ready for contract.

S-869 (IR-165) - Parking Facilities, Kadlec Hospital, Design completed 3-1-54.

IR-171 - Automatic Bar Screens, Sewage Lift Station - Plans and Specifications to AEC for review 3-31-54.

ENGINEERING SERVICE REQUESTS:

I 90014 - Free Methodist Church - 99% complete. No progress this month.

I 90024 First Baptist Church (Richmond and Raliegh Streets) - 90% complete. Work progressing very slowly.

I 90034 Assemby of God Church - 80% complete. Work progressing very slowly.

I 90044 Alteration Permits - An open active file - 4 sign permits issued.

ENGINEERING UNIT (Cont.)

ENGINEERING SERVICE REQUESTS (Cont.)

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. No progress this month. Open for business.

I 90104 Plans, Specs., Inspections, Newberry Store - 99% complete. Exceptions being cleared. Open for business.

I 90114 Plans, Specs., Inspections, Latter Day Saints Storehouse - 99% complete. Work progressing very slowly.

I 90124 Plans, Inspections, Specs., American Legion - 99% complete. All exceptions not cleared. Open for business.

I 90154 Plans, Specs., Inspections, Parcell Service Station, Duportail and Hartford - Construction 60% complete. Work progressing according to schedule.

I 90184 Plans, Specs., Inspections, Safeway Store - 45% complete. Work progressing after prolonged delay.

I 90194 Landscape Design for 300 Area - Project being submitted by Engineering Department.

I 90204 Plans, Specs., Inspections, EH Kidwell Service Station - Plans not yet received.

I 90224 Inspection & Liaison, Spokane Housing - Materially complete.

I 90234 Inspection & Liaison, Bauer-Day Housing - Materially complete.

I 90244 Plans, Specs., Inspections, Church of Nazarene Addition - 65% complete. Work progressing slowly.

I 90254 Plans, Specs., Inspections, Seattle First National Bank Addition - 99% complete. Final inspection to be made. Open for business.

I 90264 Plans, Specs., Inspections, Richland Heights Baptist Church, Thayer and Duportail - Partial plans received March 4, 1954. Building permit not yet issued.

I 90274 Inspection, McMurray Road - Asphalt surfacing yet to be done in about six weeks.

I 90324 Design, Engineering, Inspection of Walks, Drives at Columbia Playfield - Design completed 3-1-54.

ENGINEERING UNIT (Cont.)

ENGINEERING SERVICE REQUESTS (Cont.)

I 90334 Plans, Specs., Inspections, Richland Baptist Church, GWW - Construction 30% complete. Work progressing rapidly.

I 90354 Water System Study for Irrigation System Disposal - Study information submitted to AEC.

I 90374 Plans, Specs., Inspections, LG Cook Construction and Maintenance Building - 99% complete. Final Inspection to be made. (Addition being made - see ESR I 90684)

I 90474 Part II, Erosion Control & Development, Public Areas, FY 1953 - Project being prepared.

I 90504 Plans, Specs., Inspections, Pleiss Davis Addition - 99% complete. Final inspection to be made.

I 90524 Comfort Station, Riverside Park - Design 50% complete.

I 90594 "As Builts" General, Part II - Work progressing steadily.

I 90604 Inspection 24" Sanitary Sewer, Swift Boulevard, and Inspection Gribble Street Improvement. Gribble completed. Contract awarded on 24" sewer. Contractor given notice to proceed, but not yet started.

I 90614 Legal Description, Parking Lot, Baptist Church, GWW - 90% complete.

I 90624 Title III Services, Storm Drain, George Washington Way - Contract awarded and contractor given notice to proceed, but not yet started.

I 90634 Kadlec Hospital Grounds Improvements - Detail design complete and ready for contract.

I 90644 Air Conditioning, Community House - Project proposal submitted to A & B Committee

I 90654 Legal Description, Central U. P. Church - 75% complete.

I 90674 Utility Lines, Plots for Churches - 60% complete.

I 90684 Plans, Specs., Inspections, LG Cook Building Addition - 15% complete.

I 90704 Plans, Specs., Inspections, Christ the King Parish (Catholic) - Plans have been forwarded by architect to Uniform Building Code Conference headquarters for checking. Plans not yet received although building is now out for bid.

I 90714 Legal Description, Asphalt Plant, Horn Rapids Road - 60% complete.

ENGINEERING UNIT (Cont.)

ENGINEERING SERVICE REQUESTS (Cont.)

I 90724 Extension Duane Avenue Shelterbelt - Project being prepared.

I 90734 Sewer and Water Connection, Richland Heights Baptist Church - Sketch prepared. To be done with G. E. forces.

I 90754 Legal Description & diagram, Churches - 60% complete.

I 90764 Plans, and inspections, Rest Rooms, Desert Inn - 20% complete. Work progressing rapidly.

I 90774 Legal Description with utilities and plot drawing, SE corner Lee Blvd. and Wellsian Way - 20% complete.

I 90784 Legal Description with utilities, Plot SW corner Skyline Theater - 50% complete.

I 90794 Legal Description with utilities, Junior Chamber of Commerce - 50% complete.

I 90804 Legal Description, Safeway Building #1 - 10% complete.

COMMUNITY REAL ESTATE SECTION

MARCH 1954

ORGANIZATION AND PERSONNEL:

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Nonexempt	Exempt	Nonexempt
Real Estate Administration				
350	1	1	2	1
Housing & Maintenance Unit				
351	5	19	4	17
353	11	138	11	137
Commercial Property Unit				
357	6	6	6	6
	23	164	23	161

Decrease in number of employees 3 .

HOUSING AND MAINTENANCE UNIT

March, 1954

ORGANIZATION AND PERSONNEL

Number of employees on the payroll:

Beginning of month:	16	exempt
	157	nonexempt
	173	
End of month:	15	exempt
	154	nonexempt
	169	

The reduction in the nonexempt personnel is due to transfers and terminations for which replacements have not yet been received.

RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING MARCH 31, 1954

HOUSES OCCUPIED BY FAMILY GROUPS

	Conven	A&J	T	Pre Cut	Ranch	Pre Fab	Dorm Apt.	A&J Apt.	2BR Apt.	4th Hsg.	Tract	Total
G.E.Employees	2229	254	9	386	830	1154	10	52	61	199	38	5222
Comm. Fac	93	17		30	65	50		5	2	8	2	272
AEC	74	26		21	59	18		6	5	15	3	227
Other Gov't	7	2			3	1					1	14
Post Office	5				2	9				1	3	20
Schools	57			7	10	54			1	1		130
Comm.Actv.	9			1	6	4					1	21
Med. Facil.	3	20			3	1				3		30
Chas. T. Main	3			2	5	7				2		19
Kaiser Eng.	6	8		1	6	1						22
J.A.Jones	2	2			2	1						7
Blaw-Knox	3	2		2	1							8
P.S.Lord	1				2					1		4
Vernita Orch.											5	5
Vitro Corp.	1				1							2
Minor Contractors					1							1
Commonwealth Inc.						1						1
Not Certified	3	1			4	7		1			1	17
Total	2496	332	9	450	1000	1308	10	64	69	230	54	6022
Assigned leases written									1			1
Assigned leases not written	4	1	1									6
Available for assignment						29						29
	2500	333	10	450	1000	1337	10	64	70	230	54	6058

	Begin Month	Moved In	Moved Out	End of Month	Diff.
Conventional Type	2495	16	15	2496	+ 1
A&J Type	333		1	332	- 1
"T" Type	10		1	9	- 1
Precut Type	449	11	10	450	+ 1
Ranch Type	999	9	8	1000	+ 1
Prefab Type	1323	11	*26	1308	-15
A&J Apts.	64	2	2	64	
Dorm Apts.	10			10	
2BR Apts.	69	2	2	69	
Fourth Housing	229	4	3	230	+ 1
Tracts	51	**3		54	+ 3
Total	6032	58	68	6022	-10

* 4 prefabs removed from Housing Records, sent to excess. ** 2 tract houses charged to Community Operation added to Daily Housing Report. ** 1 tract house returned to Housing Rentals.

March 1954

DORMITORY REPORT

Dormitories:

	Beds Available	Vacant Beds	Occupied Beds
Men	477	58	419
Women	381*	46	335
Total	858*	104	754*

*This includes 2 beds used for Dorm Offices

Waiting List

	Single Rooms	Double Rooms
Men	2	0
Women	4	0

The following Dormitories are in stand-by condition. Total beds-239
W 21--50 beds, W 17--50 beds, W 16--50 beds, W 15--50 beds, M 7--39 beds,

HOUSING
CANCELLATION AND ALLOCATIONS

STRAIGHT CANCELLATIONS		ALLOCATIONS	
Voluntary terminations	7	Houses allocated to new tenants	22
R.O.F.	1	Exchanged houses	20
Discharge	0	Moves (within the village)	11
Transfers	2	Turnovers	3
Retirement	2	Total leases signed	56
Move off project	19	Total cancellations	70
Divorce	0	Wherry house to G. E.	0
Death	1	Houses assigned As Is	24
Move to Wherry House	1	Houses sent to Renovation	23
Miscellaneous	0	Applications pending	253
Not eligible	3		
Total	36		

TENANT RELATIONS PROGRESS REPORT

	Orders Incomplete as of February 26	Orders Issued 2-26 to 3-26	Total Orders Incomplete as of March 26, 1954
Service orders	627	2167	745
Work orders	921	441	861
Service charges		159	

Principal work order loads

	Incomplete as of February 26, 1954	Incomplete as of March 31, 1954
Laundry tub replacement	26	25
Bathroom renovations (tub, tile, lino.,)	59	11
Tileboard bathroom	4	7
Kitchen floor linoleum	69	65
Kitchen cabinet linoleum	94	93
Shower stall	10	20

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104 alteration permits were issued, as compared to 65 issued during February.

Install fence	35	Install automatic washer	9
Install automatic dryer	11	Install patio	5
Basement excavation	5	Install additional wiring	3
Install air conditioner	4	Install tool shed	4
Install sidewalk	2	Install partitions	2
Reverse range & refer	2	Build greenhouse	2
Install TV antenna	5	Remodel sink cabinets	1
Install porch & steps	1	Install floor tile	1
Remove broom closet	1	Remove window & install french door	1
Install back door	2	Install exhaust fan	1
Raise threshold	1	Install water softener	2
Install clothes poles	2	Install extension water line	1
Move hot water tank	1		

---

533 inspections were made, as compared to 674 made in February.

Alteration permits	44	Basements	4
Bathroom	4	Ceiling	3
Doors	5	Fill	5
Floorboards	14	House	13
Laundry trays	21	Linoleum	41
Lot lines	5	Paint	13
Porch & steps	16	Recall range & refer	9
Roof	3	Shower stall	7
Shower rod	3	Sidewalk	20
Sinks	7	Toilet	3
Toilet seat	30	Trees	21
Walls	1	Windows	7
Yard	16	Miscellaneous	31
Dormitories	70	Renovations	42
Cancellations	53	Shows (new tenants)	22

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
Tappan	20		1	1
Lukins	19		1	1
Armstrong	21		1	1
Total	60	137	3	3

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	159	16	157	2
B	366	21	358	8
C	0	0	0	0
D	5	1	5	0
E	42	1	42	0
F	111	8	107	4
G	3	0	3	0
H	80	5	77	3
K	0	0	0	0
L	4	0	4	0
M	2	0	2	0
Q	7	1	7	0
R	2	0	2	0
S	2	0	2	0
T	8	0	5	3
U	7	0	5	2
V	31	6	29	2
Y	196	15	189	7
Z	5	0	5	0
1BP	47	3	26	21
2BP	182	50	126	56
3BP	222	59	108	114
Tract	9	2	9	0
1 BR Apt.	10	3	8	2
W-13 Apt.	3	0	2	1
Total	1503	191	1278	225

Est. MH B. F.	53,740
This Mo. Est. MH	8,649
Total Est.	62,389

109 Units added

Actual MH B.F.	52,195
Actual MH This Mo.	8,526
Total Actual MH	60,721

PLUMBING SHOP

JOB DESCRIPTION	NO. COMPLETED
Replacements - Major fixtures:	
Bathtubs	46
Shower Stalls	8
Electric Water Heaters	21
Laundry Tubs	11
Plumbing Work Orders	43
Plumbing for Floor Tile Replacements	42
Cleared major sewer stoppages caused by tree roots	44
Plumbing for sink top replacements	54
Steam work orders	28

Stem inspection once a week on dormitories, apartments and Government owned commercial buildings.

Replaced a 750 gallon hot water tank in dormitory W-5 with a 140 gallon tank steam heated.

SERVICE ORDER CREW

The following is a status report on service orders:

A.	On hand at the beginning of the month	471
B.	Received during the month	1728
C.	Completed during the month	1755
D.	On hand at the end of the month	444

E. A total of 243 hours were spent on work orders.

F. Back log of service orders by craft:

Plumbing	228
Electrical	147
Carpentry	69
Total	444

NOTE: This report is up to and including the 26th of March.

RENOVATION & LABOR CREW

JOB DESCRIPTION	NO. COMPLETED
Renovation orders processed	23
Trash pick-ups	55
Trees removed	35
Sewers dug, backfilled & seeded	32
Front steps filled with black top	8
Sidewalks repaired	12
Minor carpenter repairs to houses	27
Minor carpenter repairs to dormitories	10
Dormitory rooms redecorated	2

All occupied dormitories serviced with linen and janitorial supplies.

MECHANICAL SHOP

JOB DESCRIPTION	NO. COMPLETED
A. Millwright Crew:	
Furnace service orders	335
Routine furnace inspection	425
Weep tubes for prefabs	1000
Oil tanks replaced	4
B. Sheetmetal Crew:	
Shower stalls replaced	8
Replacement of gutters	9
Flashing on coal hatches installed	11
Repair of dormitory cooler pad holders	209
Ranch house closet tracks	48
Smoke pipe replacement	8

CARPENTRY

JOB DESCRIPTION	NO. COMPLETED
Install bathtubs	39
Replace bath wall tile	37
Repair bath wall tile	2
Replace bath floor linoleum	37
Repair bath floor linoleum	3
Replace bath linoleum stripper	7
Replace kitchen floor linoleum	25
Repair kitchen floor linoleum	3
Replace steps and landing linoleum	1
Replace bedroom linoleum	4
Repair bedroom floor linoleum	2
Replace dining room floor linoleum	2
Replace living room floor linoleum	1
Replace kitchen sink top linoleum	71
Repair kitchen sink top linoleum	9
Replace sink top linoleum - Village Pharmacy	1
Replace work bench linoleum	8
Replace kitchen sinks	4
Repair windows - Shop	11
Make new windows - Shop	8
Drill weepholes	4
Sash Balances	2
Repair window screens - Shop	8

CARPENTRY - continued

JOB DESCRIPTION	NO. COMPLETED
Repair roofs - Houses	55
Raise slab	1
Repair porches	89
Jack & Shim	5
Repair wall	8
Repair ceiling	3
Repair floor boards	1
Cabinet doors repaired - Shop	107
Cabinet doors replaced - Shop (Made new)	32
Cabinet drawers repaired - Shop	90
Cabinet drawers replaced - Shop (Made new)	0
Closet doors repaired - Shop	16
Chempoint - Routine	39
Chempoint - Work Orders	114
Paint touch-ups	78
Interior carpentry repair to all types of houses (4 year cycle)	175
Screen doors repaired - Shop	54

This report is up to and including March 26.

COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION
March, 1954

PERSONNEL - COMMERCIAL PROPERTY UNIT:

	March
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
February	1,567	184	120	1	1,687	185
March	1,591	190	120	1	1,711	191
Net Change	+24	+6	0	0	+24	+6

SUMMARY OR ROUTINE ITEMS PROCESSED:

	Commercial		Noncommercial		Total		
	Richland	North Richland	Richland	North Richland	Richland	North Richland	Total
Work Orders	39	19	2	0	41	19	60
Back Charges	2	0	0	0	2	0	2
FY Work Orders	425	175	10	0	435	175	610
FY Back Charges	25	1	0	0	25	1	26

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Supplemental Agreements:

a. Seattle-First National Bank - to provide for the construction of an addition and to redefine and restate all rights and duties of Lessor and Lessee.

b. W. T. Vosper and L. G. Torre - to provide for the effects that may be brought about by the creation of McNary Reservoir in connection with the operation of the Allied Bowling Center.

2. Assignment:

Messrs. J. W. Fleenor and E. A. Reinertsen, d/b/a Frank Berry's Sporting Goods, sold their building located at 1348 Jadwin and assigned their Commercial Facility Lease to Jeannette V. Thurston, Leo H. Hildebrant and Margaret J. Hildebrant, d/b/a, V & J Partnership. Messrs. Fleenor and Reinertsen will continue to operate the sporting goods store under a sub-lease agreement with V & J Partnership.

3. Contract of Sale:

Vance Properties, Inc. - to provide for purchase of certain items of furniture and equipment for use in operation of the Desert Inn.

B. Noncommercial:

1. Lease

Central United Protestant Church - a month to month lease covering the occupancy of Building No. 1212. Lease is to become effective as of November 1, 1949.

GENERAL:

A. Commercial:

1. Mr. L. G. Cook, d/b/a, Richland Construction & Maintenance Co., opened for business at 885 Stevens Drive.

2. Richland Electric Center, a sublessee of L. G. Cook, opened for business at 883 Stevens Drive.

3. Neimi, Holland & Scott, Certified Public Accountants, opened for business in Automatic Laundry Company Building in the Uptown Business District.

4. Richland Television Cable Corporation opened a maintenance office at 885 Stevens Drive.

5. Mr. M. L. McGee opened a delicatessen and grocery store in the Richland Development Company, Inc. Building, Uptown Business District.

6. Mr. Jack Charlesworth, who has been subleasing space in the Richland Development Company, Inc. Building, terminated his sublease.

7. Uptown Electric Company terminated their sublease with Davis Furniture Co., Inc. covering the operation of an appliance repair business.

8. Final Inspection Report received on the Diana Langevin Building located in Downtown Business District.

9. Final Inspection Report received on the Dr. Earl W. Moore's veterinary hospital located at 2666 Van Giesen.

B. Noncommercial:

North Richland Lutheran Church and North Richland First Baptist Church commenced construction of church buildings.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland and North Richland.

Richland

Photography Shop
Dress Shop
Golf Driving Range
Service Station
Dairy Store
Tavern and Restaurant
Television and Radio Repair Shop
Paint Store

North Richland

Drive-in Restaurant
Dairy Store
Storage

COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION

March, 1954

SUMMARY OR OCCUPANY AND EXPANSION STATUS

	FEBRUARY			MARCH		
	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	66	7	73	66	7	73
a. Number of Prime Lessee Businesses	41	6	47	41	6	47
b. Number of Businesses operated by Sublessees	107	1	108	110	1	111
c. Total Businesses in Privately-owned Buildings	148	7	155	151	7	158
4. Privately-owned Buildings under Construction	7	0	7	5	0	5
5. Total Number of Businesses in Operation	203	16	219	206	16	222

COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION

March, 1954

SUMMARY OF OCCUPANCY AND EXPANSION STATUS

	FEBRUARY			MARCH		
	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		Total	11		
2. Privately-owned Buildings						
a. Completed and in use	10	1	11	10	1	11
b. Under Construction	6	0	6	6	2	8
Total	16	1	17	16	3	19
3. Pasture Land Permits	0		98	0		98

G-98

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RADIOLOGICAL SCIENCES DEPARTMENT

MARCH 1954

Summary

Twenty-four informal, 6 Class I, and 2 Class II radiation incidents were recorded. None affected the tolerance status of individuals. Widespread contamination from the ruthenium release in January continued. A special study group was established to consider the problems of vehicle contamination.

In research and development, removal of plutonium adsorbed by soil, by ammonium ions was noted. As such a process could occur in nature, it may be significant in long-range disposal plans.

Uptake of ruthenium by rats was found to be 100 times that given in the literature. This probably indicates the need for a reduction in permissible limit for ruthenium, which would aggravate the existing poor situation in the areas with respect to this contaminant.

Transmission of plutonium salt contamination through the skin of rats was directly proportional to the normality of acid used to wash the skin; this finding strengthens the long-standing suspicion that the use of acid in skin decontamination may be inadvisable.

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Radiological Sciences Department

RADIOLOGICAL SCIENCES DEPARTMENT

MARCH 1954

Organization

The month end force of 377 included 29 supervisors, 103 engineers and scientists, 19 clerical, and 226 other personnel.

Number of Employees on Payroll		
Beginning of month	-	374
End of month	-	377
Net increase	-	3

General

There were 24 informal, 6 Class I, and 2 Class II radiation incidents. None was of sufficient magnitude to affect the tolerance status of any employee.

In view of the widespread vehicle contamination, resulting chiefly from the substantial emissions of radio-ruthenium in January, a special study group was assigned to study control methods for vehicle contamination. In a preliminary survey, about 20% of some 1700 vehicles tested were found to be contaminated.

Position description and preliminary position evaluation work was completed. Organization changes suggested by these studies were either placed in effect, or planned for action as soon as appropriate placement of affected personnel can be achieved.

A general departmental information meeting was held to review progress in 1953.

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

General (Continued)

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
None	None

RADIOLOGICAL ENGINEERING

The installation of the accelerator in the positive ion accelerator laboratory approached completion.

Several lump sum contractor construction areas in and around the 200 Areas are in questionable status with respect to contamination from Redox stack emission.

A review of reactor safeguard formula using optimistic levels for K reactor operation and expected levels resulting from project CG-558 improvements showed exclusion circles including significant land areas west, north, and east of present control zones.

The effects of a single tube coolant failure were re-evaluated following revision by the Engineering Department of the predicted aluminum melting time. It is now concluded that the reactor atmosphere system would not contain the fission product release; therefore, gross contamination may be released to the atmosphere through the exhaust system.

Initial results of drawdown tests in wells in the proposed Gable Mountain reactor effluent disposal area indicated favorably high permeabilities, in contrast with calculations that suggested that this method of disposal was infeasible.

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RADIOLOGICAL RECORDS AND STANDARDS SECTION

1. Radiation Monitoring

General Statistics

	February	March	1954 Total
Special Work Permits	557	509	1,578
Routine and Special Surveys	1,542	1,801	4,862
Air Samples	1,579	1,376	4,790
Skin Contamination	9	18	53

Contamination levels on the ground in the vicinity of the 200 West Area decreased noticeably during the month. Nevertheless, extensive monitoring of construction areas and equipment was required to assure proper radiation control. Nearly 1700 plant vehicles were surveyed to determine the extent of the contamination pickup. About 20% of such vehicles were found contaminated, and 49 were found contaminated on the inside.

One Applied Research Sub-Section employee and two Reactor-Maintenance employees were exposed to high level radiation while dismantling special equipment at the Metallurgy Laboratory, 111-B building. The work was undertaken without proper procedure or monitoring, and was investigated as a Class I radiation incident.

Contamination was spread to the ground at the 100-B Area after the 107-C retention basin was emptied, for repairs by minor construction. The entire area east and southeast of the retention basin, including patrol headquarters, the gatehouse, and the main entrance roads was extensively contaminated. The incident was investigated as a Class I radiation incident.

During removal of plastic bags from special containers of tritium from Los Alamos more than 10,000 curies of tritium oxide were released to the stack at 108-B. A maximum of about 3700 curies was released in one 24-hour period. No increase in bioassay sample results was observed as a result of this operation.

Water was diverted from the Redox Swamp into the new crib southwest of the Redox area and backfilling of the swamp was begun. Exposure rates on dried portions of the swamp area were excessive and special controls for personnel doing the work were required.

