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HANFORD
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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

FOR

SEPTEMBER 1953

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Compiled By
DEPARTMENT MANAGERS

October 21, 1953

RICHLAND, WASHINGTON

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

September 1953

GENERAL SUMMARY

Production Operations

In the Metal Preparation Section production for the month was 15 percent over the forecast. The overall canning yield was 1.6 percent over the yield of August.

The reactor input production for the month of September was 96.4 percent of forecast. The most significant difficulties affecting production were the large number of slug failures, inadvertent functioning of the third safety system at H reactor, and continuation of the moderator drying operation at the H reactor. The total reactor output production was 25 percent greater than forecast.

There were nine regular uranium slug failures during the month. In addition, nine other failures occurred; five enriched aluminum alloy slugs, three enriched uranium slugs, and one uranium slug jacketed in 63S aluminum.

Redox production for the month was 96 percent of forecast, while the T Plant production was 97 percent of forecast. The monthly output was reduced by the necessity for maintenance work. The UO_3 operation was normal with 106 percent of the revised July forecast being attained. The over-all commitments for 234-5 production were exceeded.

Engineering Technology

The decision has been made to convert from triple dip canning of slugs to salt bath heat treatment of rods and lead dip canning of the slugs machined therefrom. Specifications for chemical composition, reactivity, rolling, and beta heat treatment of uranium have been drawn up. These will be included as part of the lead dip canning process specification which is to be issued shortly. The Feed Materials Production Center should be able to produce salt bath heat treated rods on a production basis by June 1954.

Design progress on Project CA-512-R, 100-K Reactor Facilities was advanced to 96.5 percent completion during the month. Design activity for the 200 Area Expansion was concentrated on the Purex Waste Facility and was advanced to 93 percent completion. Design work on project CG-551, Expansion of 234-5 Facilities was advanced to 36 percent completion.

Twenty-four informal, 6 Class I and 2 Class II radiation incidents were reported. The exposure in both Class II incidents was insufficient to be of any harm to the employees involved.

Personnel and Services

No lost time injuries were reported during the month of September.

Employee separation rate increased from 1.43% in August to 2.62% in September.

All employees were given the opportunity to participate in the follow-up Attitude Survey conducted September 10 and 11. Over 80 percent participation was realized. Completed questionnaires were delivered to Statistical and Computing for analysis of the results.

The total number of housing applications pending is 411.

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STAFF

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

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HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
SEPTEMBER 30, 1953

	EXEMPT		OTHERS		TOTAL	
	9-30-53	8-31-53	9-30-53	8-31-53	9-30-53	8-31-53
Engineering Department						
General	17	17	73	77	90	94
Design	161	161	34	38	195	199
Project	248	242	326	328	574	570
Technical Section						
General	6	7	3	3	9	10
Applied Research	122	124	59	62	181	186
Separations Technology	136	139	43	46	179	185
Pile Technology	101	105	62	70	163	175
Fuel Technology	64	63	65	68	129	131
Advance Technology	12	9	1	1	13	10
Manufacturing Department						
General	16	16	7	7	23	23
Reactor	252	249	1 033	1 032	1 285	1 281
Separations	304	305	1 186	1 197	1 490	1 502
Metal Preparation	90	91	426	424	516	515
Plant Auxiliary Operations Department						
General	1	1	1	-	2	1
Elect. Dist. & Telephone	31	31	137	137	168	168
Transportation	43	42	452	457	495	499
Purchasing & Stores	49	49	229	240	278	289
Plant Protection						
Patrol & Security	59	59	457	461	516	520
Safety & Fire	43	43	111	111	154	154
Office Services	21	22	289	298	310	320
Administration Main. Service	10	10	51	51	61	61
Statistical & Computing	41	40	54	57	95	97
Community Operations & Real Estate Dept.	99	99	337	356	436	455
Financial Department						
General	4	3	8	6	12	9
Accounting	47	46	199	198	246	244
Payroll & Auditing	24	24	54	55	78	79
Employee & Public Relations Department	49	47	153	168	202	215
Radiological Sciences Department						
General	4	5	3	3	7	8
Records & Standards	27	27	136	136	163	163
Biophysics	58	58	53	58	111	116
Biology	37	38	35	33	72	71
Engineering	4	4	-	-	4	4
Medical Department	42	41	207	202	249	243
Law	3	3	2	2	5	5
General	13	14	25	27	38	41
Total	2 238	2 234	6 311	6 409	8 549	8 643

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AREA PERSONNEL DISTRIBUTION
SEPTEMBER 30, 1953

	100-B Area	100-D Area	100-F Area	100-H Area	101 Area	100-K Area	200-E Area	200-W Area	300 Area	700-1100-3000 Area And Plant General	Total
Engineering Department											
Exempt	45	74	1	12	-	29	74	68	243	321	867
Other	22	35	3	44	-	21	64	26	195	256	666
Total	67	109	4	56	-	50	138	94	438	577	1 533
Manufacturing Department											
Exempt	83	64	42	68	-	7	2	283	88	25	662
Other	253	245	399	156	-	-	109	1 053	426	11	2 652
Total	336	309	441	224	-	7	111	1 336	514	36	3 314
Plant Auxiliary Operations Department											
Exempt	26	9	7	8	-	10	17	19	16	186	298
Other	59	61	106	57	11	55	85	184	112	1 051	1 781
Total	85	70	113	65	11	65	102	203	128	1 237	2 079
Community Operations & Real Estate Dept.											
Exempt	-	-	-	-	-	-	-	-	-	99	99
Other	-	-	-	-	-	-	1	1	-	335	337
Total	-	-	-	-	-	-	1	1	-	434	436
Financial Department											
Exempt	-	-	-	1	-	-	2	1	1	70	75
Other	-	-	2	1	-	-	2	1	1	254	261
Total	-	-	2	2	-	-	4	2	2	324	336
Employee & Public Relations Department											
Exempt	-	-	-	-	-	-	-	-	-	49	49
Other	4	7	7	1	1	1	7	3	24	98	153
Total	4	7	7	1	1	1	7	3	24	147	202
Radiological Sciences Department											
Exempt	1	-	39	-	-	-	2	19	56	13	130
Other	8	-	37	-	-	-	6	14	149	13	227
Total	9	-	76	-	-	-	8	33	205	26	357

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	100-B Area	100-D Area	100-F Area	100-H Area	101 Area	100-K Area	200-E Area	200-W Area	300 Area	700-1100-3000 Area And Plant General	Total
Medical Department											
Exempt	-	-	-	-	-	-	-	-	-	42	42
Other	1	4	4	1	-	-	1	7	1	188	207
Total	1	4	4	1	-	-	1	7	1	230	249
General											
Exempt	-	-	-	-	-	-	-	1	2	13	16
Other	-