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2. Radiological Standards

Two Class II, six Class I, and 24 informal radiation incidents were reported. The Class II incidents involved the slight overexposure of a radiation inspector at the 105-B reactor, chiefly in the discharge area, and the localized skin exposure of 7.5 rads of a laboratory worker in the Redox analytical laboratory as a result of coverall contamination. In addition to the 2 Class I incidents reported under Radiation Monitoring above, the Class I incidents included: unplanned and unmonitored exposure of a minor construction observer in the rod room at the 105-B reactor, unplanned and unmonitored exposure of 2 Applied Research engineers at the Redox laboratory, uncontrolled entry of an instrument trainee into the gas tunnel at 105-C, and ground contamination at the 241-TX tank farm resulting from a process difficulty.

3. Exposure Records

(a) Personnel Meters, and Records and Photometry

General Statistics

	February	March	1954 Total
Gamma pencils read	228,754	218,130	650,704
Potential overexposures	12	9	34
Confirmed overexposures	1	0	0
Slow neutron pencils read	728	1,048	2,574
Potential overexposures	1	0	1
Confirmed overexposures	0	0	0
Beta-gamma film badges processed	37,401	33,577	106,943
Potential overexposures	103	56	222
Confirmed overexposures	1	0	1
Fast neutron badges processed	291	379	1,020
Potential overexposures	0	1	1
Confirmed overexposures	0	0	0
Lost readings (all causes)	30	29	101

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3. Exposure Records (Continued)

(b) Bioassay

1. Plutonium Analyses	February	March	1954 Total
Samples assayed	737	940	2,344
Results above detection limit*	32	13	62
Resamples assayed	23	56	114
Results above detection limit*	7	11	30
Maximum d/m/sample	1.35	2.10	2.12

*Detection limit was 0.05 d/m.

2. Fission Product Analyses	February	March	1954 Total
Samples assayed	866	1,011	2,582
Results above 10 c/m/sample	6	1	9

The result above 10 c/m is under investigation.

3. Uranium Analyses

Results of 265 samples processed this month are tabulated below. This brings the total number of samples processed in 1954 to 885.

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	31.8	4.8	53	12.4	2.4	44
Technical	22.5	7.5	12	19.5	4.4	8
Minor Construction	-	-	-	-	-	-
UO_3 Plant	23.4	2.4	128	-	-	-
Radiation Incidents	220.2	46.2	7	-	-	-

The result above 220 µg/liter was in association with the incident which occurred at the Cold Semi-Works building last month.

3. Exposure Records (Continued)

4. Tritium Analyses

	Activity Density ($\mu c/cc \times 10^3$)						
	0-5	5-10	10-35	35-70	>70	Total	1954 Total
Number of Samples	306	15	0	0	0	321	879

(c) Thyroid Checks

All thyroid checks reported were below the warning level.

(d) Hand Score Summary

There were 45,889 alpha and 59,682 beta scores reported. About 0.015% of the alpha and about 0.006% of the beta scores were above the warning level. Decontamination of the reported high cases was attempted and was successful.

4. Calibrations

	Number of Routine Calibrations		
	February	March	1954 Total
Fixed Instruments	91	91	223
Portable Instruments	2,952	3,237	9,302
Personnel Meters	15,211	20,053	51,987
Total	18,254	23,381	61,512

BIOPHYSICS SECTION

CONTROL UNIT

Regional Survey

The general findings are summarized in the following table:

SAMPLE TYPE AND LOCATIONS	Activity Type	Average Activity Density ($\mu c/cc$)
Drinking Water and Related Materials		
Benton City Water Co. Well	alpha	1.5×10^{-8}
Richland, N.Richland, Benton City Wells	alpha	$(< 0.5 \text{ to } 1.3) \times 10^{-8}$
100 Areas	beta	$(< 0.5 \text{ to } 7.8) \times 10^{-7}$
Pasco, Kennewick, McNary Dam	beta	$(< 0.5 \text{ to } 3.4) \times 10^{-7}$
Backwash Solids-Pasco Filter Plant	beta	2.1×10^{-2} $\mu c/g$
Backwash Liquids-Pasco Filter Plant	beta	1.0×10^{-6} $\mu c/g$
Sand Filter-Pasco Filter Plant	beta	2.6×10^{-4} $\mu c/g$
Anthracite Filter-Pasco Filter Plant	beta	7.4×10^{-5} $\mu c/g$

Radiological Sciences Department

CONTROL UNIT (Continued)

SAMPLE TYPE AND LOCATIONS	Activity Type	Average Activity Density (μc/cc)
Other Waters and Related Materials		
300 Area Wells #1,2,3.	alpha	$(0.5 \text{ to } 1.1) \times 10^{-7}$
300 Area Well #4	alpha	3.9×10^{-8}
Well #4 measured as uranium	U	2.4×10^{-8}
Other wells on the reservation	beta	$(< 0.05 \text{ to } 2.0) \times 10^{-6}$
Columbia River-Hanford Ferry	beta	1.6×10^{-5}
Columbia River-Below reactors	beta	1.3×10^{-5}
Columbia River-Patterson to McNary	beta	$(1.1 \text{ to } 3.4) \times 10^{-7}$
Columbia River-Shore mud	beta	$(0.3 \text{ to } 1.3) \times 10^{-4}$ μc/g
Raw water-Operating areas	beta	$(< 0.05 \text{ to } 1.8) \times 10^{-6}$
Reactor effluent retention basins	beta	$(4.3 \text{ to } 7.7) \times 10^{-3}$
Reactor effluent retention basins	alpha	$< 5 \times 10^{-9}$
I^{131} in farm wastes	I^{131}	6.8×10^{-7}
I^{131} in Columbia River-Hanford	I^{131}	$< 6.5 \times 10^{-7}$
Atmospheric Pollution		
Gross alpha emitters	alpha	$(< 0.4 \text{ to } 1.6) \times 10^{-14}$
Gross dose rate-Separations areas	beta-gamma	0.8 to 32 mrads/day
Gross dose rate-Residential areas	beta-gamma	0.3 to 0.7 mrads/day
Filterable beta-Separations areas	beta	$(0.5 \text{ to } 3.3) \times 10^{-12}$
I^{131}-Separations areas	I^{131}	$(0.1 \text{ to } 1.1) \times 10^{-12}$
I^{131}-Separations stacks	I^{131}	3.7 curies/day
Ruthenium-Separations stacks	$Ru^{103,106}$	1.4 curies/day
Rare earths-Separations stacks	beta-gamma	0.1 curie/day
Active particles-Wash,Ida.,Ore.,Mont.	--	< 0.001 to 0.013 ptle/m^3
Active particles-HAPO	--	0.01 to 0.36 ptle/m^3
Tritium(as oxides)-Reactor stacks	T	1.2 curies/day
Vegetation		μc/g
Environs of Separations areas	I^{131}	$(1.7 \text{ to } 3.8) \times 10^{-5}$
Residential areas	I^{131}	$(< 3 \text{ to } 5) \times 10^{-6}$
Eastern Wash. and Oregon	I^{131}	$< 3 \times 10^{-6}$
Non-volatile beta emitters-Wash.&Ore.	beta	2.4×10^{-5}
Alpha emitters-Separations areas	alpha	$(1.0 \text{ to } 3.0) \times 10^{-6}$
Alpha emitters-300 Area	alpha	3.0×10^{-7}

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Regional Survey (Continued)

General decreases were observed in the ground contamination (primarily ruthenium) previously defined in the 200-West Area although several isolated locations within a 1200 foot radius of the 202-S stack still showed dosages ranging from 25 to 100 mrads per hour during the last week of the month.

Although trace particulate contamination was detected in Montana, Idaho, and Oregon on several dates, the data did not establish definite evidence of influx of radioactive debris from Pacific tests. Mean daily concentrations did not exceed 6×10^{-2} particle per $meter^3$ at remote locations during the period.

Analytical Control Laboratory

Routine and special analyses were carried out as follows:

Laboratory	Analyses Completed February	March	1954 Total
Type Sample			
Vegetation	1405	1207	3859
Water	2053	2188	5955
Solids	188	273	650
Air samples	617	444	1465
Uranium (fluorophotometer)	641	542	1704
Oil fog (fluorophotometer)	0	0	0
Special survey samples (RMSS)	8	16	48
Special survey samples (RMU&RS)	48	30	92
Phillips Petroleum (tritium in water)	0	0	0
Total	4960	4700	13773
Counting Room			
Beta measurements (recounts included)	6826	6308	19012
Alpha measurements (recounts included)	1951	2073	6143
Control points (alpha and beta)	2761	2975	8415
Decay curve points	4574	5912	13685
Absorption curve points	325	608	1032
Gamma ray spectrometer scans	41	61	102
Total	16478	17937	48389

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Control Services

Evaluation of the Sr^{91} activity in reactor effluent water resulting from fission of natural uranium showed approximately 1×10^{-8} $\mu c/cc$ with present power levels. Studies were initiated to evaluate plots of the radioactive decay of soluble and insoluble materials in reactor effluent water to determine if any major difference in composition existed between them.

Synoptic Meteorology

Forecasts	Number made	March Percent reliability
Production	93	83.9
24-hour	63	84.4
Special	70	85.7

The weather was featured by low temperatures observed from March 28 to March 30 with the extreme low of 18°F occurring on March 29. This was a record low for that date, but in 1935 lower temperatures were observed at Hanford on April 1 and 2. Average temperature for the past month was 41.5°F, which was 4.3° below normal. Precipitation totalled 0.59 inches which was 0.26 inches above normal.

RESEARCH AND DEVELOPMENT ACTIVITIES

Experimental Meteorology

Development work continued on a method for predicting the movement on a regional scale of air contaminants at 5000 feet elevation which could result from a major plant disaster.

An analysis was completed on the diffusion of stack effluents during periods of strong atmospheric stability associated with drainage winds at HAPO. The experimental results and predictions therefrom were compared with predictions from Sutton's hypothesis and Friedman's diffusion coefficients and with those from Robert's theory and Barad's diffusion coefficients. It was found that, although the plume geometry was quite different in each case, the values of the axial concentrations predicted at each downwind distance between 400 and 40,000 meters by each of the three methods were within an order of magnitude.

Field tests continued on various components of the Portable Mast

Radiological Sciences Department

Experimental Meteorology (Continued)

equipment in preparation for full-scale field experiments. Analysis of themocouple signals indicated that a reasonable profile of mean temperature was obtained. Attempts to obtain simultaneous observations of wind and temperature profiles were not satisfactory because of anemometer drift from calibration during the runs.

Earth Sciences

The appearance of uranium in the ground water in one new well in the 300-North Area (321 building crib) and the increased concentration in two other wells strongly suggested that the southeastern limit of the contamination is now approximately known in the direction of movement of the ground water and contained contaminants. Further data from the non-radioactive salt content will permit a realistic estimate of the rate of movement of the ground water under natural gradients at this site.

Soils containing previously adsorbed plutonium were shaken with solutions of various salts and the removed plutonium was determined. Dilute solutions of ammonium salts extracted more plutonium from the soil than the comparable sodium salts and reached a maximum with ammonium acetate, which removed 10% of the plutonium with one extraction. Ammonium acetate at higher concentration removed 65% of the adsorbed plutonium in one extraction and 98% in five extractions. This may have considerable influence on the long-range disposal picture because of the use of ammonium salts in fertilizer, and, more remotely, through the effect of atmospheric ammonia.

The adsorption of Sr^{90} by soil from synthetic silica gel regeneration solutions was found to be more than 90% effective for the unneutralized acid wastes and for those neutralized to a pH value of 5.

Industrial Hygiene

Samples were collected daily at 300 Area and at Portland for the determination of fall-out from Pacific tests. Minor peaks in activity density, about 1×10^{-11} $\mu c/cc$, were observed at each location although none was established as attributable to the tests. Radioautographs of Portland samples did not indicate the presence of radioactive particles.

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Industrial Hygiene (Continued)

Analysis of samples collected simultaneously at the Redox stack and sand filter was continued. Preliminary results indicated that the contribution of radioactive particles to the stack by the sand filter effluent was negligible, thus indicating that the major sources of stack particles were the off-gas lines.

The use of caustic scrubbers following the automatic filter sampler at Redox stack showed that the average filter efficiency for Ru was ca. 99% with the lowest observed value being 95.8%.

The study of industrial noise was resumed; frequency analyses were completed at all noisy sites in the 100 Areas.

A study was made at the request of AEC of irritant atmospheres associated with certain heliarc welding operations conducted by Kaiser Engineers at their White Bluffs Boilermakers Shop.

Methods

The permeability of Vinylite V-U-1940 bagging material to HT was measured by separating two identical proportional counting chambers with a thin sheet of this resin. Methane-argon counting mixture was introduced into each chamber, one chamber was spiked with HT and the change in counting activity with time for each chamber was followed. The permeation rate of HT is less than that reported for H_2 by a factor of 0.7, the ratio of the square roots of the molecular weights - thus indicating that the rate of passage of the gases through pores (effusion rate) may be the rate-determining step.

The analytical procedure for determination of Sr^{90} in urine was adapted to the determination of that isotope in milk. A recovery of greater than 93% was obtained. The effect of other contaminants on this procedure is being studied.

Two sodium iodide crystal gamma scintillation counter heads and two anthracene crystal beta scintillation counter heads have been assembled for the Redox stack monitor. Counting efficiency tests are proceeding on stack gas scrubber solution and filter samples.

A U.S.Bureau of Standards calibrated P^{32} source was counted on the

Methods (Continued)

BGO counter and on the 4 π counter in order to test the correction factors for the BGO counter and the procedure for 4 π beta counting. Results were in excellent agreement with the calibrated value giving confidence in Control Laboratory results for this important isotope.

A Brown strip chart recorder was incorporated into the gamma ray spectrometer allowing energy scans to be completed in less than 20 minutes as compared with the 2 to 3 hours originally required.

The average energy of the beta particles emitted from Cs^{137} was calculated by the numerical integration method of Marinelli, et al, and the beta ray spectrometer data of Langer and Moffat. The value obtained was 0.28 Mev, which will be used in dose calculations.

Physics

Changes in the filament control potentiometers of the electron Van de Graaff made possible the reduction of the beam current to a value which will enable its use for beta ray instrument calibrations; the changes have reduced the sensitivity of control at the high beam currents.

An investigation was begun of the possibility of using air in a geiger counter for the measurement of tritium concentrations in air.

Routine progress was made on the diffusion cloud chamber for tritium detection, preparation of targets for the positive ion Van de Graaff, construction of a larger external extrapolation chamber, study of relative sensitivity of thin anthracene crystals to beta and gamma rays, energy sensitivity study of the Hanford film badge, ion chamber saturation studies preliminary to measurement of energy per ion pair in gases, and improvement of the proportional thimble chamber.

Instrument Development

Current Redox stack monitoring data indicate that both a filter and a scrubber are necessary to remove radioactive materials and that appreciable amounts of Zr^{95} are being emitted. Design of the stack monitor was changed to take these new factors into account. The associated

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Instrument Development (Continued)

integrator development was advanced to the extent that negligible zero drift occurred in a one-week test, and reliable resetting was effected in laboratory tests. Over-all progress permitted devising a final arrangement and preparing for fabrication of the first unit.

The new stack gas particulate sampler for the Industrial Hygiene particle studies was nearly completed. To provide greater reliability, a light source and photocell replaced the mechanical contactor for the regulation of tape travel.

The laboratory predecessor of the ground contamination monitor for surveying from moving vehicles was used to survey plant railroads and showed fairly general contamination in the vicinity of outlying areas including one unsuspected contaminated zone near 100-B Area.

Detailed study of extra-cameral ionization effects in the CP survey meter was started for the purpose of obtaining a general solution for the problem.

BIOLOGY SECTION

AQUATIC BIOLOGY

Biological Chains

P^{32} was found to adsorb preferentially on glass surfaces in aquaria, with relatively minor amounts on organisms. Fixation on aluminum was 70 times greater than on glass.

Absorption of Tritium by Aquatic Organisms

Preliminary tests show that the body water of salmon fry reaches near equilibrium with tritium oxide in surrounding water within one hour, the greater part of the uptake occurring in less than one-half hour.

Ecology

Survey of the Columbia River

Activity densities of plankton, invertebrates, and small fish remained

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Radiological Sciences Department

Survey of the Columbia River (Contd)

at approximately the same levels as last month, but bottom algae increased substantially. All values are about the same as one year ago.

Pertinent activity densities of other organisms follow:

Organisms	Location	Activity Density (μc/g)
Midge larve	McNary Reservoir	6×10^{-5}
Whitefish flesh (1 specimen)	Ringold	2×10^{-4}
Caddis fly larvae	100-D Emergency Flume	6×10^{-3}
Small fish	100-D Emergency Flume	2×10^{-3}
Algae	100-D Emergency Flume	2.5
Algae	Nearby seepage area	3×10^{-2}

Effluent Monitoring

During the past month, slightly higher mortality occurred in 2% area effluent than in the river water control. Chemical toxicity of 3% reactor influent retarded the growth of the young salmon by about 15%.

Survival of young chinook salmon from local stock continues to be good in temperatures anticipated for the Columbia River at future reactor levels (1X).

BIOLOGY CONTROL UNIT

Biological Monitoring

Rodents collected in the vicinity of 200-West Area showed a kidney activity density average value of 7.5×10^{-4} μc/g, decreasing from the February 3 maximum of 3×10^{-3} μc/g. The contaminant was ruthenium.

Radiological Sciences Department

Biological Monitoring (Continued)

The thyroid from a wild horse, which for several months grazed HAPO project areas of relatively low I^{131} vegetation contamination, contained 7.5×10^{-4} μc of I^{131}/g of tissue.

Rodent thyroid activity densities increased, with the maximum of 4.5×10^{-2} μc I^{131}/g occurring one mile SE of Redox.

Clinical Laboratory

In addition to routine services a special problem was completed for the Experimental Animal Farm on the effect of fetal thyroid on blood constituents of hypothyroid ewes.

Microscopy and Radiochemistry

Routine services continued at normal levels.

EXPERIMENTAL ANIMAL FARM

Toxicology of I^{131}

There appeared to be no significant difference among lambs born to the groups of ewes being fed various quantities of I^{131}.

Sheep being fed I^{131} contaminated hay showed peak thyroid uptake 10 to 14 days after feeding was initiated. The fraction of iodine fed which was absorbed and deposited in the thyroid appears to be about 0.3 at this time.

METABOLISM

Plutonium Absorption and Metabolism

Over a 5-day period rat skin absorption of plutonium ranged from 0.1% to 1% depending on the acidity of the solution applied. This finding tends to contra-indicate the use of acids in removal of plutonium contamination from human skin.

Fission Product Absorption and Metabolism

Rats administered Ru^{106} by stomach tube concentrated the substance in the liver and kidney, each of which contained about 0.2% of the administered dose. This figure is about 100 times larger than the value

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Radiological Sciences Department

Fission Product Absorption & Metabolism (Contd)

previously reported by Hamilton, et al, and agrees well with results obtained locally with chickens. This is an important finding in view of the current widespread ruthenium contamination.

PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS

Radioactive Particles, Metabolism and Toxicology

Preliminary tumor induction tests of ruthenium particles in mice were initiated.

Experimental Therapeutics

By employing creatinine tests on urine from an individual containing plutonium, it was tentatively concluded that inconsistent bioassay results were due to either faulty collection of 24-hour urine specimens or to plutonium excretion being related to creatinine excretion and/or metabolism.

PLANT NUTRITION AND MICROBIOLOGY

Absorption and Translocation of Radioelements in Plants

Spectrochemical analysis of soil samples from plots irrigated with reactor effluent indicate a buildup of chromium in the soil.

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FINANCIAL DEPARTMENT MONTHLY REPORT
MARCH, 1954

Preparation of the Budget for Fiscal Year 1956 and Revision of Budget for Fiscal Year 1955 progressed satisfactorily, the following schedules being transmitted to the Hanford Operations Office of the Atomic Energy Commission on the dates indicated:

Personnel Estimates	-	March 9
Net Cash Working Capital	-	March 23
Inventories	-	March 31

The budget for the 7000 (Community) Program was scheduled for delivery to the Commission early in April, and other operating programs, including the estimates for Research and Development, and Production Costs were scheduled for review by Hanford Atomic Products Operation Management by April 15.

In connection with the Plant and Equipment budget, preliminary summaries and data sheets have been submitted to the Commission for review before formal transmittal, which will take place about April 22. The estimate for Equipment Not Included in Construction Projects is scheduled for final review by HAPO's management on April 13. Budget work on Plant and Equipment - Projects was completed in March except for review with AEC Budget Division personnel, and this is scheduled for early in April. Some revisions are expected to be made at that time.

As the result of a request by the Engineering Department for an increase of $434,000 in the Financial Plan for FY 1954 to provide for Research and Development requirements, the Commission is making an additional $200,000 available and has advised that this amount should be adequate if: (1) certain graphite development is deferred to the next fiscal year, and (2) prototype facilities required due to the 3X Program are financed from the applicable construction project. Including the additional $200,000, the funds available for the balance of this fiscal year will permit a monthly expenditure of $814,500, as compared with $702,500 for the first nine months of the fiscal year. No changes in the operating budget are planned to incorporate this revision; however, analysis letters and other data which reflect control points and trends will base comparisons on the revised Financial Plan.

Current estimates indicate that production costs for the present fiscal year may exceed available funds by $200,000, and it may be necessary to request the Commission to provide further additional funds for this purpose after an analysis of March expenditures has been made.

An analysis of funds required to finance graphite procurement for 100-K Reactors, completed in March, indicates that the cost of this material will be $12,600,000 as compared to $10,600,000 in the official project estimate. As a result of these findings, the Manager - Engineering Administration, has requested that a current estimate be made for all phases of work to be performed by General Electric on Project CA-512-R, 100-K Reactor Facilities. Since there appear to be underruns in design costs and graphite fabrication, it may not be necessary to request an increase in over-all project funds authorized to General Electric but only a reallocation of existing authorized funds.

A member of the staff of the AEC Controller's Office, Accounting, from Washington, D.C., spent two weeks at Hanford reviewing the procedures in connection with the Product Cost Report prepared by the Manufacturing Cost Unit for the AEC.

Coal supplies in the custody of the Manufacturing and the Plant Auxiliary Operations Departments were physically inventoried this month, the work commencing on March 17 and continuing through March 31. Reconciliation of inventory values with book values is to be completed in April.

The Commission's approval of revised water and sewage rates recently proposed by HAPO for commercial establishments was received in March. These rates, which are based on a study of those of municipalities in southeastern Washington, are to go into effect as water meters are installed or as soon as leases are renegotiated.

United States savings bonds purchased by employees in 1948 under the G.E. Employees Savings and Stock Bonus Plan were delivered to approximately 2,000 participants at HAPO on March 12, along with checks for accumulated stock dividends credited to the respective participants' accounts.

A payment of $207,704.46 was made to the Schenectady Office in March to cover HAPO's portion of the cost of the GE Employees Savings and Stock Bonus Plan for 1953.

A management information meeting attended by all exempt employees of the Financial Department and the former Administrative Practices group was held in the Public Library on March 29 to enable the Manager - Finance to make an announcement of tentative reorganization plans in connection with the consolidation of the two organizational components.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

Summary of Cash Disbursements, Receipts and Advances	I - 3
Accounting Section Reports	
General Accounting Unit	I - 4 through I - 9
General Cost Unit	I - 10 through I - 11
Manufacturing Cost Unit	I - 12 through I - 13
Engineering Cost Unit	I - 14
Appropriations Section Report	I - 15 through I - 17
Payroll and Auditing Section Reports	
Payroll Unit	I - 18 through I - 21
Internal Audit Unit	I - 22
Personnel and Organization Statistics	I - 23

SUMMARY OF CASH DISBURSEMENTS, RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of $6,100,000 and $8,600,000, respectively, by the Atomic Energy Commission) for the months of March and February, 1954, is shown below:

Disbursements	March	February
Payrolls (net)	$2 795 409	$2 716 589
Materials and Freight	2 390 939	1 362 102
Payments to Subcontractors	907 679	2 035 387
Payroll Taxes	641 195	708 738
HAPO Stock Bonus Plan Payment for 1953	207 704	-0-
United States Savings Bonds	184 406	183 000
Group Insurance Premium	132 291	131 509
Pension Plan - Employees' Portion	109 341	100 701
Travel Advances to Employees	82 193	-0-
Pension Plan - Employer's Portion	-0-	1 829 049
All Other	258 146 (a)	141 129
Total	7 709 303	9 208 204
Receipts		
Rent	129 333	142 938
Electricity	86 324	100 117
Hospital	79 251	69 010
Telephone	53 261	59 868
Sales to AEC Cost-type Contractors	12 863	8 491
Sundry Accounts Receivable	11 555	20 945
Refund of Travel Advances to Employees	11 449	-0-
Bus Fares	9 090	7 841
Refunds from Vendors	8 186	991
Other	19 119	5 040
Total	420 431	415 241
Net Disbursements	$7 288 872	$8 792 963

(a) Includes outstanding balances of Travel Advances to Employees and Travel and Living Expense Variation Accounts as of February 28 in the amount of $84,410.

Outstanding advances as of March 31, 1954, and February 28, 1954, were as follows:

	March	February
Cash in Bank - Contract Accounts	$2 200 121	$3 304 583
Cash in Bank - Salary Accounts	50 000	50 000
Travel Advance Funds	40 590	125 000
Total	$2 290 711	$3 479 583

GENERAL ACCOUNTING UNIT
MONTHLY REPORT - MARCH, 1954

ACCOUNTS PAYABLE

At the request of the Commission, a quarterly report of completed contracts and purchase orders amounting to $25,000 or more was inaugurated, the first report covering the three months ended March 31, 1954. It included 26 items aggregating $1,149,382.

Due to increased procurement activity, the volume of work handled in the Accounts Payable group, based on number of invoices booked (4,415), was heavier than any month since March, 1952.

Final shipments of graphite under the three special agreements with National Carbon were made this month. However, adjustments for unacceptable material and certain price redeterminations are yet to be made pending negotiations.

Active contracts handled by the Accounts Payable group, excluding requirement contracts, numbered 26 and open contract commitments at the end of March amounted to $1,912,127. Payment on these contracts totaled $528,596 for work performed during the month. Disbursements in connection with requirements contracts amounted to $368,104.

Commitment records maintained on 30 construction projects showed an open balance at the end of March of $4,537,999.

Revisions of the Accounts Payable Procedures manual have been completed and distribution of revised pages to holders of copies of this manual is now in progress.

Other Accounts Payable statistics are listed below:

	March	February
Vouchers Booked but Not Paid - Beginning of Month	$ 610 142	$ 425 927
Vouchers Entered During Month	4 700 282	6 491 839
Vouchers Paid During Month	4 645 194 Dr.	6 308 615 Dr.
Cash Receipts	8 186	991
Vouchers Booked But Not Paid - End of Month	$ 673 416	$ 610 142
Number of Vouchers Entered	4 415	3 376
Number of Checks Issued	2 746	1 904
Number of Freight Bills Paid	1 381	1 191
Amount of Freight Bills Paid	$ 344 191	$ 278 865
Number of Purchase Orders Received	2 512	1 700
Amount of Purchase Orders Received	$2 442 180	$1 842 659

ACCOUNTS RECEIVABLE

The gross accounts receivable balance at March 31 amounted to $270,963, a decrease of $29,933 from the balance at February 28. Decreases were reflected in all account balances with the principal decreases being in the hospital, rent, telephone and AEC cost-type contractors accounts. The balance of $270,963 represents the lowest month-end gross balance since consolidation of accounts receivable work as of December 1, 1951.

Billing procedures in connection with the conversion of electricity billings from the IBM to a Burroughs application were completed in March. The billing machine was delivered on March 16, and initial billings under this system will be issued in April.

Preliminary planning and scheduling for putting increased telephone rates into effect on May 1, in accordance with instructions from the Commission, were completed in March, as were revisions in accounts receivable records to reflect the decrease in the federal excise tax applicable to telephone rental rates on and after April 1.

Out-patient invoices issued at Kadlec Hospital in March numbered 2,245 and totaled $11,123, as compared with 1,960 in February, totaling to $8,808. In-patient revenue amounted to $66,588, as compared with $66,215 in February. The adult patient-day census decreased from 89.9 in February to 78 during March.

Other data reflecting the activity of the accounts handled by the Accounts Receivable group are summarized below:

Accounts Receivable (End of Month Balance)	March	February
Hospital	$127 049	$133 890
Sundry	33 114	33 638
Electricity	28 611	30 451
Equipment Sales to Facilities	26 524	26 873
Rent	25 844	31 882
Telephones	23 742	27 054
Cost-Type Contractors	4 554	14 838
Safety Shoes	807	1 516
Loans to Employees	718	754
Sub-Total	270 963	300 896
Reserve for Bad Debts	24 959 Cr.	25 369 Cr.
General Ledger Balance	$246 004	$275 527
Hospital		
Number Out-Patient Invoices Issued	2 245	1 960
Charges During the Month	$ 77 711	$ 75 022
Collections - Cash	79 251	69 010
- Payroll Deductions	5 511	4 911
Cost-Type Contractors		
Number of Invoices Issued	27	24
Amount of Invoices Issued	$ 2 635	$ 5 441
Cash Received	12 863	8 491

ACCOUNTS RECEIVABLE Cont.	March	February
Rent		
Houses		
Number of Houses Occupied	6 027	6 034
New Leases and Lease Modifications	46	77
Lease Cancellations	45	50
Charges During the Month	$307 287	$307 291
Collections - Cash	53 162	54 016
- Payroll Deductions	256 095	256 445
Dormitories		
Number of Rooms Occupied	775	784
New Assignments	71	102
Removals	80	117
Charges During the Month	$ 17 913	$ 17 934
Collections - Cash	5 830	5 658
- Payroll Deductions	12 428	12 647
Facilities		
Number of Facility Leases	165	164
Revenue	$ 70 342	$ 83 264
Sundry		
Number of Invoices Issued	278	243
Amount of Invoices Issued	$ 11 413	$ 11 608
Cash Received	11 555	20 945
Telephones		
Working Telephones (Excludes Official Telephones)	6 289	6 188
Telephone Work Orders Processed	289	306
Charges During the Month	$ 50 747	$ 53 513
Cash Received	53 261	59 868
Electricity		
Number of Bills Issued	7 274	7 273
Amount of Bills Issued	$ 84 174	$ 81 702
Cash Received	86 324	100 117

Uncollectible Accounts (Total to Date)	Number	Amount
Accounts Forwarded to Collection Agencies	632	$ 52 679
Accounts Returned as Uncollectible	302	30 531
Collections	205 (a)	8 344 (b)
Balance at Collection Agencies March 31, 1954	155	$ 13 804

(a) Includes 175 accounts collected in full and 30 accounts partially collected.

(b) Represents total collections, half of which is remitted to General Electric.

GENERAL ACCOUNTS

At the end of March unexpended advances received from the Commission, as indicated in the statement on page I-3, amounted to $2,290,711, compared with the February 28 balance of $3,479,583. This decrease is due to action by the Commission to reduce funds in the hands of contractors in order to reduce interest payments on amounts borrowed by the Government. Advances of $6,250,000 were requested at the end of March to cover April expenditures, which have been estimated as follows: payrolls, $3,750,000; material and freight, $1,320,000; subcontracts, $615,000; and miscellaneous, $635,000.

Financial statements for the Hanford Atomic Products Operation and the Atomic Products Division were issued for February on March 10 and 11, respectively. The Trial Balance for the month of February was completed on March 5 as compared with March 10 in 1953.

Revision of the Cash Control Procedures manual is under way and it is anticipated that it will be ready for distribution sometime during May. This manual presents the principles and procedures governing the recording, distribution, and reporting and control of cash receipts and disbursements at the Hanford Atomic Products Operation.

Noted below are three general ledger accounts which were established during the month of March.

1. 0207 Reserve for Annuity Fund

   This reserve was established by charging Prior Years Cost Transferred to AEC and will offset the asset established to cover annuities to be paid to former Du Pont employees.

2. 0650 Partially Completed Projects in Service

   This account was established as a contra amount for completed portions of projects transferred to plant accounts. It will be charged as Construction Work in Progress is cleared upon financial completion of projects.

3. 0690 Equipment Work in Progress

   The purpose of this account is to segregate Equipment Work in Progress from Construction Work in Progress and to establish a consistent procedure for recording equipment purchases against authorized funds.

Eighty-seven shipping documents for excess materials were processed during the month, relieving Excess Inventories valued at $178,000, and sixty-nine other open shipping documents were cleared through cost transfers or billings.

During March, 398 expense reports were booked as compared with 295 in February. This exceeds the next highest month this fiscal year by 25%. The amount of advances issued during March totaled $82,530 as compared with $59,418 for the previous month, which indicates that this heavy activity will continue.

Forty-two travel and living expense reports were returned this month to individuals who approved them with questions regarding certain items included. In addition, 27 requests for cash advances were returned for proper approvals, reductions in amount, or more complete information.

GENERAL ACCOUNTS Cont.

Additional information concerning travel and living expenses of employees is given below:

	March	February
Cash Advance Account		
Cash Advances - Beginning of Month	$79 912	$75 936
Advances During the Month	82 530	59 418
Expense Accounts Submitted	63 151 Cr.	47 397 Cr.
Cash Refunded	11 449 Cr.	8 045 Cr.
Cash Advances - End of Month	$87 842	$79 912
Outstanding Cash Advances		
Current	$75 260	$70 968
Over 30 Days	12 582	8 944
Total	$87 842	$79 912
Travel and Living Expenses		
Actual Expenses	$61 031	$46 724
Billed to Government	58 026	44 586
Balance in Variation Account at End of Month	7 502	4 498 Dr.

INVENTORY ACCOUNTING

Detailed procedures for taking the physical inventory of essential materials, scheduled for the latter part of April, were developed during March, and meetings were held with the Manufacturing Department to work out time schedules and arrange for personnel requirements.

An extensive analysis was made this month of the Fabrication Work in Progress account with respect to off-site fabrication of spare parts and spare equipment. As a result of this analysis, the account was reduced $140,000 by transferring $128,000 to Spare Equipment Held in Storage and $13,000 to Spare Parts Inventory.

An evaluation, based on current market values, of spare parts fabricated by the General Engineering Laboratory was completed by Manufacturing Department personnel and a report was submitted by them for final review by the Stores Unit and the Financial Department. As a result of the revaluation, the Spare Parts Inventory was written down by $52,000.

In cooperation with Stores Unit and AEC Finance personnel, the development of a procedure governing the transfer of spare parts from Kaiser Engineers to General Electric was continued. It is expected that the formulation of this procedure will be completed during April.

PLANT ACCOUNTS

A change in the manner of recording transfers to and from AEC, Blaw-Knox and Kaiser Engineers was placed in effect during March. Previously, all such transfers had been recorded through the Retirement Work in Progress account and treated as retirements. In the future, such transfers will be classified as reassigned equipment.

PLANT ACCOUNTS Cont.

Ledgers were converted from a manual to a machine posting operation this month. Approximately ten man-days a month will be saved under the new method.

Numerous meetings were held with other Units and the AEC relative to the issuance of a consolidated report on changes in plant and equipment. Detailed letters of instructions were issued to various cost units stating specifically the information required by Plant Accounts in connection with this report, which will be initially issued as of July 1, 1954.

A decision was reached that the Ball 3X System would be depreciated over the remaining life of the piles and that depreciation write offs would begin the first of March. Normally, depreciation would have started on the in-service date of the Ball 3X System in each respective area; however, sufficient data was not available to begin depreciation on those dates.

During the month, 4,505 purchase orders were classified, of which 625 pertained to capital equipment. A total of 168 work orders were reviewed, of which 83 were classified as investment.

Unitization was completed of project CG-362 (Waste Metal Recovery Facilities (TBP)) by the Project Section. However, additional work is required in connection with this unitization before distribution of costs can be made to classified accounts, and it is estimated this project will not be cleared from Unclassified Property until May 15. This is largely due to the fact that the retirement of U Plant equipment is involved; this equipment is booked at $5,145,462 and is currently being held in Plant and Equipment Held for Future Use.

Unitizations were also completed this month on the projects listed below. Distribution to classified accounts will be made as soon as costs are transferred from Construction Work in Progress accounts.

Project	Title	Authorized Amount
AEC-111	Central Stores Warehouse	$1 350 000
CA-192	Biology Lab Building - 108-F	1 303 000
CA-500	Installation of Lubrication Pits, 1716-D and 1716-F Garages	22 000
CA-504	Improved Lighting in 760, 761 and 762 Buildings	47 000
CA-529	Personnel Meter Gatehouse Facility Improvements to 2701-W, 2701-E, 1701-B, D and F	33 000

GENERAL COST UNIT
MONTHLY REPORT - MARCH, 1954

Consolidated Costs and Budgets

Instructions for the preparation of form PER-40 ("Manpower Requirements by Facility"), a report required semi-annually by the Commission, were prepared for unit cost accountants. The current report is to cover estimated personnel requirements at various specific dates from June 30, 1954 through June 30, 1958.

Assistance to the Plant Accounts group in the preparation of a status report on the budget item, "Miscellaneous Projects of Less Than $100,000," required considerable time in March.

A special analysis of Computing Unit liquidation rates and a review of IBM billings for previous fiscal periods was also completed.

IBM Liaison

Beginning March 1, with the payment of travel expenses from a Contract bank account instead of the travel advance account, which is being discontinued, entries for such expenses were integrated with the accounts payable distribution. This facilitates the preparation of reports on travel expenses by the General Accounts group.

A preliminary outline of the revised IBM reports required in connection with proposed changes in the work order procedure was reviewed with some of the cost supervisors involved.

Plant Auxiliary Operations

In connection with the transfer of the Safety Unit and fire inspectors from the Plant Auxiliary Operations Department to the Health and Safety Section of the Employee and Public Relations Department, effective in March, budget and cost responsibilities were transferred to the group handling costs for the Health and Safety Section, located in the Kadlec Hospital.

In order to assist the Plant Accounts group in reporting plant and equipment changes, Construction Work in Progress accounts are being analyzed and a report is being prepared covering all activities for the first eight months of the fiscal year 1954. This report conforms to specifications outlined by the Plant Accounts group and will be prepared monthly hereafter.

Community Operations and Real Estate

Because of the wide variations in reported revenue which would result from the use of actual receipts for electrical service under the new bi-monthly cycle billing plan which is to become effective April 1 (as for example, the period when usage for "pre-fabs" heated by electricity

are recorded), a method of calculating an accrual based on a normal month's usage is being inaugurated. By using this method of reporting, costs and revenues may be analyzed on a comparative basis.

Items of general interest were discussed at a management information meeting held in March, with the Community, Medical, and Consolidated Costs groups attending. These meetings are to be scheduled regularly in the future.

Medical

Several meetings were held with a representative of the Public Administration Service, a consulting firm which is making a study of the operation of Kadlec Hospital, to explain costs and furnish information as to the nature and magnitude of certain categories of expense. Considerable additional data on specific items, such as laundry, maintenance, and financial service, were also supplied.

A procedure was developed, with the cooperation of the Accounts Receivable group, to maintain more complete information on Blue Cross claims, welfare cases and industrial billings, making it possible to analyze more accurately the variation between charges to patients, based on the hospital's fee schedule, and actual payments. This change will be effective April 1.

Staff

"Cents-less" accounting, used on a trial basis for the past three months, has proved to be satisfactory and has been adopted. Other improvements in accounting methods have been made and as a result, operating reports have been completed earlier in the past six months, with indications that a further reduction of two days may be accomplished in the near future.

are recorded), a method of calculating an accrual based on a normal month's usage is being inaugurated. By using this method of reporting, costs and revenues may be analyzed on a comparative basis.

Items of general interest were discussed at a management information meeting held in March, with the Community, Medical, and Consolidated Costs groups attending. These meetings are to be scheduled regularly in the future.

Medical

Several meetings were held with a representative of the Public Administration Service, a consulting firm which is making a study of the operation of Kadlec Hospital, to explain costs and furnish information as to the nature and magnitude of certain categories of expense. Considerable additional data on specific items, such as laundry, maintenance, and financial service, were also supplied.

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MANUFACTURING COST UNIT
MONTHLY REPORT - MARCH, 1954

A discussion on product cost accounting was presented at a meeting of all Manufacturing Cost Unit employees on March 18. Flow charts were used in explaining the manufacturing processes and the general format of the Product Cost Report. Following a safety and security meeting on March 24, a general information meeting was held.

In accordance with the Manufacturing Cost Unit's policy of giving employees as comprehensive a knowledge of all phases of manufacturing cost work as possible, a business graduate doing Separations Section cost work was transferred to the Reports and Records group, and a cost clerk from the latter group to the Separations assignment.

A meeting was held with supervisors of the Power Operations Unit of the Separations Section to review the costs reports issued to them, and to learn what additional information might be desired for better cost control. The superintendent requested a report showing the monthly liquidations of Separations power cost in detail.

Two representatives of the Portland headquarters of the General Accounting Office spent several days with Manufacturing Cost personnel reviewing the processing procedure of Manufacturing work orders.

A top secret document (XX-1172) titled "Product Unit Cost (Current Basis)," covering the unit costs of feed material, conversion, and depreciation for the second quarter of the fiscal year 1954, was issued in March.

Standard billing prices on plutonium were decreased for the first time since July 1, 1953. The decrease was made to bring the billing prices in line with actual and forecast unit costs for the balance of this fiscal year.

Additional work was done for the Engineering Department on the cost reduction study mentioned in last month's report. Savings in SF materials, conversion and depreciation costs, waste tank storage and additional piles not built, were calculated for each calendar year from 1947 through 1953. In this study each previous year was used as the base and all improvements up to the end of that year were taken into consideration in calculating the savings.

Unit costs on a current basis for the present P-10 Program were calculated and will be represented by a ratio on the March Summary of Manufacturing Costs.

Two comparisons of Manufacturing costs and production quantities were made in March, as follows:

1. Standard Costs, actual costs and variances for the month of March and the fiscal year to date.

2. March Forecast for FY 1954, compared with the February Forecast and the AEC Financial Plan.

The method of calculating the standard costs for the Reactor Section was reviewed by Reactor Costs personnel with employees from the Reports and Records group who have undertaken the issuance of these reports.

An attempt was made to expedite the delivery of work orders at the end of the month from the clerks in the various 100 Areas to the Work Order Control group in Richland. This was done in an effort to reduce the unmatched detail at month end. Personal contacts were made in each area and work orders picked up in order to assemble the papers by the evening of the 29th. Based on the results in March, it is planned to continue this month-end pickup in the future.

Considerable time was expended reviewing the standards for the Separations Section. A report listing the historical averages of the indirect expenses and recommendations for standards was prepared and submitted to the Plant Engineering Unit.

The procedures for the preparation and revision of the Manufacturing Department budget were revised.

ENGINEERING COST UNIT
MONTHLY REPORT - MARCH, 1954

Alternate computations reflecting cost reductions resulting from improvements in the art of making plutonium were made at the request of the Technical Section during the Month. Engineering Cost and Manufacturing Cost personnel have been collaborating on this analysis for the past few months.

Dates and routines for an inventory of graphite which will be necessary after completion of the machining operation for 105-KE were discussed during March and responsibilities established. This inventory will be taken in April by General Electric personnel in the 2101 Building who are standing by awaiting the packing of 105-KE.

Operating reports for February were issued on March 9, with analysis letters following on March 17.

Financial Closing Statements were issued during the month covering the following projects:

CG-187-D	-	Redox Production Facilities, Part I
CA-362	-	Waste Metal Recovery Facility (TBP)
CG-519	-	Repair of 105-D Reactor Effluent Line
CG-560	-	First Cycle Waste Supernatant Cribbing Facilities

APPROPRIATIONS SECTION
MONTHLY REPORT - MARCH, 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 March are shown in the following list:

CA-431-A & B - New Reactor, 105-C Plant

Project proposal requesting $228,000 additional funds for design and construction inadequacies which must be corrected to provide a continuously operable plant was forwarded to the Commission March 24.

CA-512, No. 2 - 100-K Area Facilities - 1706-KE Recirculation Facilities

Project proposal requesting $1,530,000 for facilities for experimental study of high pressure and temperature water in closed recirculation loops was forwarded to AEC March 25.

CA-514 - Expansion of 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. Directive dated March 26 authorizes AEC $5,085,000.

CA-543 - Replacement of Sanitary Tile Fields - 200-U and Administration Areas 200 West

AEC directive dated March 9, 1954, authorized $57,000 for this project. Work Authority dated March 16 authorized GE $8,000.

CA-546 - Fuel Element Pilot Plant

Letter dated January 1, 1954, A. B Greninger to J. I. Thomas, requested GE funds be increased from $450,000 to $530,000 to cover miscellaneous additional work. An interim authorization dated March 1 authorized GE $495,000.

CG-558 - Reactor Plant Modification for Increased Production

March 3, the A & B Committee approved and forwarded to the AEC a revised proposal requesting $9,500,000 for design, procurement, handling and warehousing of critical material and equipment. The total estimated project cost is $26,800,000. March 8, the AEC authorized $200,000 additional funds for procurement of horizontal rods. To date AEC, Washington, has not released funds for this project.

CA-561 - 713 Building Alterations

Directive dated March 17 authorized $71,600 for alterations to the 713 Building. Work Authority dated March 17 authorized GE $4,200.

CA-566 - Building for Prototype Physical Constants Test Reactor

Project proposal requesting $91,500 to construct sub-grade concrete building to house the prototype physical constants test reactor was approved by the AEC March 3. Work Authority dated March 12 authorized GE $20,000.

CA-570 - Replace Raw Water Line - No. 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. Directive dated February 24 authorized this work. Work Authority dated March 4 authorized GE $12,000.

CG-572 - Particle Problem, Animal Exposure Equipment

Project proposal requesting $22,500 for the installation of an animal exposure room and laboratory equipment was approved by AEC March 8.

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 dated March 1, 1954, authorized GE $10,200.

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 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 were prepared separating "C" from the rest of the scope. AEC directive dated March 15 authorized $532,000 for improvements in 100-B, D, F, DR and H Areas.

CG-580 - Cell Air Cleaner, Redox Facilities, 202-S Building

Project proposal requesting $78,500 for two portable ventilating units, together with power supply and filter, in the Redox Canyon, for the purpose of alleviating radioactive contamination on the crane was approved by the AEC March 23.

CG-581 - P-10 Development Facilities

Project proposal requesting $10,000 for preliminary design, preparation of project proposal and initiation of detailed design was forwarded to AEC March 25.

AEC-117 - Survey of Richland, Washington

Letter dated January 15 requested additional funds in the amount of $8,000 to complete "As-built" drawings. Work Authority dated February 26 authorized GE a total of $33,000.

The following informal requests were approved at the March 29 Appropriations Sub-Committee meeting and forwarded to the Commission:

Electricity Metering - Richland Domestic Water System	$ 7,500
Expansion of Riverside Park - South	6,500
Air Conditioning - Community House	5,400
Comfort Station, Sewage Lift Station, Chlorination Station - Riverside Park	10,000
Dual Purpose Wind Tunnel Installation	18,000

Appropriation requests were approved during the month amounting to $205,803.

PAYROLL UNIT
MONTHLY REPORT
MARCH 1954

A payment in the amount of $207,704.46 was made in March to cover Hanford Atomic Products Operation's portion of the cost of the G.E. Employees Savings and Stock Bonus Plan for the year 1953.

New authorization cards for checkoff of union dues were received from the HAMTC in March, to be effective with union dues deducted from salaries for the month of March. The new cards authorize deduction of union dues on the payday next subsequent to the first payday of each month in those cases where the first pay has been advanced or is insufficient to make the deduction. This provision was not included in the former authorization cards.

In order to improve the procedure for obtaining statistical data with IBM equipment, the weekly time card was revised and Office Letter No. 194 was issued March 30 describing the changes made on the card. The new time card will be used beginning Monday, April 12, 1954.

During March, assistance was rendered to Computing Unit in key-punching manpower inventory cards. Payroll personnel performed 22 manhours of work on this task.

The special absenteeism report which was issued monthly during 1953 to Section Managers covering non-exempt employees whose absences aggregated 14 days (men) or 20 days (women), has been revised. The new report will be based on the frequency of absences rather than the total days absent and will be issued quarterly beginning in April 1954. The new report will also indicate absences during the preceding two calendar years.

At the request of the Legal Department, work was begun in March on calculations of possible payments to plaintiffs in the Connolly & Black vs. General Electric Company case.

As a result of re-classification of Engineering Assistants, effective retroactively on various dates back to June 1, 1953, retroactive adjustments were paid on March 12 to 59 employees in the total amount of $6,528. Calculation of these payments required approximately 120 manhours, of which 60 were expended in March.

U. S. Savings Bonds purchased in 1948 under the G.E. Employees Savings and Stock Bonus Plan were delivered to participants in the Plan on March 12, 1954. Checks covering income on accumulated stock to the credit of the participants were delivered with the 1948 bonds.

A schedule was furnished in March to the Chief, Organization and Personnel, Atomic Energy Commission, Hanford Operations Office, covering all employees transferred from other components of General Electric since September 1, 1946. This schedule indicated name, date of transfer, position, title, and if no longer at Hanford, the date of removal from payroll.

In connection with the Annuity Plan for former duPont employees who transferred to General Electric at Hanford on September 1, 1946, statistical data was furnished to the Manager, Employee and Public Relations Department concerning 40 women employees who were between the ages of 45 and 50 at the time they were hired by the duPont Company. This data will be used by Employee and Public Relations Department in interviews with the employees prior to normal retirement date, to determine if they wish to work beyond normal retirement age in order to qualify for an annuity.

Reimbursement Authorization No. 222 was issued by HOO-AEC on March 26, 1954 to be effective May 16, 1953, covering revision of the Vacation Plan for exempt employees to include changes made effective in May of 1953 for non-exempt employees as a result of collective bargaining agreements.

Revision of OPG 18.1 on the subject "Weekly Time Cards" was transmitted to Administrative Practices Planning in March. The revision covered changes necessary as a result of the revision of the time card effective April 12, 1954.

Round-table discussions were held by supervisors with all non-exempt employees during March.

Payroll Unit (continued)

STATISTICS

NUMBER OF EMPLOYEES	Total	Monthly Payroll	Weekly Payroll
Changes During Month			
Employees on Payroll at beginning of month	8 571	2 304	6 267
Additions and transfers in	93	8	85
Removals and transfers out	(69)	(11)	(58)
Transfers from weekly to monthly payroll		10	(10)
Transfers from monthly to weekly payroll		(3)	3
Employees on payroll at end of month	8 595	2 308	6 287

OVERTIME PAYMENTS DURING MONTH	March Number	March Amount	February Number	February Amount
Weekly Paid Employees -a)	6 965	$136 884	6 610	$118 824
Monthly Paid Employees	419	45 643	369	30 913
Total	7 384	$182 527	6 979	$149 737

NUMBER OF CHANGES IN SALARY RATES AND JOB CLASSIFICATIONS	March	February
Temporary changes	92	41
Retroactive changes	10	76
Normal changes	618	432
Total	720	549

GROSS PAYROLL PAID DURING MONTH -a)	March	February
Engineering	$ 816 401	$ 786 581
Manufacturing	1 693 623	1 636 543
Plant Auxiliary Operations	834 280	831 556
Other	688 801	675 736
Total	$4 033 105	$3 930 416

EMPLOYEE BENEFIT PLANS	Number Participating		Percent Participation	
Participation in Benefit Plans at Month End	Mar.	Feb.	Mar.	Feb.
Pension Plan	7 912	7 874	97.5%	97.4%
Insurance Plan				
Personal Coverage	8 508	8 483	99.0	99.0
Dependent Coverage	5 905	5 885	-	-
U. S. Savings Bonds				
Stock Bonus Plan	4 110	4 087	47.8	47.7
Savings Plan	1 103	1 087	12.8	12.7
Both Plans	4 719	4 684	54.9	54.6

(a- Payments to weekly paid employees are for four week periods.

Payroll Unit (continued)

EMPLOYEE BENEFIT PLANS (continued)	March	February
Pension Plan		
Number Retired	6	2
Number who became eligible for participation	51	43
Number who applied for participation	50	41
Number who elected not to participate	1	1
Replies not received	-	1
Insurance Plan - Number of Claim Payments		
Employee Life Insurance	2	1
Employee Accident & Health Insurance	601	465
Dependent Accident & Health Insurance	526	446
Total	1 129	912
GOOD NEIGHBOR FUND		
Number Participating	5 708	5 772
Percent of Participation	66.4%	67.3%
SUGGESTION AWARDS		
Number of awards	47	1
Total amount of awards	$785	$275
PREFERRENTIAL RATES		
Number (Eliminated) or added	(12)	(29)
Number Currently in Effect	631	643
NUMBER OF MILITARY ALLOWANCE PAYMENTS		
Number	2	5
NUMBER OF PAYROLL DEDUCTIONS - OTHER THAN TAXES		
Barracks Rent	18	17
Dormitory Rent	531	543
Good Neighbor Fund	11 397	9 452
Hospital	498	535
House Rent	5 116	5 126
Insurance	8 486	8 456
Pension -a)	29 900	24 200
Safety Shoes	483	347
Savings Bonds	17 716	14 334
Trailer Space	155	156
Union Dues	1 720	1 759
Other	168	170
Total	76 188	65 095

a- Approximate number of payroll deductions rounded to nearest hundred.

INTERNAL AUDIT UNIT
MONTHLY REPORT - MARCH, 1954

Reports were issued for the following audits:

Accounts Receivable - Sundry
General Electric Employee Purchase Plan
Nucleonics Employees Good Neighbor Fund
Cash Funds - Purchasing and Stores Section

The following audits were continued:

Work Order Procedures
Plant Library Reference Materials

Reports are being prepared for the following audits:

Accounts Receivable - Rent
Accounts Receivable - Electricity
Accounts Receivable - Kadlec Hospital
Source and Fissionable Accountability Records - 300 Area

Audits were started during the month of March for:

	Date Started
Cash Controls	March 11, 1954
Source and Fissionable Accountability Records - 100 Area	March 15, 1954

At the request of the Engineering Department, a review was made of a price redetermination proposal re-submitted by National Carbon Company for deliveries of graphite for the second 1,000 tons on Special Agreement No. G-23.

At the request of the Legal Department, preliminary figures were compiled for Washington business and occupation taxes paid by General Electric Company and its cost-plus-fixed-fee contractors prior to October 1, 1953, the effective date of an amendment to the Atomic Energy Act which removed the exemption of the AEC from taxation by the state. This data was desired for reference in connection with negotiations with the State Tax Commission for a refund of taxes paid but not due in accordance with a decision of the U. S. Supreme Court issued February 8, 1954.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION
MARCH, 1954

	Current Month	Prior Month
Personnel Changes During Month		
Employees at beginning	336	339
Additions and transfers in	6	1
Removals and transfers out	(5)	(4)
Employees at end of month	337	336
Personnel by Unit at Month-End		
General	9	8
Reimbursement Unit	4	4
General Accounting Unit		
General Accounts	19	19
Inventory Accounting	11	10
Plant Accounts	34	33
Accounts Payable	33	33
Accounts Receivable	23	23
General	3	3
	123	121
General Cost Unit		
Consolidated Costs and Budgets	5	5
Plant Auxiliary Operations	17	16
Community Operations and Real Estate	7	7
Radiological Sciences and Other	7	6
Medical	3	3
General	4	4
	43	41
Manufacturing Cost Unit		
Costs and Budgets	34	34
General	8	8
	42	42
Engineering Cost Unit		
Project Section Costs	16	17
Design Section Costs	7	7
Technical Section Costs	10	10
General	7	7
	40	41
Payroll Unit		
Preparation and Employee Records	30	33
Confidential Payroll Records	8	8
Employee Benefit Plans & Payroll Reports	20	20
IBM Procedures	1	1
General	2	2
	61	64
Internal Audit Unit	15	15
Rotational Trainees	0	0
Total	337	336

PLANT PROTECTION SECTION

MONTHLY REPORT - MARCH 1954

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	Beginning of Month	End of Month	Increase	Decrease
Staff	2	2		
Administration Area Maintenance	63	62		1 (a)
Security and Patrol	509	510	1 (b)	
*Fire Protection	156	138		18 (c)
Office Unit (Laundry and Building Services, Clerical, and Records Control)	303	300		3 (d)
TOTALS	1,033	1,012	1	22

NET DECREASE: 21

(a) - Administration Area Maintenance

1 - Deactivated

(b) - Security and Patrol

5 - Rehires
2 - Reactivated
3 - Transferred in
6 - Transferred out
2 - Deactivated
1 - Termination

(c) - Fire Protection

* 19 - Transferred out
1 - Transferred in

(d) - Laundry and Building Services

4 - New Hires
7 - Deactivated

Clerical Services

7 - New Hires
7 - Transferred out

* This was formerly Safety and Fire Protection Unit. Safety Personnel (16) and three Fire Protection Engineers were transferred to Health and Safety Section on March 1, 1954.

FIRE PROTECTION UNIT

Industrial Fires

Department	Area	No. of Fires	Cause	Loss
Manufacturing Separations Section	200-W	1	Chemical reaction on wood.	None
Manufacturing Reactor Section	100-B	1	Gasoline spilled on portable welding unit motor.	$15.00
Engineering Department Reactor Project Section	200-E	1	Electrical	None
			TOTAL LOSS	$15.00

OFFICE UNIT

Laundry and Building Services

200-West Laundry	February	March
Pounds Delivered	256,307	230,334
Pounds Rewashed	13,480	11,073
Total Dry Weight	269,787	241,407
Monitoring Section		
Poppy Check - Pieces	232,317	192,364
Scaler Check - Pieces	342,882	300,957
Total Pieces	575,199	493,321
700 Area Laundry		
Flatwork - Pounds	38,646	34,176
Rough Dry - Pounds	69,179	71,754
Finished - Pounds	2,191	2,454
Total Weight	110,016	108,384
Estimated Pieces	144,121	141,983

Clerical Services

Central Mail and Addressograph

Central Mail hit a new high in volume, both in inter-office and postal mail, also extra new high for total postage used.

Addressograph completed a new file for electrical billing which involved making 7,800 new plates and seven runs of the plates after completion, totaling 54,600 impressions.

Types and Pieces of Mail Handled	March	February
Internal	2,201,375	1,953,371
Postal	89,455	89,098
Special	2,253	2,197
	2,293,083	2,044,666
Total postage used	$3,600.35	$3,541.24
Total teletypes handled	2,437	2,984
Total store orders handled	913	838

Addressograph	March		February	
Type of List	Number of Runs	Total Copies	Number of Runs	Total Copies
Plant name list	96	114,367	112	173,642
Housing list	22	83,510	16	69,182
Payroll list	8	23,142	11	39,688
Total new plates	9,382		5,326	
Total corrected plates	1,967		4,125	
	11,349		9,451	

Office Equipment - Furniture

The annual physical inventory of office furniture in warehouse stock was completed on March 15, 1954 and stock records have been posted accordingly.

The FY 1955 Revised and FY 1956 Budget of Office Equipment was forwarded to General Cost, Financial Department. The total value of FY 1955 revised was $183,605 and FY 1956 was $76,265. Approximately 90% of FY 1956 budget consisted of replacement requirements.

A request for appropriation to purchase additional equipment for 100-K Area has been prepared for the A&B Committee approval in the amount of $37,030. The total additional requirements requested for capital equipment was $59,710. Surplus equipment available from inventory stock reduced this amount to $37,030.

The issues and receipts of furniture remained about even with the previous month's activity. The follow is a list of items, by quantity, handled during the month.

Item	Received by Credit S.O.	Issued	Salvaged
Blackboard	4	15	0
Bookcase	1	10	2
Chair	120	110	4
Costumer	5	7	8
Card File	7	36	1
Cabinet	39	64	12
Desk	88	80	4
Table	38	41	9
Miscellaneous	36	141	1

Office Machines

A total of nine electric typewriters were picked up from service and 19 were issued to fill justified requirements. The plant inventory status of electric typewriters as of March 20th is as follows: (1) 768 machines in service, (2) 581 by GE, 100 by AEC and 87 by other CPFF contractors.

A total of 70 machines were issued from stock and 79 machines were returned to stock during the month, leaving a net decrease of nine machines in service. The total number of office machines in service and stock is 5,432.

One new Burroughs Sensimatic type 300 series billing machine was received and set up for Financial Department to be used in issuing telephone billings on a cycle basis.

A utilization survey of electric typewriters in service by GE has been completed. A total of 554 machines surveyed indicated an average of 4.6 hours usage per day. AEC Operations machines will be surveyed by Office Equipment to determine hourly usage.

A resurvey has been requested by AEC on 125 electric typewriters which were reported to GSA with a three hours or less usage. An increased utilization must be established on these machines; or machines must be made available for reassignment or disposal as surplus.

Office Machine Repair

During the month the instrument mechanics inspected and tested a new compound Sparling water meter being installed in water line to the Desert Inn. This meter will measure the amount of water used for domestic purposes as well as for fire. A meeting was held with a Mr. Combs of the Foxboro Instrument Company regarding the installation of two new steam flow meters, one to be located at the Desert Inn to measure steam sold by GE to the Desert Inn and the other meter to be located in the 784 power house.

Central Printing

At our request, the AEC reviewed a cross section of our color and illustrated printing and advised us they feel we are performing work within the regulations set forth by the Joint Committee on Printing, Congress of the U. S.

Work Completed	March	February
Orders received	376	418
Orders completed	385	402
Back log	65	81
Copies printed	1,160,276	1,627,465
Negatives masked	754	667
Negatives processed	829	624
Photo copy prepared	137	159
Litho plates processed	978	760

Stenographic Services

Only one new employee was assigned to Stenographic Pool during March, thus it was possible to fill only two transfer requests. Employment advises that little or no relief is anticipated on this situation before June.

The Cost Unit has approved a charge of $2.25 per hour for stenographic loan assignments in the outer areas to offset the isolation pay. This is twenty-five cents an hour over the present charge, the change being made effective in March.

Loan requests continue heavy and 25 such requests were filled in March.

At the request of Duplicating, a 16,500 page collating assignment was completed for AEC.

Assistance was given to Salary Administration throughout the month on overloads of work in connection with the new salary plan -- collating forms, filing and setting up of new files, miscellaneous typing, etc.

Breakdown of Hours	March	February
Dictation and Transcription	8	12
Machine transcription	73.5	--
Letters	30.5	38
Rough Drafts	28.5	72
Ditto, duplimats, xerography	307.5	271
Miscellaneous	431	478
Training time	154.5	81.5
Meeting time	2.5	3.5
Unassigned time	16	32
Absentee time	--	--
Holiday and vacation time	--	56
	1,052	1,044
Employees on loan to other units	1,004	971
	2,056	2,015

Area Mail and Duplicating

Duplicating and Mail Statistics	March	February
Orders received	3,161	3,118
Orders completed	2,975	3,093
Orders on hand	109	37
Offset plates	16,166	15,097
Offset copies	808,617	817,996
Stencils	196	387
Stencil copies	2,428	3,589
Ditto masters	550	578
Ditto copies	18,007	14,807
Verifax masters	2,750	2,851
Verifax copies	7,120	9,540
Xerox plates	1,196	1,031
Internal Mail	560,845	630,773

Records Control

Quantity of records received, processed and stored:

Employee and Public Relations Department	4	Standard Storage Cartons
Engineering Department	129	" " "
Financial Department	110	" " "
Manufacturing Department	30	" " "
Plant Auxiliary Operations Department	22	" " "
Radiological Sciences Department	23	" " "
Sub-Contractors		
Vitro Corporation	58	" " "
TOTAL	376	Standard Storage Cartons

Persons provided records services: 970

Records destroyed: 1,005 cartons

Records cartons issued: 184

Percentage of Records Service Center vault (exclusive of North Richland) occupied by records is 81.8%.

Twenty-two requests for file cabinets received. Sixteen requests were filled, 6 requests were cancelled, 4 requests are pending. Three fireproof combination locked cabinets were picked up in exchange for key locked cabinets resulting in a saving of $450.00 ($225.00 cost of combination cabinet minus $75.00 cost of key locked cabinet equals $150.00 saving per cabinet exchanged). Three key locked cabinets and one combination locked cabinet were picked up with no exchange and returned to stock.

Four Evaluations of Records for disposal were developed and submitted for internal approval.

Uniform filing was established in five offices during the month. A total of 476 offices have installed the uniform filing system to date. Eleven rechecks were made on established files.

One thousand, seven hundred twenty-eight (1,728) cartons of records were reviewed in the classified search. The search was completed on March 30 with a total of 5,756 cartons searched.

ADMINISTRATION AREA MAINTENANCE UNIT

-- New Administration Building: Information received from AEC indicates they have no current hope of obtaining approval for a new building this year.

AEC-114 New Transportation Facilities: Actual completion 45%; scheduled completion 48%. Floor slabs and sprinkler system are being installed in ,ain building. Railroad connection is being made. All concrete, roof sheeting and sprinkler system completed in Dispatchers Building.

CA-434 Bio-Assay Laboratory: Phase I, 99% complete; Phase II, 86% complete; General Electric, 40% complete. Contact engineer indicates Phases I and II will be complete and that building can be occupied by the middle of May.

CA-561 713 Building Alterations: Approved by AEC March 17. Order issued for final design.

IR-169 Alterations of Warehouse #13, Stores Yard #2: Bid Assembly in course of final preparation by AEC.

CA-533 Official Telephone Exchange, Hanford Works: Revision 1, covering conversion of 706 Building, ready for submission.

CA-571 703 Basement Alterations, Fifth Wing, North: Request from AEC to review scope in effort to cut costs.

A total of eight doors and eighty-four lineal feet of Hauserman partitioning were installed on two requests from 700 Area and two requests from 300 Area.

Fifteen office furniture moves were made during the month.

Fince along south side of 703 Building has been temporarily relocated, to exclude 712-A Hutment from Area.

Trees and shrubs were removed, ground area leveled and additional bumper logs installed ti provide increased temporary parking space immediately east of 760 and 761 Buildings.

Small addition to 784-A was completed, to house Civil Defense emergency generator.

General Maintenance

Interior painting of 713-A was completed. Hauserman partitions and fluorescent lights were installed in south section to provide office space for Design group.

The former dark room in 721 Building was remodeled for use as ladies rest room and lounge. The old rest room will be converted to office space.

Plenum chambers for the two coolers over 760 Building drafting wing were repaired and one was enlarged. Altered ducts and placed cork pads under coolers to reduce vibration and duct noise.

Platforms were extended and ducts revised in 703 Building first wing attic in connection with installation of Farr-Air rotors on air coolers. Blowers in north section of the wing were replaced with larger units.

Fiberglas acoustical ceiling tile was installed in a few offices in 703 Building fifth wing to reduce noise.

Roofs were repaired on Buildings 702, 744 and on the Radiological tower office building.

Floors were repaired in ten offices of 703 Building. Thin, cracked and broken boards were replaced.

Forty feet of fence was repaired at 1131 Area and 120 broken posts in fence at Stores Yard #2 were stubbed.

Interior painting included repainting second floor hallway of 703 and approximately 50% of reproduction area in 760.

Final coat of paint, both exterior and interior was applied to Mobile Defense Center.

The exterior of the Civil Defense storage building at Prosser Barricade was repainted.

The steam-generated hot water tanks in 717-A, 717 and 721 Buildings were disconnected and electric hot water tanks installed. This will permit all steam service to be shut down to these buildings during the summer months resulting in line loss saving.

Air conditioning switch and control circuits were changed in 770 Building to correspond to area served.

Monthly test of fire alarms in 700, 1100 and central stores areas was made.

Reqired emergency circuit for 703, fifth wing, and installed electrical hook-up for emergency generator.

New Smithcraft fluorescent fixtures were installed to replace old ceiling recessed type in a number of offices in the third wing of 703.

Tested all low level alarm circuits in fire alarm system, Central Stores.

Repaired six hot plates for 706 Laboratory and rebuilt two plates.

Installed 300 feet of conduit for telephone group in Covered Storage Building, Central Stores Area, and installed receptacles for phone service in 762 Building.

Changed all operating switches on receiving doors at Central Stores to momentary type, so that doors will not operate without attendant. This is a safety factor and should prevent excessive damage to doors.

Revised control circuit for 784 Air Compressor to correct unloading action on start-up.

Relamped lights on tower and repaired battery charger at Meterological Building.

Overhauled motor generator No. 4 for telephone group.

Purged bearings and lubricated motors on 75% of all air conditioners in 700 Area.

Thirty door locks were remastered for 726 Building; 25 for 325 Building and 25 for Separations Section. Rekeyed and remastered 14 locks for 100-H Building. Mastered locks for 701-B.

Replaced small temporary condensate meter with larger meter near Seattle First National Bank.

Relocated post indicator valve south of 703 Building for clearance of new fence.

Installed 14 pipe antennas on roof of 703 Building, fifth wing, Civil Defense Mobile Center.

Replaced nipples in 20 radiators in 703 Building.

Repaired broken duct work and repaired coolers at hospital and public health buildings.

Steam Operation

Numbers 1 and 2 boilers were in service at the beginning of the month, with numbers 3 and 4 in reserve.

On March 19, the outboard stoker on No. 2 boiler suddenly failed, necessitating removal of this boiler from the line, and activation of No. 3 boiler. Stoker repairs were completed on March 24, restoring No. 2 boiler to an availalbe status. Numbers 1 and 3 boilers remained in service for the balance of the month, with numbers 2 and 4 in reserve.

The quantity of steam generated at 784 Plant was 2.4% greater than in March, 1953.

A physical inventory of the coal on hand was taken on March 24 at the request of the Inventory Accounting group of Financial Department.

Coal Consumed: 1,653.70 net tons

Steam generated:	23,151.3 M. Lbs.
Steam leaving plant:	20,007.2 M. Lbs.
Steam delivered:	17,775.2 M. Lbs.
Total water softened:	3,026,300 Gallons
Total Soft Water sent to Kadlec Hospital:	48,970 Gallons
Total soft water sent to 784 Heating Plant:	2,977,330 Gallons

SECURITY AND PATROL UNIT

Document Report

Number of classified documents unaccounted for as of March 1, 1954: 337
(143 of the above 337 documents are chargeable to E. I. du Pont de Nemours & Co.)

Number of classified documents reported as unaccounted for during March: 30

In the past, we have reported an unaccounted for document with a documented attachement as a single loss rather than a multiple loss. However, during this reporting period a recapitulation was made showing these documents with classified attachments as individual losses. There are 13 such documents in this category.

Number of classified documents either recovered or downgraded in security classification during the month of March: 17

Eleven classified documents were located and six were downgraded in classification.

Number of documents remaining unaccounted for as of April 1, 1954: 350
(143 of the above 350 documents are chargeable to E. I. du Pont de Nemours & Co.)

The Non-Technical Document Review Board held one meeting during March and reviewed a total of sixteen documents. Of this number

1 was downgraded to "Confidential - Undocumented",
5 were downgraded to "Official Use Only", and
10 had their classification retained.

Security Education

Five security articles appeared in the Works NEWS during the month.

There were 425 security meetings held and attended by 5,851 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 14 meetings, each with an average attendance of 23 employees.

"The Tallest Shadow" was shown at five meetings with an average of 23 employees in attendance at each meeting.

"The Defense Rests" was shown at two meetings, with an average attendance of 17 employees at each meeting.

"Signal 99" was shown at four meetings, each with an average attendance of 16 employees.

"Only the River" was shown at five meetings, each with an average attendance of 15 employees per meeting.

"On Guard" was shown at one security meeting with 23 people present.

GE Security Bulletin No. 83 entitled "No Drums Will Beat" was issued on March 12.

The following Organization and Policy Guides concerning the subject of security were issued during the month:

"Personnel Assigned to Sensitive Positions" was issued March 16 as a new instruction and procedure.

"Responsibility for Security" was issued as a revision on March 19.

A Security Field Memorandum entitled "Classified Document and Print Inventory" was given plantwide distribution on March 17 advising personnel of the inventory that will be conducted of all classified documents within the near future.

On March 19, a memorandum entitled "Security Audit Activities" was issued concerning the auditing of individual security performance at Hanford Atomic Products Operation.

Fifty-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 March.

Sixteen cases were forwarded to the Atomic Energy Commission during March requesting an emergency "Q" security clearance with access to "Restricted Data".

Statistical Report of Security Patrol Activities

	100-B	100-D	100-F	100-H	100-K	200-W	300
Pat Searches	99	99	42	99	0	0	2
Escorts	15	8	16	54	52	45	76
Ambulance Runs	6	4	2	2	5	3	3
Passes issued:							
One day temporary	62	4	8	19	0	56	103
Travel	0	0	0	0	0	0	23
Red Tag	170	130	44	41	0	571	90
Telephonic	0	0	0	2	0	0	24
Supervisor's Post Contacts	479	331	303	313	382	1,060	566

Other Security Patrol Activities (computed by hours):							300 & 700
Security File Check	171	234	223.8*	394*	445	599	1,426
Building Check	371	33			475	680	744

*File and Building Checks are combined.

Other Security Patrol Activities:

Buildings and Doors opened	275
Railroad Gates opened	369
Master System keys issued	328
Operation gas pumps	206

Arrest Report

Violations	Number of Violations	Cases Cleared	Cases Fined
Speeding	7	7	7
Passing in "No Passing" zone	1	1	1
Operating Motor Vehicle on wrong side of road	2	2	2
Failure to Obey traffic officer's hand signal	1	1	1
TOTAL	11	11	11

Citation Tickets issued:	11
Warning Tickets issued:	32

Security Patrol Training Activities

90 Security Patrolmen received classroom instruction during the month of March.

181 Security Patrolmen received Firearms training during the same reporting period.

Training courses:		
	Safety Class	1/4 hour
	Security Class	1/2 hour
	Operations Class	1 1/4 hours

Security Patrol Post Changes

There were three temporary construction posts established in the 105-KW Area during the month of March as follows:

105-KW Gas Instrument Room, March 4, 1954
Continuous Block Patrol, 105-KW, March 8, 1954
North Elevator Pit 105-KW, March 9, 1954

On March 2, the temporary construction post, 202-S Construction Badge House, requiring one man on the day shift, was discontinued.

The 181-B Building Tower Post, 100-B Area, was discontinued on March 8.

On March 10, one "X" level post, 105-KW Area, was discontinued. This was a temporary construction post.

Field Inspection Activities

Contacts made to locate unaccounted for documents: 13
Searches conducted to locate unaccounted for documents: 5

General

On March 10 and 11, representatives of the Atomic Energy Commission Security Division and security personnel of the Hanford Atomic Products Operation inspected the National Acme Company, Cleveland, Ohio, to establish security regulations for work on off-site contract Project CA-514.

On March 31 and April 1, Security representatives assisted in the tour of the plant areas for personnel of the Detroit Edison Company who were making an official visit to this installation. The security personnel also monitored the classified meetings and conferences during their visit.

Security Administration Information

Daily Badge Log Entries	2,241
"Q" Clearances	47
Formal "P" clearances issued	10
"P" Approval Clearances issued	46
Category Access granted	47
Category Access withdrawn	10

331 Photo Passes were laminated and issued
355 "A" type badges were assembled and distributed to the proper areas
275 "A" badges were received from the areas
89 visitor, construction, and "A" badges were received from the areas for repair.

Rephotographing Project

Number of "A" Badges	93
Number of "B" Badges	391
Photos for passes	62
Total	546

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HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING MARCH 31, 1954

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
ENGINEERING DEPARTMENT - ADMINISTRATION SUB SECTION							
I. Visitors to this Works							
G. F. Hamby General Electric Company Lockland, Ohio	Inspection and orientation of Hanford document control system	C. G. Stevenson	3-23-54	3-26-54	X	100-H 300-L 700	XXX XXX
B. F. Robertson General Electric Company Lockland, Ohio	Inspection and orientation of Hanford document control system	C. G. Stevenson	3-23-54	3-26-54	X	100-H 300-L 700	XXX XXX
II. Visits to other Installations							
Betty J. Borgmier to: U. S. Atomic Energy Comm. Oak Ridge, Tennessee	Attend Technical Information Panel Sub-Committee meeting on book catalog	A. G. Abdian	3-29-54	3-30-54	X		
Betty J. Borgmier to: U. S. Atomic Energy Comm. Los Alamos Scientific Lab. Los Alamos, New Mexico	Attend Technical Information Panel Sub-Committee meeting on coordinate indexing	H. F. Redman	4-1-54	4-2-54	X		
R. J. Schier to: General Electric-ANP Evandale, Ohio	Discuss engineering program and practices	R. Shoults	3-8-54	3-9-54	X		
C. G. Stevenson to: U. S. Atomic Energy Comm. Oak Ridge, Tennessee	Attend Technical Information Panel Sub-Committee meeting on book catalog	A. G. Abdian	3-29-54	3-30-5[illegible]	X		
C. G. Stevenson to: U. S. Atomic Energy Comm. Los Alamos Scientific Lab. Los Alamos, New Mexico	Attend Technical Information Panel Sub-Committee meeting on coordinate indexing	H. F. Redman	4-1-53	4-2-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
ENGINEERING DEPARTMENT - TECHNICAL SECTION							
I. Visitors to this Works							
A. E. Aletti Catalytic Construction Co. Oak Ridge, Tennessee	Solvent extraction process and equipment discussion	F. W. Woodfield N. G. Wittenbrock M. J. Szulinski	3-16-54	3-17-54	X		300-L XXX
R. Anderson U. S. Atomic Energy Commission Oak Ridge, Tennessee	Solvent extraction process and equipment discussion	F. W. Woodfield N. G. Wittenbrock M. J. Szulinski	3-16-54	3-17-54	X		300-L XXX
E. E. Beauchamp Oak Ridge National Laboratory Oak Ridge, Tennessee	Discuss irradiation and waste disposal	J. A. Berberet	3-23-54	3-25-54	X		100-B 105-C 100-H 105 200-W 221-T,221-U Redox 300-L XXX; 700
H. Berman Catalytic Construction Co. Oak Ridge, Tennessee	Waste disposal information	V. R. Cooper R. E. Smith	3-3-54	3-4-54	X		200-W Redox,221-U 300-L XXX
F. N. Browder Catalytic Construction Co. Oak Ridge, Tennessee	Waste disposal information	V. R. Cooper R. E. Smith	3-3-54	3-4-54	X		200-W Redox,221-U 300-L XXX
H. H. Bulkowski Catalytic Construction Co. Oak Ridge, Tennesse	Solvent extraction process and equipment discussion	F. W. Woodfield N. G.Wittenbrock M. J. Szulinski	3-16-54	3-17-54	X		300-L XXX
L. F. Coffin, Jr. Knolls Atomic Power Lab. Schenectady, New York	Discuss thermal stress studies	E. A. Eschbach	3-30-54	4-2-54	X		100-B 105-B,105-C 100-D 105 100-F 105 100-H 105 300 303; 700
J. A. Fellows Mallinckrodt Chemical Works St. Louis, Missouri	Discuss fuel elements	E. A. Eschbach	3-23-54	3-25-54	X		100-B 105-B,105-C 100-D 105 300 303; 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
[illegible] Gardner North American Aviation Co [illegible], California	Discuss plutonium analysis and analytical procedures	E. P. Galbraith E. M. Kinderman	3-29-54	3-30-54	X		300-L XXX
[illegible] Chapelle [illegible] National Laboratory [illegible] Tennessee	Discuss irradiation [illegible] waste disposal	J. A. Berberet	3-23-54	3-25-54	X		100-B 105-C 100-H 105 200-W 221-T, 221-U Redox 300-L XXX; 700
[redacted]	[redacted]	[redacted]					
[illegible] [illegible] Atomic Power [illegible] Pennsylvania	Inspect double [illegible] X-ray spectrometer	M. J. Sanderson	3-11-54	3-12-54	X		300-L XXX
[redacted] [illegible] Nuclear Works [illegible]	Discuss fuel [illegible]	E. A. Eschbach	3-23-54	3-24-54	X		100-B 105-B, 105-C 100-D 105 300 303; 700
[illegible] [illegible] [illegible]	Conference concerning analytical procedures-wet chemistry	R. J. Ercuns	3-25-54	3-26-54	X		300-L XXX
R[illegible] K[illegible] Power Lab. S[illegible], New York	Meeting on modification of KAPL-120 in-pile loop for Sub-marine Intermediate Reactor	J. A. Berberet	3-29-54	3-20-54	X		100-B 105-C 100-H 105 105-KE, 105-KW 700 ; 300-XXX
M. Kreitzer U. S. Atomic Energy Comm. Washington, D. C.	General discussion on technical matters	A. E. Smith E. R. Irish W. H. Reas F. W. Woodfield	3-26-54	3-26-54	X		200-W XXX 300-L XXX
C. C. Lockhart E[illegible] Power[illegible] Sa[illegible] Au[illegible]	P-10 production information	J. C. L. Chatten	3-23-54	3-26-54	X		100-B 108-B 300-L XXX
G[illegible] E[illegible] Powers Sva[illegible] Augusta, Georgia	Product purity and laboratory information	A. E. Smith	3-17-54	3-17-54	X		200-W 234, 235

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. P. Patnovic E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	P-10 production information	J. C. L. Chatten	3-23-54	3-26-54	X		100-B 108-B 300-L XXX
C. D. Purdie E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	P-10 production information	J. C. L. Chatten	3-23-54	3-26-54	X		100-B 108-B 300-L XXX
R. A. Quadt Hunter-Douglas Corporation Riverside, California	Extrusion problems	A. C. Callen	3-2-54	3-3-54	X		300 303
R. P. Schuman General Engineering Lab. Schenectady, New York	Discuss nuclear chemistry problems	A. H. Bushey F. W. Albaugh	3-25-54	3-26-54	X		100-D 105 200-W Redox, 222-S 300-L XXX; 700
L. G. Weber Mallinckrodt Chemical Works St. Louis, Missouri	Discuss fuel elements	E. A. Eschbach	3-23-54	3-26-54	X		100-B 105-B, 105-C 100-D 105 300 303; 700
J. B. Tinker E.I. du Pont de Nemours & Co. Augusta, Georgia	Discuss hot pumps and flow	N. G. Wittenbrock	3-9-54	3-10-54	X		100-B 105 100-D 105 100-H 105 100-F 105 200-W Redox, 221-U, 231 300 303
F. P. Vance Phillips Petroleum Co. Arco-,Idaho Falls, Idaho	Discuss continuous dissolution	F. W. Woodfield	3-15-54	3-15-54	X		300-L XXX
B. Weidenbaum Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Slug manufacturing and fuel element development	E. A. Eschbach V. R. Cooper G. E. McCullough	3-24-54	3-26-54	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105 200-W 234, 235 300-L 303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass	Areas
J. R. Wetch North American Aviation Co. Downey, California	Consultation on reactor safety project	A. B. Carson	3-22-54	3-26-54	X		100-D 105 100-H 105 300-L 303; 700
C. W. Wheelock North American Aviation Co. Downey, California	Consultation on reactor safety project	A. B.Carson	3-22-54	3-26-54	X		100-D 105 100-H 105 300-L 303; 700
J. F. White U. S. Atomic Energy Comm. Washington, D. C.	Technical discussion on graphite irradiation	L. P. Bupp	3-18-54	3-19-54	X		100-D 105 300-L 303
W. M. Wright Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Slug manufacturing and fuel element development	E. A. Eschbach V. R. Cooper G. E. McCullough	3-24-54	3-26-54	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105 200-W 234, 235 300-L 303
R. J. Christl E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	P-10 Production information and weapons elements information	J. C. L. Chatten	3-23-54	3-26-54	X		100-B 108-B 300-L XXX
II. Visits to other Installations							
G. B. Barton to: Knolls Atomic Power Lab. Schenectady, New York	Discuss separations chemistry	J. F. Flagg	3-31-54	4-2-54	X		
A. G. Blasewitz to: Knolls Atomic Power Lab. Schenectady, New York	Discussion on fuel element development	K. H. Kingdon	3-2-54	3-3-54	X		
A. G. Blasewitz to: U. S. Atomic Energy Comm. New York, New York	Discussion on fuel element development	R. L. Kirk	3-4-54	3-5-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Date Class.	Unclass	Areas
A. G. Blasewitz to: Vitro Corp. of America West Orange, New Jersey	Discuss electro-kinetic process on contract AT-850	F. Fahnoe	3-4-54	3-5-54	X		
A. G. Blasewitz to: Bridgeport Brass Co. Bridgeport, Connecticut	Discuss fuel element development	Mr. French	3-4-54	3-5-54	X		
A. G. Blasewitz to: Battelle Mem. Institute Columbus, Ohio	Discuss fuel element development	H. M. Russell	3-8-54	3-9-54	X		
A. G. Blasewitz to: Ames Laboratory Ames, Iowa	Discuss fuel element development	F. H. Spedding	3-10-54	3-11-54	X		
A. G. Blasewitz to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss fuel element development	J. R. Johnson	3-9-54	3-9-54	X		
J. J. Cadwell to: Argonne National Lab. Lemont, Illinois	Attend Metallurgy Sub-Committee Meeting	H. D. Young F. Foote	3-17-54	3-18-54	X		
W. H. Clark to: Argonne National Lab. Lemont, Illinois	Discuss various out-standing HIR's and survey future requests	R. Fiore	3-17-54	3-18-54	X		
W. H. Clark to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss various out-standing HIR's and survey future requests	C. A. Bruch	3-11-54	3-12-54	X		
W. H. Clark to: Knolls Atomic Power Lab. Schenectady, New York	Discuss various out-standing HIR's and survey future requests	T. F. Fisher	3-15-54	3-16-54	X		
D. J. Donahue to: General Electric-ANP Lockland, Ohio	Attend information meet-ing on safety fuses at ANP	M. C. Leverett	3-8-54	3-10-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
D. J. Donahue to: Knolls Atomic Power Lab. Schenectady, New York	Discuss experimental reactor instrumentation at KAPL	L. Tonks	3-10-54	3-15-54	X		
P. F. Gast to: National Lead Company Fernald, Ohio	Discuss reactor fuel problems	F. L. Cuthbert	3-16-54	3-17-54	X		
P. F. Gast to: General Electric-ANP Evandale, Ohio	Discuss reactor development	W. J. Kelly	3-16-54	3-17-54	X		
P. F. Gast to: Carbide & Carbon Oak Ridge, Tennessee	Discuss reactor fuel problems	G. A. Garrett	3-18-54	3-19-54	X		
P. F. Gast to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss reactor development	J. Swarthout	3-18-54	3-19-54	X		
P. F. Gast to: U. S. Atomic Energy Comm. New York, New York	Discuss reactor declassification work with committee	W. A. Strauser	3-22-54	3-23-54	X		
P. F. Gast to: Knolls Atomic Power Lab. Schenectady, New York	Discuss reactor development	K. H. Kingdon	3-24-54	3-24-54	X		
P. F. Gast to: General Electric Co. Schenectady, New York	Discuss reactor development	H. W. Huntley	3-24-54	3-24-54	X		
H. H. Hopkins to: Knolls Atomic Power Lab. Schenectady, New York	Discuss separations chemistry	J. F. Flagg	3-31-54	4-2-54	X		
W. T. Kattner to: Argonne National Lab. Lemont, Illinois	Consultation on uranium quality	F. Foote	3-3-54	3-3-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
W. T. Kattner to: U. S. Atomic Energy Comm. New York, New York	Consultation on uranium quality	G. Briggs F. Huke	3-4-54 3-22-54	3-4-54 9-22-54	X X		
W. T. Kattner to: Bridgeport Brass Co. Bridgeport, Connecticut	Consultation on uranium quality	S. F. French	3-5-54 3-22-54	3-5-54 9-22-54	X X		
E. M. Kinderman to: Brookhaven National Lab. Upton, Long Island, New York	Discuss fission yield experiments and other analytical problems	S. Katcoff	3-5-54	3-5-54	X		
E. M. Kinderman to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fission yield experiments and other analytical problems	J. F. Flagg	3-8-54	3-10-54	X		
E. M. Kinderman to: Argonne National Lab. Lemont, Illinois	Discuss fission yield experiments and other analytical problems	R. C. Hagemann	3-11-54	3-12-54	X		
M. Lewis to: Argonne National Lab. Lemont, Illinois	Observe high temperature loops in operation at ANL	J. E. Draley	3-22-54	3-23-54	X		
M. Lewis to: Atomic Energy of Canada, Ltd. Chalk River, Ontario	Conferences on aluminum corrosion work by Atomic Energy of Canada	Mr. Lavigne	3-24-54	3-25-54	X		
G. E. McCullough to: Knolls Atomic Power Lab. Schenectady, New York	Discussion on fuel element development	K. R. Van Tassel	3-2-54	3-3-54	X		
G. E. McCullough to: U. S. Atomic Energy Comm. New York, New York	Discussion on fuel element development	R. L. Kirk	3-4-54	3-5-54	X		
G. E. McCullough to: Bridgeport Brass Co. Bridgeport, Connecticut	Discussion on fuel element development	S. F. French	3-4-54	3-5-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
G. E. McCullough to: Battelle Mem. Institute Columbus, Ohio	Discussion on fuel element development	H. M. Russell	3-8-54	3-9-54	X		
G. E. McCullough to: Mallinckrodt Chemical Wks. St. Louis, Missouri	Discussion on fuel element development	C. D. Harrington	3-9-54 3-29-54	3-10-54 3-31-54	X X		
G. E. McCullough to: Ames Laboratory Ames, Iowa	Discussion on fuel element development	F. H. Spedding	3-9-54	3-10-54	X		
G. E. McCullough to: National Lead Company Fernald, Ohio	Discussion on fuel element development	G. W. Wunder	4-1-54	4-2-54	X		
J. E. Minor to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Consultation on metallurgical problems	P. Cohen	3-4-54	3-5-54	X		
O. W. Rathbun to: Bridgeport Brass Co. Bridgeport, Connecticut	Consultation on uranium quality	S. F. French	3-22-54	9-22-54	X		
O. W. Rathbun to: National Lead Company Fernald, Ohio	Consultation on uranium quality	J. M. Ciborski	3-29-54	3-29-54	X		
R. L. Reynolds to: General Eng. Lab. Schenectady, New York	Consultation on underwater examination equipment	J. E. Brown, Jr.	3-24-54	3-25-54	X		
U. L. Upson to: General Eng. Lab. Schenectady, New York	Alpha scintillation phosphors and counting techniques	W. W. Schultz	3-8-54	3-8-54	X		
U. L. Upson to: Argonne National Lab. Lemont, Illinois	Discuss counting instruments	R. K. Swank	3-10-54	3-10-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
U. L. Upson to: Research Laboratory Schenectady, New York	Alpha scintillation phosphors and counting techniques	H. A. Liebhafsky	3-9-54	3-9-54	X		
K. P. Pokish to: General Eng. Lab. Schenectady, New York	Consultation on underwater examination equipment	J. E. Brown, Jr.	3-24-54	3-25-54	X		
ENGINEERING DEPARTMENT - DESIGN SECTION							
I. Visitors to this Works							
R. O. Fehr General Engineering Lab. Schenectady, New York	Advise on the accoustic design on pump buildings	C. H. Pilkey G. H. Bauer	3-4-54	3-5-54	X	100-B	XXX
P. S. Locke General Electric Company Schenectady, New York	Test new 10,000 horsepower motor drives in 100-K Area	D. J. Quigley	3-20-54	4-3-54		X	
R. C. Mann General Electric - ANP Evandale, Ohio	Engineering conferences on instrumentation	R. H. Beaton	3-14-54	3-19-54	X	100-B 100-D 100-H 200-E 200-W 300	105-C, 105-C 105 105 XXX 221-U 303; 700
II. Visits to other Installations							
R. H. Beaton to: Radiation Laboratory University of California Berkeley, California	Research and development discussions	G. T. Seaborg	3-5-54	3-6-54	X		
R. J. Burgey, Jr. to: U. S. Atomic Energy Comm. Idaho Falls, Idaho	Discussions regarding shipment schedule and containers for P-10 Project	W. Ginkle	3-3-54	3-4-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass	Areas
E. S. Day, Jr. to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation and inspection of equipment and design on P-10 irradiation and extraction	D. A. Miller W. Morris	3-1-54	3-3-54	X		
E. S. Day, Jr. to: E. I. du Pont de Nemours Wilmington, Delaware	Consultation and inspection of equipment and design on P-10 irradiation and extraction	E. Cole J. P. Patnovik	3-4-54	3-5-54	X		
J. F. Fletcher to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation and inspection of equipment and design on P-10 irradiation and extraction	D. A. Miller W. Morris	3-1-54	3-3-54	X		
J. F. Fletcher to: E. I. du Pont de Nemours Wilmington, Delaware	Consultation and inspection of equipment and design on P-10 irradiation and extraction	E. Cole J. P. Patnovik	3-4-54	3-5-54	X		
J. F. Fletcher to: Consolidated Vacuum Co. Rochester, New York	Consultation and inspection of shop and equipment being made for Dupont P-10 Program	G. Bancroft	3-4-54 3-9-54	3-8-54 3-9-54	X X		
J. F. Fletcher to: Hammel-Dahl Company Providence, Rhode Island	Consultation and inspection of special valve development being done for Dupont	E. Dahl	3-4-54	3-8-54	X		
W. P. Ingalls to: E.I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation and inspection of equipment and design on P-10 irradiation and extraction	D. A. Miller W. Morris	3-1-54	3-3-54	X		
W. P. Ingalls to: E. I. du Pont de Nemours Wilmington, Delaware	Consultation and inspection of equipment and design on P-10 irradiation and extraction	E. Cole J. P. Patnovik	3-4-54	3-5-54	X		
R. L. Junkins to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation and inspection of equipment and design on P-10 irradiation and extraction	D. A. Miller W. Morris	3-1-54	3-3-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
R. L. Junkins to: E. I. du Pont de Nemours Wilmington, Delaware	Consultation and inspection of equipment and design on P-10 irradiation and extraction	E. Cole J. P. Patnovik	3-4-54	3-5-54	X		
L. C. Koke to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation and inspection of equipment and design on P-10 irradiation and extraction	D. A. Miller W. Morris	3-1-54	3-3-54	X		
L. C. Koke to: E. I. du Pont de Nemours Wilmington, Delaware	Consultation and inspection of equipment and design on P-10 irradiation and extraction	E. Cole J. P. Patnovik	3-4-54	3-5-54	X		
L. C. Koke to: Consolidated Vacuum Co. Rochester, New York	Consultation and inspection of shop and equipment being made for Dupont P-10 Program	G. Bancroft	3-4-54 3-9-54	3-8-54 3-9-54	X X		
L. C. Koke to: Hammel-Dahl Co. Providence, Rhode Island	Consultation and inspection of special valve development being done for Dupont	E. Dahl	3-4-54	3-8-54	X		
G. P. Kesel to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation and inspection of equipment and design on P-10 irradiation and extraction	D. A. Miller W. Morris	3-1-54	3-3-54	X		
G. P. Kesel to: E. I. du Pont de Nemours Wilmington, Delaware	Consultation and inspection of equipment and design on P-10 irradiation and extraction	E. Cole J. P. Patnovik	3-4-54	3-5-54	X		
P. R. McMurray to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation and inspection of equipment and design on P-10 irradiation and extraction	D. A. Miller W. Morris	3-1-54	3-3-54	X		
P. R. McMurray to: E. I. du Pont de Nemours Wilmington, Delaware	Consultation and inspection of equipment and design on P-10 irradiation and extraction	E. Cole J. P. Patnovik	3-4-54	3-5-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
P. R. McMurray to: Consolidated Vacuum Co. Rochester, New York	Consultation and inspection of shop and equipment being made for Dupont P-10 Program	G. Bancroft	3-4-54 3-9-54	3-8-54 3-9-54	X X		
P. R. McMurray to: Hammel-Dahl Co. Providence, Rhode Island	Consultation and inspection of special valve development being done for Dupont	E. Dahl	3-4-54	3-8-54	X		
A. J. Karnie to: U. S. Atomic Energy Comm. Idaho Falls, Idaho	Discussions regarding shipment schedule and containers for P-10 Project	W. Ginkle	3-3-54	3-4-54	X		

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ENGINEERING DEPARTMENT - PROJECT SECTION

I. Visitors to this Works

F. N. Browder Catalytic Construction Co. Oak Ridge, Tennessee	Design of waste storage tank farms	H. B. Sargent	3-3-54	3-3-54	X	3000-101	
H. Berman Catalytic Construction Co. Oak Ridge, Tennessee	Design of waste storage tank farms	H. G. Sargent	3-3-54	3-3-54	X	3000-101	
P. Selak U. S. Atomic Energy Comm. Savannah River Plant Augusta, Georgia	Discussion of purex plants	H. H. Hubble W. B. Webster	3-24-54	3-24-54	X	3000-101	

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

I. Visitors to this Works

D. R. Mash California Research & Dev. Livermore, California	Job ratings for employees working in metallurgy	D. W. McLenegan	3-4-54	3-5-54	X	100-H 105 300-L 303	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass	Areas
II. Visits to other Installations							
D. L. Gilliland, Jr. to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss shielding problems	E. P. Blizzard C. E. Clifford	3-2-54	3-3-54	X		
R. C. Grant to: General Electric-ANP Lockland, Ohio	Discuss salary matters and administration	H. P. Smith	3-24-54	3-24-54	X		
R. C. Grant to: Aircraft Gas Turbine General Electric Co. Cincinnati, Ohio	Discuss salary matters and administration	G. P. Lehmann	3-25-54	3-26-54	X		
W. D. Smyth to: General Electric-Aircraft Gas Turbine Cincinnati, Ohio	Confer with Department Suggestion Committee personnel	O. R. Rohrmann	3-12-54	3-12-54	X		
J. J. Tagen to: General Electric Co. Arco, Idaho	Conference on wage and classification program	J. H. Julien R. Lewis J. M. Frame	3-5-54	3-6-54	X		
MANUFACTURING DEPARTMENT							
I. Visitors to this Works							
E. F. Beauchamp Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss chemical waste disposal	V. R. Chapman	3-24-54	3-25-54	X	200-W	221-T, 221-U Redox
H. W. Bellar E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Technical data on production problems and plant organization	J. E. Maider	3-8-54	3-9-54	X	100-B 100-D 100-F 100-H 200-W 300	105-B, 105-C 105 105 105 221-T, 221-U Redox, 231 303; 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass	Restricted Data Areas
J. E. Cole E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Technical data on production problems and plant organization	J. E. Maider	3-8-54	3-9-54	X	100-B 100-D 100-F 100-H 200-W 234,235 300	105-B, 105-C 105 105 105 221-T, 231, Redox, 221-U 303; 700
J. B. Donahue E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Technical data on laboratory operations	W. N. Mobley	3-15-54	3-19-54	X	100-B 100-D 100-F 100-H 200-W 300	105-B, 105-C 105 105 105 Redox XXX
W. J. Gardner North American Aviation Downey, California	Solvent extraction processes consultation	W. N. Mobley	3-29-54	3-30-54	X	200-W 300-L	Redox, 231 XXX
J. H. Gillette Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss chemical waste disposal	V. R. Chapman	3-24-54	3-25-54	X	200-W	221-T, 221-U Redox
H. L. Greene E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Technical data on production problems and plant organization	J. E. Maider	3-8-54	3-12-54	X	100-B 100-D 100-F 100-H 200-W 300	105-B, 105-C 105 105 105 Redox, 221-U 221-T, 231 303
J. M. Herndon, Jr. U. S. Atomic Energy Commission Oak Ridge, Tennessee	Discuss slug fabrications	E. W. O'Rorke	3-24-54	3-25-54	X	100-B 100-H 300	105-C 105 303
R. B. McKellar E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Production operations and and radiological science work	G. R. Moore	3-30-54	4-8-54	X	100-B 100-D 100-F 100-H 200-W 300	105-B, 108-B 105-C 105 105 105 221-T, 231 Redox, 221-U [illegible]

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Restricted Data Areas
G. B. O'Connor E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Analytical procedures and techniques used in 200 Areas	L. M. Knights	3-15-54	3-19-54	X	200-W 300	234, 235 Redox, 231 XXX
R. W. Thompson E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Familiarization with radiation control methods	G. R. Moore	3-31-54	4-8-54	X	100-B 100-D 100-F 100-H 200-W 300	105-B,108-B 105 105 105 221-T, 231, Redox, 221-U 234, 235 XXX
J. B. Tinker E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Technical data on production problems and plant organization	J. E. Maider	3-8-54	3-9-54	X	100-B 100-D 100-F 100-H 200-W 300	105-B, 105-C 105 105 105 231, 221-T 234, 235 Redox, 221-U 303; 700
R. E. Wilmer E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Technical information on laboratory operations	W. N. Mobley	3-15-54	3-19-54	X	100-B 100-D 100-F 100-H 200-W 300	105-B, 105-C 105 105 105 Redox, 231 234, 235 XXX
E. J. Boyle Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss fuel elements fabrication	E. W. O'Rorke	3-24-54	3-25-54	X	100-B 100-H 300	105-C 105 303

II. Visits to other Installations

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
S. M. Gill to: National Lead Company Fernald, Ohio	Discuss uranium slug manufacturing problems	C. H. Walden	3-22-54	9-1-54	X		
J. E. Maider, Jr. to: General Electric Co. New York, New York	Organizational and salary administration problems discussions	L. L. Ferguson	3-23-54	3-23-54	X		
J. E. Maider, Jr. to: U. S. Atomic Energy Comm. Washington, D. C.	Combined Operations Meeting	F. K. Pittman	3-24-54	3-25-54	X		
J. E. Maider, Jr. to: E. I. du Pont de Nemours Wilmington, Delaware	Discuss mutual problems with the 3-X Program	R. M. Evans W. C. Kay L. Squires	3-26-54	3-26-54	X		
E. W. O'Rorke to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Discuss metal quality improvement program	C. Harrington	3-30-54	3-31-54	X		
E. W. O'Rorke to: National Lead Company Fernald, Ohio	Discuss metal quality improvement program	G. W. Wunder	4-1-54	4-2-54	X		
R. J. Bursey to: U. S. Atomic Energy Comm. Arco, Idaho	Discuss problems associated with "J" slug processing, storage, and handling relative to the proposed Hanford 3-X Program	D. G. Reid J. L. Schwennesen	3-3-54	3-4-54	X		

MANAGEMENT

I. Visitors to this Works

P. E. Mills General Electric Company Schenectady, New York	Study organization structure	W. E. Johnson	3-31-54	4-6-54	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105 200-W 221-T, 231 Redox, 221-U 300 303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
RADIOLOGICAL SCIENCES DEPARTMENT							
I. Visitors to this Works							
C. C. Gamertsfelder General Electric - ANP Lockland, Ohio	Discuss radiation hazard problems	H. M. Parker	3-9-54	3-10-54	X		100-F XXX 300-L XXX 700
PLANT AUXILIARY OPERATIONS DEPARTMENT - PLANT PROTECTION SECTION							
I. Visitors to this Works							
G. F. Hamby General Electric - ANP Lockland, Ohio	Security discussion on document control	T. B. Farley	3-23-54	3-26-54	X		100-H XXX 300-L XXX 700
E. S. Robertson General Electric - ANP Lockland, Ohio	Security discussion on document control	T. B. Farley	3-23-54	3-26-54	X		100-H XXX 300-L XXX 700
PLANT AUXILIARY OPERATIONS DEPARTMENT - OPERATIONS ANALYSIS SECTION							
I. Visitors to this Works							
F. P. Vance Phillips Petroleum Company Arco, Idaho Falls, Idaho	Process data control	C. A. Bennett	3-11-54	3-12-54	X		300 XXX 700
R. E. L. Stanford U. S. Atomic Energy Comm. National Lead Company Fernald, Ohio	Statistics discussion	B. F. Butler C. A. Bennett B. E. Leslie	3-2-54	3-5-54	X		700
M. Hudson U. S. Atomic Energy Comm. Washington, D. C.	Discuss precisions of accuracy of SF Accountability	C. A. Bennett	3-30-54	3-31-54	X		700
D. Musser U. S. Atomic Energy Comm. Washington, D. C.	Discuss precisions of accuracy of SF Accountability	C. A. Bennett	3-30-54	3-31-54	X		700

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PURCHASING AND STORES SECTION
PLANT AUXILIARY OPERATIONS DEPARTMENT
SUMMARY MARCH 1954

The workload of the procurement units in March, as measured by the number of requisitions received, increased substantially over prior months. Construction Procurement received 110 more requisitions in March than the 365 received in February and Operations Procurement received 728 more than the 1975 received in February.

A.E.C. has requested General Electric Co. to procure tools and equipment for administration buildings in 100-K Area. Approximately 50 requisitions were received covering this material.

Authorization was received for procurement of horizontal rods for Project CG-558. Requisitions were received for special aluminum extrusions, seamless aluminum tubing and special boron carbide sintered rings. Approval has been obtained from the Commission to negotiate with Carboloy, a Department of General Electric Co., for approximately 200,000 of the sintered rings.

Nickel Sulphate and Potassium Ferrocyanide have been added to the Essential Material list and the initial orders placed.

A contract for the purchase of Bismuth Metal at Omaha, Nebraska was renegotiated resulting in a yearly savings in freight charges of about $1190 based on 1954 consumption.

As a result of the tax reduction from 15 % to 10% on passenger fares, effective April 1, 1954, HAPO travel expenses should be reduced by an estimated $10,000 per year.

During March, shipments of material received increased 33% and receiving reports written increased 43% over the previous 8 month average of 4976 shipments received and 4124 receiving reports written per month.

A physical inventory was taken of furniture stocked in Central Stores and new stock records were prepared.

A scrap sale covering miscellaneous buildings in 100-F Area was approved. This sale will free 100-F Area of all undesireable shacks, hutments and scrap lumber accumulations. Also approved for sale is like material in the 300 Area.

During March material and equipment valued at $50,758.24 were withdrawn from Excess Accounts for use on the project.

Organization and Personnel	2-28-54	3-31-54	Change
Employees on Roll	271	274	+ 3

PURCHASING AND STORES SECTION
ADMINISTRATION UNIT
MARCH 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.

March 1954 Cost Category	Government Agency	Small Business	Big Business	Educational and Other
$0 - $ 24.99	$ 37.00	$ 5,498.28	$ 2,333.40	$ 131.70
$25 - $ 499.99	450.00	159,027.97	81,026.89	355.19
$500 - $ 24,999.00	1,330.00	541,152.30	423,159.77	-
$25,000 - $ Up	-	651,183.62	604,495.00	-
	$ 1,817.00	$1,356,862.17	$1,111,015.06	$ 486.89
Number of Actions	8	1850	944	17

Vendors Contacts 254
Damage Reports Processed 10
Over & Short Reports Processed 1
Accounts Payable Requests Handled. 339
Difference Slips Processed 61
Clearance Slips & Purchase Order Change Approvals. . .317
Material Exception Reports 333
Return Orders Issued 177

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	$ 749,162.77	$ 286,975.77	$ 1,036,138.54
Oregon	202,206.25	63,855.51	266,061.76
Idaho	(152.62)	(7.90)	(160.52)
Other	971,323.11	196,818.23	1,168,141.34
Total	$1,922,539.51	$ 547,641.61	$ 2,470,181.12

PURCHASING AND STORES SECTION
ADMINISTRATION UNIT

	G	D	Total
Requisitions on hand 3-1-54			
Operations Procurement	820	0	820
Construction Procurement	0	200	200
A.E.C. Procurement	220	44	264
Total	1040	244	1284
Requisitions Assigned during March			
Operations Procurement	2703	0	2703
Construction Procurement	0	475	475
A.E.C. Procurement	463	66	529
Total	3166	541	3707
Requisitions Placed during March			
Operations Procurement	2562	0	2562
Construction Procurement	0	486	486
A.E.C. Procurement	403	62	465
Total	2965	548	3513
Requisitions on hand 3-31-54			
Operations Procurement	961	0	961
Construction Procurement	0	189	189
A.E.C. Procurement	280	48	328
Total	1241	237	1478

Purchase Orders Placed	HW	HWC	Total
Operations Procurement	2164	0	2164
Essential Material	44	0	44
Construction Procurement	0	441	441
Local Purchase	41	0	41
Total	2249	441	2690

Value of Orders Placed			
Operations Procurement	$ 748,606.45	$	$ 748,606.45
Essential Material	839,900.84		839,900.84
Construction Procurement		934,805.62	934,805.62
Local Purchase	484.89		484.89
Total	$ 1,588,992.18	$ 934,805.62	$2,523,797.80

Alterations Issued	Increase	Decrease	No Change	Total
HW Operations	60	33	9	102
Essential Material	5	5	0	10
HWC Construction	34	16	8	58
Total	99	54	17	170

Value of Alterations Issued	Increase	Decrease	Total
HW Operations	$ 16,805.53	$ 2,726.51	$ 19,532.04
Essential Material	21,427.80	98,616.20	120,044.00
HWC Construction	13,599.90	3,622.31	17,222.21
Total	$ 51,833.23	$104,965.02	$156,798.25

Government Transfers	OR	ORC
	2	0

Organization and Personnel	2-28-54	3-31-54	Change
Employees on Roll	25	26	[illegible]

PURCHASING AND STORES SECTION
CONSTRUCTION PROCUREMENT UNIT
MARCH, 1954

The Construction Procurement Unit received a copy of the Atomic Energy Commission's letter of March 8, 1954, subject: Procurement of Equipment for Administration Buildings 100-K Area, requesting the General Electric Co., to procure hand tools, special tools, specialized equipment, laboratory equipment, shop benches, shelving, and specialized first aid equipment for the 1702, 1704, 1717, 1720, and the 1614 buildings in the K Area. This material is to be delivered to the Kaiser Engineers' warehouse in the 100-K Area. This month we have received approximately 50 requisitions for this material. This is an unanticipated work load over and above that previously contemplated.

Authorization has been received for the expenditure of $200,000 for the procurement of the horizontal rods included in Project CG-558. Requisitions have been received for the special aluminum extrusions, approximately 36' long, seamless aluminum tubing and the special boron carbide sintered rings. The requisition for the sintered rings has been received and prior approval has been obtained from the Commission to negotiate with Carboloy, A Department of General Electric Co., for them to furnish approximately 200,000 of these special sintered rings.

Work authorization for Project CG-578 Effluent Water Monitoring Improvement has been received. This authorization is for $532,000 which covers design, field engineering, procurement, and construction by plant forces.

The work load of the Unit continues to increase by substantial proportions. Requisitions received during March amounted to 475 as compared to 365 in February. By the use of overtime we have managed to maintain a relatively stable backlog of requisitions on hand. Due to the continuing trend of the work load, we have requested planned overtime for Saturday for 75 per cent of the Unit personnel for the second quarter of calender year 1954.

Organization and Personnel	2-28-54	3-31-54	Change
Employees on Roll	19	19	0

PURCHASING AND STORES SECTION
OPERATIONS PROCUREMENT UNIT
MARCH - 1954

Statistical and General

The comment in last month's report concerning the levelling off of the workload was, apparently, premature, as a very substantial increase was experienced in March. This is shown by the following table:

	Requisitions Received	
October	-	1704
November	-	1817
December	-	1959
January	-	2179
February	-	1975
March	-	2703

We presently have no information as to the future trend, although the level of activity on plant does not seem to adequately justify the incoming requisition load.

The expediting workload has increased an additional 8.6% over February and the open orders on hand stand at 2392.

Essential Materials -

Our present supply of Aluminum caps and cans for the operating units is presently adequate and new design changes are being worked into the outstanding orders. Orders have been placed for the Aluminum dummies required for K Pile.

Two new materials, Nickel Sulphate and Potassium Ferrocyanide, have been added to the Essential Material list and the initial orders placed.

Essential Material Contracts -

1. Aluminum Nitrate Nonahydrate - contract has been drafted providing for an increase in the period and the quantity and submitted to the Law Department for review.

2. Contracts on Aluminum Sulphate and Sodium Dichromate have been written, approved by the Law Department, and sent to the vendor for signature.

3. Tributyl Phosphate -- request for quotations have been sent to prospective vendors.

Organization and Personnel

	2/28/54	3/31/54	Change
Employees on roll	32	31	- 1

PURCHASING AND STORES SECTION
STORES UNIT
MARCH 1954

A study of receiving operations was made during the month and methods were changed to insure more efficient movement of materials.

A total of 6596 shipments of material were received and 5896 receiving reports were written during March. These figures represent an increase of 33% and 43% respectively over the previous 8 month average of 4976 shipments received and 4123 receiving reports written.

A total of 167 construction purchase orders which include "operational spares" are now being held by the Spare Parts Material Records Unit. Approximately 85 shipments of material are being held by Kaiser Engineers pending the establishment of procedure for transfer of this material to General Electric Co. This transfer, when effective, will substantially increase the work load and present both warehousing and material records problems.

A scrap sale covering the old fish hatchery and miscellaneous shacks in the 100-F Area has been approved. This sale will free 100-F Area of all undesirable shacks, hutments and scrap lumber accumulations. Also approved for sale is like material in the 300 Area.

Preparation for taking physical inventories was started with the Excess inventory scheduled for June 2 and 3. No definite date has been set for taking inventory of General Supplies.

A physical inventory was taken of the furniture stocked in Central Stores and new stock records were prepared. This action should improve control of this inventory.

In the Excess Material and Equipment Accounts, the following items are reported:

Disbursement by Store Order	$49,224.06
Transfers to Inventories	1,534.18
Offsite Shipments	185,346.54
Receipts	162,589.62

Organization and Personnel	2-28-54	3-31-54	Change
Employees on Roll	184	187	+3

PURCHASING & STORES SECTION

TRAFFIC UNIT

March, 1954

STATISTICAL AND GENERAL

At the suggestion of the Traffic Unit, a contract for the purchase of Bismuth Metal at Omaha, Nebraska was renegotiated in order to take advantage of a reduced freight rate. The savings in freight charges will amount to approximately $1,190.00 yearly, based on 1954 consumption.

As a result of the passenger fare tax reduction, from 15% to 10%, which becomes effective April 1, it is estimated that HAPO travel expenses will be reduced by approximately $10,000.00 per year.

Effective April 1, the Air Express Division of the Railway Express Agency is adjusting it's class rate structure. The rate per cwt. will be increased $3.20 from the New York and St. Louis areas; $6.40 from the Detroit and Denver areas. A reduction of $3.20 per cwt. will be made from the Los Angeles and San Francisco areas.

As a result of rate reductions obtained from the carriers, there was a total savings in freight charges for the month of March amounting to $3,936.40. This makes a total savings from September 1, 1946 to date of $1,762,839.90.

Savings Report

1. Rate reductions obtained from carriers:

Commodity	Origin	Savings for March, 1954	Savings from 9-1-46 thru February, 1954	Savings from 9-1-46 to date
Aluminum Extrusions, C/L	Edgewater, N.J.	$ 525.84		
Ammonium Silicofluoride	Carteret, N.J.	254.98		
Caustic Potash	Pittsburg, Calif.	450.18		
Limestone	Aragonite, Utah	640.00		
Machinery, T/L	Los Angeles, Cal.	137.94		
Silicate of Soda	Tacoma, Wash.	982.07		
Sulfamic Acid	Grasselli, N.J.	945.39		
		$3,936.40	$1,758,903.50	$1,762,839.90
2. Freight Bill Audit		1,754.31	117,894.34	119,648.65
3. Loss & Damage & Overcharge Claims		547.48	136,892.37	137,439.85
4. Ticket Refund Claims		1,573.83	36,318.83	37,892.66
5. Household Goods Claims		106.33	17,528.80	17,635.13
		$7,918.35	$2,067,537.84	$2,075,456.19

PURCHASING & STORES SECTION
TRAFFIC UNIT
March, 1954

Work Volume Report

Completed Travel Requests		159
Reservations resulting from above:	Rail	82
	Air	210
	Hotel	216
Expense Accounts Checked		292
Household Goods & Automobiles	Movements Arranged Outbound	5
	Insurance Bills Approved	1
	Claims Collected - Number	2
	Claims Collected - Amount	$106.33
Ticket Refund Claims	Filed	19
	Collected - Number	31
	Collected - Amount	$1,573.83
Freight Claims	Filed	5
	Collected - Number	6
	Collected - Amount	$547.48
	Over and Shorts Processed	8
	Damage Reports Processed	8
Freight Bill Audit Savings		$1,754.31
Freight Shipments Traced		34
Quotations	Freight Rates	280
	Routes	239
Bills Approved	Air Freight	2
	Air Express	29
	Carloading	163
	Express	169
	Rail	785
	Truck	287
Carload Shipments	Inbound	809
	Outbound	4

Report of Carloads Received

Commodity	CMS TP&P	NP	UP	TOTAL
Aluminum Extrusions			1	1
Aluminum Sulphate	2	2	3	7
Ammonium Silicofluoride	1			1
Asphalt	1			1
Building Paper		2		2

PURCHASING & STORES SECTION
TRAFFIC UNIT
March, 1954

Commodity	OMSTP&P	NP	UP	TOTAL
Caustic Potash	1		1	2
Caustic Soda	12	12	12	36
Chlorine	1	1	1	3
Coal	118		581	699
Furnace Liners			8	8
Laundry Trays		1		1
Lime		2		2
Limerock	1		1	2
Methyl Isobutyl Ketone	1	1		2
Naphtha, Petroleum	1	1	2	4
Nitric Acid		6	4	10
Oxalic Acid			1	1
Pallets		2		2
Partitions			1	1
Phosphoric Acid	1	1	1	3
Salt	1		1	2
Silicate of Soda	3	2	2	7
Soda Ash	2	1		3
Sodium Nitrate		1		1
Steel Containers		1		1
Sulphuric Acid	1	1		2
Sulfamic Acid	1			1
Transformers			2	2
Transformer Parts	2			2
Total	150	37	622	809

Organization & Personnel	2-28-54	3-31-54	Change
	9	9	0

TRANSPORTATION SECTION
MONTHLY REPORT
March 1954

GENERAL

Transportation Section personnel forces decreased from 488 to 485 by three new hires, two transfers in, two terminations, four transfers out, and two deactivations - personal illness.

Completed Transportation Section Budgets for FY 1955 and FY 1956. The Operating Budget totals $4,234,885 for FY 1955 and $4,341,269 for FY 1956 as compared to the FY 1954 Midyear Review of $4,146,368. The Equipment Budget totals $1,232,525 for FY 1955 and $913,825 for FY 1956 as compared to the FY 1954 Midyear Review of $1,313,390.

Bids were opened on March 16 for the 60 replacement sedans requisitioned on October 21, 1953. These units will be Chevrolets and delivery has been promised for the first two weeks in May.

Thirty-three units of heavy mobile equipment being procured by the Atomic Energy Commission for upgrading purposes were unloaded on March 16. Request for Appropriation No. 54-S-37 has been submitted to the A & B Committee to be considered on April 12.

The Purchasing and Stores Section has been requested to defer procurement of repair parts for Pontiac equipment pending the A & B Committee meeting of April 12 at which time Request for Appropriation 54-S-40 for the upgrading of 50 sedans is to be considered.

Construction of the Consolidated Transportation Facility progressed from 25% on February 19 to 35% on March 25 compared to the scheduled 40%. The five to six per cent loss occasioned by a carpenter strike in January and inclement weather plus a delay in the receipt of steel has not as yet been regained. Approximately 68 craftsmen are currently engaged in this activity.

Revised the monthly physical inventory of fuels to coincide with financial closing dates and provide a more expedient means for reconciling physical quantities with general ledger balances.

Established a procedure for charging premium rates to customers for work performed at their request on an overtime basis. This policy will normally be applied to work order charges of 16 hours or more.

Increased the IME rate of the Equipment Maintenance Unit from 85% to 95% effective with March business. This increase has been largely occasioned by the loss incurred in excessing repair parts. The Equipment Maintenance Unit was underliquidated by $25,833 at the end of February.

Effective March 22 the 700 Area Motor Pool Attendants were assigned to Shift Schedule VI - 67 covering the #2 and #3 Shifts with a fifteen minute overlap between shifts and no scheduled lunch period. These two employees were formerly assigned to Shift Schedule VI - 2 which provided an overlap of two hours and forty-five minutes with a forty-five minute lunch period.

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Transportation Section

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RAILROAD ACTIVITIES

Commercial cars handled during March decreased 10.58% over February as receipts of coal and construction materials were somewhat lower. The following recapitulation indicates the distribution of commercial cars handled:

Carload Movements -	Loads In	Empties In	Loads Out	Empties Out
General Electric Company	695	18	19	723
A.E.C.	38	0	0	40
A.E.C. - Kaiser Engineers	60	0	0	71
Blaw-Knox	21	0	0	27
Buchanan Co., Inc.	1	0	0	1
Bumstead & Woolford	3	0	0	2
Gaasland Construction Co.	3	0	0	2
Grove, Shepard, Wilson, & Kruge	3	0	0	3
L. H. Hoffman Co.	4	0	0	2
Kaiser Engineers	74	1	1	85
D. V. Libby & Co.	4	0	0	4
Soule Steel Co.	1	0	0	2
Sound Construction Co.	3	0	0	2
Thorne & Marble	2	0	0	2
U. S. Army	9	0	0	8
U. S. Geological Survey	2	0	0	0
	923	19	20	974

Process service continues to be severely impeded by restrictive operating conditions from uncontrolled contamination. Great difficulty has been experienced in keeping a sufficient number of locomotives and cask cars available for service. In order to better cope with the situation the work schedule for train crews was revised effective March 15 to provide around-the-clock service, Monday through Friday. This was accomplished without additional manpower. Week-end service is still being rendered on an overtime basis as requested and required 788 man-hours during March as actual cars handled increased 54.1% over February. Process cars totaled 188 exceeding the previous recorded highs of 181 in October and 182 in July 1953.

Total car movements including process service totaled 2,482 in March compared with 2,624 in February and 2,545 in January.

Installation of asbestos shingles on three permanent buildings at Riverland was completed on March 24 by Minor Construction forces at a cost of $3,120.42.

Beacon ray flasher type lights have been installed on all four 120-ton locomotives.

Well car 10B-3645 was brought to Riverland on March 3 for annual inspection and maintenance services. This is the second car which has been modified to accommodate a third cask.

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Transportation Section

Track Maintenance forces performed a motor car and trailer tour of railroad trackage with Radiation Monitoring personnel to appraise contamination of the right-of-way.

Completed Work Order C-20679 at a total expenditure of $3,369.87 compared to the maximum authorized cost of $3,500. This work order covered accident damage repairs connected with the runaway and derailment of four cement hopper cars on June 2, 1953. The total expenditure is to be backcharged to the construction contractor by the Atomic Energy Commission.

AUTOMOTIVE ACTIVITIES

The Plant Bus System transported approximately 12% fewer passengers in March than in February primarily because of more favorable weather conditions and a lesser number of working days. The following statistics indicate the magnitude of service rendered:

Passenger volume	139,255
Revenue - bus fares	$ 6,962.77
Earnings - transit advertising (February)	$ 97.86
Bus trips	6,304
Bus miles - passenger carrying	179,885
Passenger miles	4,432.697

Bus service for the 100-K Area has been extended within the area. Passenger volume is increasing steadily and extreme caution is necessitated by the heavy construction traffic and the temporary nature of the roads.

The Richland Bus System transported 14.36% fewer passengers in March than in February. Decreased passenger volume resulted from more favorable weather conditions and a lesser number of working days. The following statistics indicate the volume of service rendered:

Total passengers including transfers	13,136
Revenue - bus fares	$ 808.34
Earnings - transit advertising (February)	$ 4.45
Bus trips	1,104
Bus miles - passenger carrying	5,851
Passenger miles	30,360

Off-Plant chauffeured automobile trips (Company business and/or official visitors) totaled 129 which were rendered to the following locations as indicated:

Benton City, Washington	4
Hinkle, Oregon	14
Kennewick, Washington	14
McNary Dam, Washington	1
Pasco, Washington	64
Pendleton, Oregon	13
Prosser, Washington	1
Richland "Y", Washington	1
Sunnyside, Washington	5
Walla Walla, Washington	8
Yakima, Washington	4

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Transportation Section

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	37,935	26,470	9,100	1,957	279
Received during month	87,421	12,900	18,300	3,510	0
Dispensed during month	80,966	16,115	22,400	4,156	22
Stock at end of month	44,390	23,255	5,000	1,311	257

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	147
Class B Inspections and Lubrications	1,139
Semi-monthly inspections - buses	110
Weekly inspections - fuel trucks and off-Plant vehicles	56
Other routine maintenance repairs and service calls	2,040
Accident repairs and paint jobs	34
Tire repairs	561
Wash jobs	535
	4,693

The following tabulation indicates the Plantwide usage of automotive equipment:

Code	Type	No. of Units	Total Mileage
1A	Sedans	337	415,556
1B	Buses	98	194,210
1C	Pickup Trucks	460	191,738
1D	Panel, Carryall, Station Wagons	153	107,877
1E	Armored Cars	3	101
1G	Jeeps	2	270
68 Series	Trucks	207	67,323
		1,260	977,075

LABOR ACTIVITIES

Completed excavation of a new burial pit in the 300 Area which was begun on February 22 and required the movement of approximately 6,000 cubic yards of material.

Maintenance of primary roads required 683 man-hours (includes 112 man-hours for weed control); secondary roads required 23 man-hours; walkways, parking lots, and related ground maintenance in the Manufacturing Areas required 690 man-hours.

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Transportation Section

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	38.18	0
Used during month	67.40	0
Stock at end of month	54.69	79.97

The following tabulation indicates the volume of road aggregate materials handled by Road Maintenance personnel:

	3/4" to 0 Pre-mix Tons	¼" to 0 Pre-mix Tons	5/8" Chips Cu.Yd.	1/4" Chips Cu.Yd.	3/4" Crushed Rock Cu.Yd.
Stock at start of month	232	0	3,317	4,745	2,042
Made during month	813	599	0	0	0
Used during month	522	125	20	405	588
Stock at end of month	523	474	3,297	4,340	1,454

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April 6, 1954

ELECTRICAL DISTRIBUTION AND TELEPHONE SECTION

MONTHLY REPORT

March, 1954

GENERAL

The Section total work force was one hundred and sixty-eight (168) as of March 31, 1954, a decrease of one from last month.

A new Plant electrical peak was established during the month, exceeding the previous billing demand by 948 KW.

Date	Demand KW	February Comparative KW Demand
3-24-54 (10:30 AM-11:00 AM)	117,243	116,295

Position descriptions for all exempt employees of this Section were completed and delivered to Salary Administration on March 15.

C. N. Ganse, telephone foreman, died of a heart attack on March 19. A replacement has not been selected to date.

ELECTRICAL DISTRIBUTION UNIT

Maintenance and Operation

Detailed inspection of the 230 KV loop was essentially completed during the month except for the by-pass switches to the 100-B, D and F Areas. Inspection of these switches requires an extended critical "W" power condition on the loop and this will be accomplished as soon as outages can be arranged.

Modernization work on three 230 KV breakers scheduled for completion during March was not accomplished as the necessary power outages could not be arranged. Work will proceed as soon as an extended critical "W" power condition can be secured.

One of the telemetering transmitters located at the Midway Substation failed and was returned for repairs. The spare which was to be installed temporarily to subtract the 100-K test power was instead substituted at Midway.

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ELECTRICAL DISTRIBUTION

Maintenance and Operation (Continued)

The test power contract between the Bonneville Power Administration and the Atomic Energy Commission covering test of 100-K Area became effective on Monday, March 22.

On March 28, at 3:05 PM, one of the 13.8 KV underground circuits to the 183-C Building failed and load was transferred to the other circuit with no loss to production. The faulted conductor and the other two phase conductors, which were burned, were pulled and replaced. Damage to the cable probably occurred during installation two years ago.

System Expansion and Planning

The No. 2 3750 KVA 115/2.3 KV transformer supplying power to the 300 Area was energized at 2:50 PM on March 2.

The primary switch to the 328 Building, Project CA-514, has been set in position and one cable connected. Completion will probably be in May when a full day building outage can be secured.

Work was begun on the terminal of the newly installed 13.8 KV cables at the 251 Substation. These cables will provide the double circuit lines to Purex.

TELEPHONE UNIT

Maintenance and Operation

Rewired the Minor Construction office building at White Bluffs and replaced unit type protectors and drop wires with multiple type to improve service.

Located and cleared moisture faults in trunk cables between Richland and the BY Station and BY and White Bluffs. Installed 12 lead repair sleeves in these cables at sheath openings made to locate moisture faults. The completion of the gas pressuring program for trunk cables will greatly reduce faults and subsequent repair work.

Completed sixty percent of the service and repair work on the 202-S Building private automatic telephone exchange.

System Expansion and Planning

The construction contractor completed installation of the Richland-North Richland tie cable and Unit forces tested and tied this into the terminal exchanges. Installation of equipment for approximately 200 additional Richland subscribers will begin on April 3.

Nine additional Richland-North Richland trunk circuits were installed bringing the inter-connecting capacity to 48 simultaneous conversations.

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TELEPHONE UNIT

System Expansion and Planning (Continued)

Prepared official exchange drawings for cable racking and splicing arrangements, underground cable tie-in requirements, outlet and conduit requirements, and a physical mock-up of the manual switchboard face layout.

Plans were completed for a building which will be erected by the 700 Area maintenance forces to house the Civil Defense Control Center emergency generator. This completes all planned work by the Telephone Unit on Civil Defense projects.

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	6088	989	28	250	3996
N. Richland	365	217	180	37	420
Process Areas	23	1852	362	-	1690
Total	6476	3058	570	287	6106

Richland Exchange four-party service:

	March 20, 1954	February 20, 1954
Number of Subscribers	1234	1209
Number of Vacant Sides	150	147

Seventy-five (75) new requests for telephone service in Richland were received, making the backlog four hundred and thirty-seven (437).

Service orders during the month were as follows:

Residential and commercial	268
Official (permanent)	214
Official (temporary)	59
Total	541.

RB Britton

ELECTRICAL DISTRIBUTION
AND TELEPHONE SECTION

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POWER STATISTICS
ELECTRICAL DISTRIBUTION AND TELEPHONE SECTION
FOR MONTH ENDING MARCH 31, 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)	21730	25830	42400	43400	76.3	80.0
A-4 Out (100-D)	15180	15930	24800	24400	91.1	87.7
A-5 Out (100-H)	9130	9390	16200	14700	83.9	85.9
A-6 Out (100-F)	7070	8990	12700	14400	82.8	83.9
A-8 Out (200 Area)	5560	6080	9500	9500	87.1	86.0
TOTAL OUT	58670	66220	105600**	106400**	82.7	83.7
MIDWAY IN	59130	66803	102400*	104000*	85.9	86.3
115 KV System						
B1-S4 Out (N. Rich.)	2371	2448	5126	4608	68.8	71.4
B1-S5	108	108	518	432	31.0	33.6
Richland	10724	11278	25920*	22080*	61.5	68.6
BB3-S4 Out (300 Area)	1712	2032	3520	3520	72.4	77.6
TOTAL OUT	14915	15866	35084**	30640**	63.2	69.6
Benton In	15220	16140	39600*	41600*	57.2	52.1
So. Richland In	100	-	-	-	-	-
TOTAL IN	15320	16140	39600	41600	57.6	52.1
66 KV System						
B9-S11 Out (100-K)	1578	1776	3040	3120	77.2	76.5
B7-S10 Out (W. Bluffs)	546	576	1553	1418	52.3	54.6
Hanford Out	80	78	300**	300**	39.7	34.9
TOTAL OUT	2204	2430	4893**	4838**	67.0	67.5
HANFORD IN	2238	2713(1)	5600*	11000*(2)	59.5	33.1
Project Total						
230 KV Out	58670	66220	105600**	106400**	82.7	83.7
115 KV Out	14915	15866	35084**	30640**	63.2	69.6
66 KV Out	2204	2430	4893**	4838**	67.0	67.5
TOTAL OUT	75789	84516	145577**	141878**	77.5	80.1
230 KV In	59130	66803	102400*	104000*	85.9	86.3
115 KV In	15320	16140	39600**	41600**	57.6	52.1
66 KV In	2238	2713(1)	5600**	11000**(2)	59.5	33.1
TOTAL IN	76688	85656(1)	147600	156600(2)	77.3	73.5

* Denotes Coincidental Demand
** Denotes Non-Coincidental Demand
(1) Includes 244 MWH of "K" Test Power
(2) Includes approx. 5500 KW of "K" Test Demand

Average Power Factor-230 KV system 90.6
Average Power Factor-115 KV system 92.1
Average Power Factor- 66 KV system 96.4

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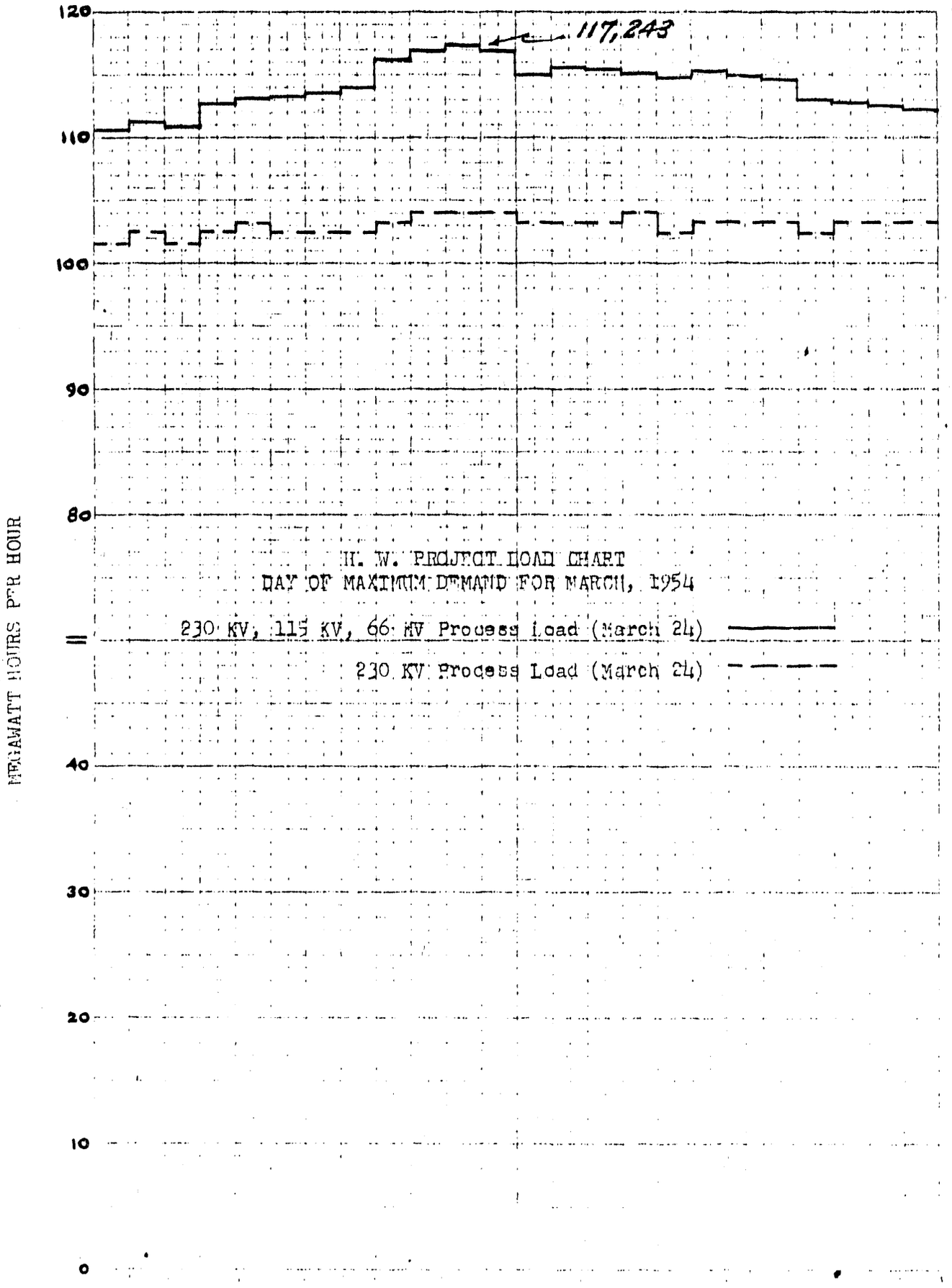

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PLANT AUXILIARY OPERATIONS DEPARTMENT
OPERATIONS ANALYSIS SECTION

MONTHLY REPORT - MARCH, 1954

Personnel Statistics

Following is the month end summary of personnel:

Operations Analysis Section

Unit	As of 2-28-54			As of 3-31-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
General	1	1	2	1	1	2	0	0	0
Applied Mathematics	22	5	27	22	5	27	0	0	0
Computing	6	47	53	6	47	53	0	0	0
Graphics	1	10	11	1	11	12	0	+1	+1
Procedures	12	3	15	12	3	15	0	0	0
TOTAL	42	66	108	42	67	109	0	+1	+1

Applied Mathematics Unit

	As of 2-28-54			As of 3-31-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	3	4	1	3	4	0	0	0
Administrative Statistics	5	0	5	5	0	5	0	0	0
Technical Statistics	5	0	5	5	0	5	0	0	0
Mathematical Analysis	3	0	3	3	0	3	0	0	0
Numerical Analysis	8	2	10	8	2	10	0	0	0
TOTAL	22	5	27	22	5	27	0	0	0

F. P. Vance of Phillips Petroleum Company, Idaho Falls, Idaho visited with members of the unit on March 11, 12, and 15 to confer on problems in connection with chemical processes.

Representatives of the S. F. Accountability Section, Washington Operations Office conferred with members of the unit on March 31.

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Computing Unit

	As of 2-28-54			As of 3-31-54			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	20	21	1	21	22	0	+1	+1
Machine Processing	3	21	24	3	20	23	0	-1	-1
TOTAL	6	47	53	6	47	53	0	0	0

One key punch operator was hired and one machine operator terminated during the month.

Graphics Unit

	As of 2-28-54			As of 3-31-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	1	2	1	2	3	0	+1	+1
Illustrators	0	7	7	0	7	7	0	0	0
Graphic Designers	0	2	2	0	2	2	0	0	0
TOTAL	1	10	11	1	11	12	0	+1	+1

One general clerk and one graphic illustrator were added to the Unit during the month. One graphic illustrator was placed on a pregnancy leave.

Procedures Unit

	As of 2-28-54			As of 3-31-54			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	11	0	11	11	0	11	0	0	0
TOTAL	12	3	15	12	3	15	0	0	0

FOR THE MANUFACTURING DEPARTMENT

After sufficient data had been collected from the reactivity tests of P-10 slugs, the sampling plan explained in document HW-30882, "Sampling Plan for Reactivity Tests on P-10 Slugs Effective February 1, 1954", was re-evaluated. It was found that the variation of the quality of the material within a heat was of such a nature as to make the existing plan no longer applicable. A new plan was derived and furnished to the persons responsible for the actual testing of the pieces (HW-31118, "Sampling Plan for Reactivity Tests on P-10 Slugs Effective March 10, 1954", to H. A. Fowler). An enlarged chart was furnished to the test pile operators in order to help facilitate speed and accuracy of acceptance or rejection decisions.

Calculations similar to those made for the reorificing of C and F Reactors have been completed for H and D reactors. Lists of orifice diameters and gauge ranges were prepared to assist operations in setting the panellit gauges at these reactors. Full utilization was made of the experience gained in the earlier reorificing calculations, and there are strong indications that savings of equivalent magnitude will again be realized. Since B-reactor was reorificed without the aid of these calculations, there remains only to complete the calculations for DR-reactor to bring this program to an end.

An attempt is being made to correlate the rupture rate of eight-inch slugs in C-reactor with tube exposure and power. Individual tube flow data of the type routinely processed here are being combined with certain temperature maps to yield two sets of averages, one corresponding to pile conditions before the recent reorificing, the other to conditions after the reorificing. From this calculated data and information about individual ruptures since February, 1953, certain ratios will be developed which it is hoped will show the relations between rupture rate and the exposure and power of the tubes in which ruptures occur.

Further statistical services were extended to the Process Sub-Section to aid in the project of placing precision statements on S. F. material transfer and inventory figures. The work done this month included calculation of: 1) the precision of feed storage figures; 2) the precision of tank transfer figures when the calibration curve, specific gravity determination, monometer readings, and weight/volume determinations are all subject to error; and 3) the precision of an "F" factor determined from the ratio of radio-assay to X-ray measurements, both of which are subject to independent measurement errors but have a common sampling error.

Routine computational work for the Manufacturing Department consisted of a D-reactor panellit gauge report and operating limit calculations for D-reactor.

A model of the Redox Plant is being constructed by Graphics for the Separations Section. Twenty-four working drawings were prepared and issued to craft personnel for fabrication of required structure units. Construction of this portion of the assignment is approximately 65% complete.

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General specifications for this assignment are as follows: Portions of the North wall and galleries will be open so that the cells and operating equipment may be seen. Cover blocks will be eliminated with one exception. One cell will be completely detailed with jumpers, piping and a removable cell block. The silo will be cross-sectioned or open in such a manner that the columns and equipment are shown. The entire south portion of the building, including various galleries will be detailed. Railroad tracks and tunnel are to be included.

The above assignment also includes preparation of a simplified process flow chart which will be keyed to the model as an aid in following the separations process thru the building.

Additional work completed by Graphics included posting current data to the Manufacturing Department Control Charts and preparation of photo copy for a formal report, document HW-30779.

For the Manufacturing Department 3 routine IBM reports and 17 non-routine jobs were completed for a total of 20 IBM service requests.

FOR THE ENGINEERING DEPARTMENT

The Metal Quality Report covering the various aspects of metal quality for metal cost at both Mallinckrodt Chemical Works and the Feed Materials Production Center is forthcoming. Computation on the December and January Mallinckrodt data and the November, December, and January FMPC data were completed. In this report several suggested methods of presenting the data in concise form are described and illustrated with examples. Through the issuance of this report it is hoped that information may be obtained as to what data is desired by whom and in what form. All available data on ruptured slugs over the period of time covered by this report will be included.

A number of thorium billets, including both virgin and recast material, have been analyzed for impurity content. On the basis of these data, tolerance limits for each impurity were established. (Secret Rough Draft: March 25, 1954 to Shirley Gudesen, "Thorium Billets Impurities".)

For purposes of comparison with some test material, the Pile Fuels Section of the Engineering Department was furnished with the average amounts of the impurities present in metal cast by the Feed Materials Production Center during the months of November and December, 1953 and January, 1954. Those impurities covered were chlorine, carbon, silica, nitrogen, chromium, iron, magnesium, nickel, and manganese. Average values for top and bottom density analysis were also given.

The exposure and power of thirteen tubes of a J-Q loading in H-reactor will be calculated on a routine basis starting in April. Daily temperature maps of these and adjacent tubes, flow information, and data on gross pile exposure will be received, from which it will be possible to calculate individual tube powers and exposures. These calculations will afford a quick and

economical means for analyzing the exposure characteristics of the new loading and will provide valuable experience in analyzing more extensive loadings of this type in the future.

Preliminary work on the general problem of determining optimum reactor parameters has been completed. This work is the most comprehensive attempt to date at relating such parameters as slug size, lattice size, and slug composition with the physically observable buckling. The problem at present is to determine certain unknown or undetermined quantities in the theoretical expression for this relation. This is being done by fitting a large number of curves to experimentally determined points. The results to date are very promising. While the presently available computing equipment has been adequate in obtaining these results, the continued success of this type of approach may soon require much larger and faster digital equipment, or possibly analog equipment.

To assist the exponential pile group in the design and operation of a new test pile, a number of harmonic corrections to proposed flux measurements were computed. The new pile is designed to measure the buckling of a P-10 lattice. The calculations were similar in form to earlier harmonic correction calculations for the standard lattice, but somewhat complicated by the fact that the new test pile is separated into two regions, the lower containing graphite only and the upper the lattice being investigated. Two lattice sizes were studied, each for a number of pile sizes, source positions, and flux measurement positions.

At present the extraneous sources for the exponential piles consist of four polonium-beryllium (essentially point) fast sources. However, in the mathematical treatment, they are assumed to emit thermal neutrons in order to facilitate solution of the experimental-computational problem of finding diffusion lengths. In order to obtain more accurate results and to be able to make measurements closer to the source plane, this group has been requested to work out the mathematical theory with the assumption of fast sources. Thus far two independent attacks have been formulated. Further work should reveal whether either of these could serve as a basis for computation.

Work on the theoretical determination of pressure and water quality in a process tube is continuing. Calculations based on experiments conducted by the Heat Transfer group were carried out, and satisfactory agreement between observed and calculated values was realized. The calculations are still limited to the case of constant heat generation; however, the results obtained give strong indication that the formulation used is correct, particularly with respect to regions of boiling. To further confirm this fact, two additional sets of experimental data will be checked before proceeding with problems in variable heat generation and increased pressures and flows. Because of the increased pressure range under consideration, a number of approximations in the calculation had to be reformulated to keep the approximating error under control.

The additional numerical work on the fast effect in hollow slugs has been completed. Fifteen cases, representing fifteen different combinations of slug and annulus size, were computed, using different cross-section values from those used in the original calculations. A report on this analysis is presently being written by a member of the Advanced Technology Sub-Section, and may be submitted to the Journal of Reactor Science and Technology.

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Work on the runaway and melt problem has been completed and a rough draft prepared for inclusion by the customer in a joint report. The theory seems to agree quite well with the experimental results obtained. It is planned to submit the combined report to the Journal of Reactor Science and Technology.

Further work is being done for the Theoretical Physics group on the Boltzmann equation for thermal neutron (directional) flux. At present, plane and cylindrical geometries are being considered. The approach being used is similar to the so-called spherical harmonics method, the differences being that Fourier series replace the series of spherical harmonics and that two different series are assumed for directions toward and away from the boundary. Results have been obtained for the plane case. These are being compared with corresponding results from the spherical harmonics method. The comparison, which involves a variational integral, seems to indicate that the new method is superior, at least for the cases thus far studied.

Theoretical work on the slowing of neutrons in mixtures is being done for the Advanced Technology Sub-Section. This consists principally of reviewing, annotating, and extending an article by G. Placgek in the Physical Review 69, 1946. Since the results of this investigation should be useful in a wide variety of instances concerning water-cooled reactors, a report is being prepared and will be issued presently.

The fitting of a theoretical formula to a set of observed points has been completed. The formula, which contains exponential and error functions and a number of undetermined parameters, was established by the Theoretical Physics group in connection with their work. By means of a trial and error method, a very satisfactory fit of the expression was made, using first two parameters and then four. The fit confirmed the theoretical basis for the formulation.

A sampling plan was formulated which will facilitate the investigation of the distribution of fission products in irradiated slugs. The results of this experiment will be used to set up an extensive test to determine the optimum size and shape of a slug.

Chemical diffusion with connection in two phases is being studied for the Applied Research Sub-Section. This is an example of a time dependent boundary value problem which is at least slightly beyond those treated in any of the standard texts or reference books. After considerable effort and many unsuccessful approaches, a series solution to the equation was finally achieved. The coefficients of this series are obtained by imposing boundary and interface conditions. It is planned to submit the solution of this problem to a technical journal.

At the request of the P-10 Process Technology Unit, calculations relating to the P-10 separation process were performed. A number of hypothetical models were investigated in which such variables as length of column and concentration of feed appeared as parameters. The calculations involved the solution of a transcendental equation containing the hyperbolic tangent. The solutions were carried out by trial and error methods on the card-programmed-calculator.

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Final results were reported on the composition of gases sampled from different points in a gas line in the 108-B building. The data had been collected to determine whether or not sampling from more than one point was necessary. (Unclassified letter, March 2, 1954 and document HW-31177 to R. D. Tillson, "Precision of Mass Spectrometer and Related Problems".)

Additional computational work on the galvanic corrosion experiments was carried out. The calculations and plotting of data were performed as before; however, a revision was made to allow for the possibility of using a given cell for a new experiment at any time. This revision will facilitate the routine processing of this data.

Purex and Redox extraction scrub studies have been conducted with both plant and laboratory prepared dissolver solutions. Decontamination factors of the various dissolver solutions were estimated. Statistical analyses were conducted to estimate the precision with which the decontamination factors were determined. Comparisons were made between the decontamination of the experimental laboratory solutions and the plant solutions currently used in the scrub columns. (Letter to W. W. Schulz, "Precision of Analyses of Laboratory Scrub Solutions for Redox and Purex", March 12, 1954.)

Using the data on Pu^{240} content and grams Pu/ton U given in HW-26584, a straight line and a quadratic were fitted using least square techniques. The quadratic term was not significant and therefore the straight line fit was reported to the Plant Processes Unit.

A nomograph was prepared which, given λ and t, estimates quickly the value of y in the equation $y = e^{-\lambda t}$. This nomograph enables one to estimate the decay factor y for values of the decay constant λ and the time of decay t within a given range.

An experiment was designed to determine the best type of tube bundle to use in Redox. Since tube bundles are rather expensive, a very limited number were available for experimental purposes and the maximum amount of information was desired. It is desired to determine which of two types of welding filler material and whether heat treatment or nonheat treatment after welding result in longer service. (Letter to H. E. Hanthorn, "Tube Bundle Experiment", March 16, 1954.)

A further analysis of attitude survey data for the Pile Technology Sub-Section has been completed. Results pertinent to the attitudes of employees in separate personnel classes within the Sub-Section and a summary of comments written on the questionnaires were supplied. (Report: "Attitude Survey Results -- Pile Technology Sub-Section", to R. B. Richards.) A similar analysis for the Design Section is nearing completion.

The conversion of the Classified File from a manual to a punched card system is continuing. The establishment of the basic accountability records as punched cards for over 130,000 classified copies is complete. The key punching of detail cards is continuing with approximately 300,000 copy cards now punched. The background training of Computing and Classified Files supervision and operating personnel in the punched card accounting system is in process.

A system of recording activity and controlling the holding records of all classified copies processed through the Classified Files was proposed and accepted. The basis of the system was a parallel, manual and machine operation. The installation of this system has begun and will be completed for individual holdings by April 29, 1954 (to create required inventory lists), as well as for Classified File HW, HEW, 3-- and 7-- prefix group of documents held.

Two panels to be used in the classified files procedure were wired. One panel is a tabulator panel for listing missing documents. The other is a statistical sorter panel for breaking a file of document cards into groups for the purposes of coding. The latter panel is complicated by the large number of different characters punched in the document card, and the large number of combinations to be distinguished. The problem of wiring this panel yielded nicely to a Boolean algebra analysis.

Also in connection with the classified files project, statistical studies are in progress to determine how well key punching is proceeding according to the proposed rate and finish date. Also under consideration is the determination of the effect of premarking the card in an effort to speed up key punching.

Assistance was given to the Materials and Inspection Unit of the Engineering Department in developing a two part inspection report to eliminate a double typing operation.

Routine computational work for the Engineering Department consisted of C-reactor hotspot calculations for January and February, C-reactor lattice conductance calculations, Special Request exposure calculations for March, and Group Nine metal studies calculations for January.

Graphics continued working on the Purex Section Model completing the Hot Pipe Trench work during the month. Construction of equipment and piping for the Operating Gallery and Sample Gallery is to start up immediately. In a recent meeting with representatives of the Design Section there was some discussion of a possibility that Blaw-Knox would have the model moved to the Area for two weeks. This will not stop construction on the Operating Gallery as the floor and walls are removable. Although the model is only 65% complete it has been used considerably in design and construction discussions.

Graphics services for Fuel Technology included mounting and touch-up of eighteen photos and preparation of photo-copy for document HW-31077 titled "A Report on Slug Rupture"; preparation of photo-copy for document HW-30923 - Technical Activities Report; completion of four graphs for document HW-30855 titled "In-Pile Behavior of Anodized Slugs"; completion of charts and preparation of photo-copy for document HW-30609 titled "Coating Apparatus and Typical Photos of Slug Coating"; and mounting photos for document HW-31315 titled "Formation of UAl_3 at Brake in Ni Diffusion Barrier".

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Graphics work for Applied Research included preparation of graphs for document HW-30898 titled "Flame Photometric Determination of Cadium in Cadium-Lead Alloys"; preparation of photo-copy for document HW-30896 and HW-31031 titled "Monthly Technical Report"; and coloring a number of floor plan plates showing location of areas covered by alarm indicators.

Graphics work for Pile Technology included completion of two charts for document HW-30907 and preparation of photo-copy for document HW-30894 titled "Cross Sections of Process Tubes".

Fifteen non-routine IBM jobs were completed for the Engineering Department.

FOR THE PLANT AUXILIARY OPERATIONS DEPARTMENT

Conclusions reached from further study under the Operations Research Program on Inventory Control were assembled for the second progress report. This report will recommend the discontinuance of the present six-part invoice; reduce present purchase requisition from four to two copies; move purchasing, accounts payable, and inventory accounting personnel to the Central Stores Building; establish a central file and mail function in the Central Stores Building; re-organize the flow of paper between the functions to be housed in the Central Stores Building; transfer the responsibility for marking "HOO" on sensitive inventory items from receiving personnel to warehousemen; and, refer all inquiries regarding materials from Receiving to Expediting.

Stationary and swivel type racks were designed to be used on the four wheel floor trucks used in receiving at Central Stores. The racks will facilitate the handling of pipe and will reduce the safety hazards in handling this material.

Work was continued on the method of reducing the proportion of incompleted telephone calls in the currently overloaded Richland exchange. Regarding recommendations, accepted by the Telephone Unit, represent a potential reduction of 200,000 lost calls a year. Business and official subscribers would receive the majority of this improvement.

Most of the field work necessary to obtain information for the Electrical Substation Operations project has been completed. Data on costs and effects under various alternative situations has been obtained or is currently being developed. A formal report on this project is now being prepared. This report will present quantitative estimates of most of the major factors involved and a quantitative discussion of other relevant material.

Twenty-two new or revised IBM internal operating procedures were prepared for the Computing Unit by the Procedures Unit. Four panels were completed and delivered to the Computing Unit for the conversion from IBM type 403 to IBM type 407 accounting machine. A four hour training course on the IBM type 407 Accounting Machine was conducted for supervisors in the Computing Unit.

A procedures wagon was designed to be used wiring panels for IBM machines. This wagon will facilitate panel wiring in that needed items will be conveniently located and readily available.

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Further analysis of attitude survey data for the Transportation and Plant Protection Sections has been completed. These further studies present more detailed information than could be included in the main report to management. The attitudes of employees in separate personnel classes within units are analyzed, and a summary of comments written on the questionnaires is prepared for these additional reports. (Reports: "Attitude Survey Results -- Transportation Section", to M. F. Rice, and "Attitude Survey Results -- Plant Protection Section", to T. B. Pugh.)

Graphics services were furnished in general preparatory work and completion of special assignments for a meeting between HAPO officials and the Detroit Edison Board of Directors.

Graphics work on Operations Research programs included preparation of flow charts and references for Porgress Report # 2 on Inventory Control; completion of charts and drawings for Progress Report # 1 on Telephone Operations; and completion of one master plate for the File Operations study.

Other graphics work for the department included preparation of visual aids to be used in a security meeting; posting of current data to the Monthly Accident Statistics Report; and layout of seven organization charts for the department manager.

For the Plant Auxiliary Operations Department, 14 routine IBM machine reports and 1 non-routine job were completed for a total of 15 service requests.

FOR THE RADIOLOGICAL SCIENCES DEPARTMENT

A thorough investigation of the existing methods of compiling, analyzing, and reporting personnel exposure data is being made for the Radiological Standards and Records Section. This Section is responsible for maintaining complete and accurate records of personnel exposure as indicated by the various personnel meters -- film badges, pencils, finger rings, hand and show counters, and bio-assay tests. The existing procedures for accomplishing this are detailed and complex; the volume of data and records involved is prodigious. The purpose of the present analysis is to determine whether or not a significant savings could be realized by using IBM machine methods, in all or part of the present procedure.

The final tabulations of the isotope build-up and decay calculations for the Radiological Engineering Section have been completed. These tabulations show the activity of a large number of fission product isotopes for irradiation periods of one hour to 500 days, and for decay times of one minute to ten days. The table will be useful in evaluating the radioactivity hazards in and around a reactor, and in designing reactor components to reduce these hazards. The tabulations were made on the new alphabetic tabulator in a form suitable for extensive reproduction. Copies of the table will be available at the plant library.

At the request of the Radiological Engineering Section, a theoretical method is being devised for predicting the concentration of radioactive poisons at points

in the Columbia River downstream from the effluent duct of a retention basin. An extremely idealized model of the problem has been set up, using the theory of diffusion in turbulent flow. The solution of this problem appears in sight. Efforts will next be directed towards determining the empirical constants which characterize the river flow, after which a check of predictions against known measurable quantities will be made.

Work is progressing on the problem of the measurement of turbulent diffusion in the atmosphere using a wind component meter. The theory, which follows the work of the British school (Lamb, Sutton, Taylor, Batchelor), is undoubtedly well-based. However, certain computational problems have arisen, and an attempt is being made to simplify these through the use of revised statistical techniques.

The analysis of 1953 weather data with regard to a problem in the probability of atmospheric contamination has been completed. This analysis involved a three-way frequency distribution of wind speed, wind direction, and vertical temperature gradient as recorded at the area weather tower, and will be used, along with a similar analysis for 1951 and 1952, in predicting weather trends and their possible bearing on atmospheric contamination.

Several experiments have been conducted by the Biology Section on pigs and sheep to determine the effects of feeding radioactive materials on the various constituents of the blood. Seasonal, age, and time effects will be analyzed. The results of these experiments will supply information pertinent to radiological health standards.

An experiment to determine the effects of various levels of a radioactive element on a grain crop is scheduled for this year by the Biology Section. The experiment is to be conducted out-of-doors in order to expose the plants to normal growing conditions. In order to prevent contaminating the surrounding area, the experiment has to be conducted in plots surrounded by concrete. An experimental design was suggested which will make efficient use of the experimental plots available.

Routine computational work for the Radiological Sciences Department consisted of Aquatic Biology calculations, sheep throid and radioanalysis calculations, wind study calculations for January, and weather studies calculations for February.

A set of seven plates were prepared by Graphics for Radiological Engineering and were made into slides. In addition five large visual aids were prepared. Other work prepared included completion of a detailed area map titled "Regional Survey Control Plot Locations - 200-W Area". The Biology Section requested Graphics to make a number of revisions to existing plates previously prepared for their Annual Report. The request also called for layout and completion of three new charts.

Five routine IBM reports and 4 non-routine jobs, a total of 9 IBM service requests were completed for the Radiological Sciences Department.

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FOR THE EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

The revision of detailed Salary Administration procedures for use by Computing is continuing. This revision covers both the change from two cards to one card per employee and the conversion to IBM type 407 Accounting Machines.

The final month of electric billing on IBM equipment was completed on March 15. A final listing of customers and meters and a listing of the past eleven months billing demands of commercial customers were prepared.

For the Employee and Public Relations Department 40 routine IBM reports and 3 non-routine IBM jobs were completed for a total of 43 IBM service requests.

FOR THE FINANCIAL DEPARTMENT

Revisions were made to the procedures for preparing union dues deductions, store orders, Accounts Payable vouchers, work orders, and exempt salary distributions at the request of the Financial Department.

The new time card has been received and will be put into effect beginning April 12, 1954. The procedure for the preparation of time cards by Computing has been revised so that the time cards are printed on the IBM type 552 Interpreter rather than the IBM type 403 Accounting Machine and Bill Feed with a savings in the cost of preparation. The reports of the "Detail List of Hours" and "Weekly Earnings Record" have been revised to conform with the new cards. They will contain more statistical information and control data. A revision of an internal Computing card form in conjunction with the time card change will permit a simplified computation of the various types of holiday premium hours. A number of IBM permanent panels have been wired for Computing to use in processing the revised time card and related information.

Proposals for a combination paper check and earnings statement and a more detailed Weekly Salary Roll were submitted to the Financial Department for their consideration. The question of check reconciliation and the arrival of the IBM type 650 calculator will be factors to be considered before final form revisions are completed.

A further analysis of attitude survey data for the Financial Department has been completed. Attitudes of employees in separate sections and units within the Department were analyzed with respect to three categories of job satisfaction: future opportunities, information and communication, and physical working conditions. (Report: "Attitude Survey Results -- Financial Department", to D. M. Johnson.)

Graphics work for the Financial Department included layout, plotting and inking eight Employee and Payroll Statistics chart masters and plotting current data to twenty-six plates for the HAPO Cost Charts.

For the Financial Department 532 routine IBM machine reports and 16 non-routine jobs were completed for a total of 548 service requests. In addition, 31,670 paychecks and 31,670 earnings statements were prepared and 31,571 cancelled paychecks were reconciled.

FOR THE ADMINISTRATIVE STAFF

At the request of personnel of the Measurement Methods Unit, an analysis of data from duplicate sample of PR,MR, and B-3-S process solutions in building 234-5 was made. The object of the analysis was to obtain estimates of the sampling and analytical errors associated with sampling and analyzing these solutions, and to test for significant differences in both sources of error among the three types of solution. As a by-product of the analysis, a recommendation was made concerning the best method for future sampling if the most precise estimate of the product content of one of these solutions is to be obtained. (HW-31337, "Sampling and Analytical Precisions Associated With 234-5 Building Process Solutions", to C. B. McKee, dated March 29, 1954.)

At the request of the Measurement Methods Unit, a least squares curve is being fitted to the original calibration data for the 15-6 tank in the 200-W Area. After the curve has been fitted, a confidence band will be constructed.

An extension of the "F" and "R" factors table in HW-26609 was made to cover values of MWD/t from 175 to 950. (HW-31214, "Extension of Table of "F" Values", to C. J. Shortess, Jr., dated March 23, 1954.) Also at the request of the Accountability Section, a table of MWD/t vs. g/t based on a quadratic fit to the data of HW-26584 was prepared, to cover MWD/t values from 175-950. A report will be issued in the near future on this table.

FOR THE ATOMIC ENERGY COMMISSION

Computational work on the February Hanford release report is in progress. Henceforth it is proposed to make these reports monthly instead of twice monthly.

For the Atomic Energy Commission 6 non-routine reports were prepared by IBM.

SUMMARY

During the month of March 109 statistical, mathematical, procedural, and graphical problems were completed, and as of March 31, a backlog of 177 problems were on hand. In addition 594 routine IBM reports and 62 non-routine IBM jobs were completed for a total of 656 IBM service requests; 31,670 paychecks, 31,670 earning statements, 7,222 electric bills were prepared; and 31,571 cancelled paychecks were reconciled.

A total of 143 new forms were designed; 428 orders for forms were reviewed of which 16 were rejected and 412 were approved for a total of 1,399,390 copies.

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Department Serviced	Percent of Services Rendered				
	Units				Operations Analysis Section
	Applied Mathematics	Procedures	Computing	Graphics	
Manufacturing	11	1	3	11	6
Engineering	36	10	26	36	28
Plant Auxiliary Operations	4	42	4	25	10
TOTAL OPERATING DEPARTMENTS	51	53	33	72	44
Radiological Sciences	8	1	3	17	6
Employee & Public Relations	5	5	5	5	5
Financial	1	10	57	6	31
Administrative Staff	32	31	0	0	13
TOTAL STAFF DEPARTMENTS	46	47	65	28	55
A. E. C.	3	0	2	0	1
TOTAL	100	100	100	100	100

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DATE FILMED

6/29/92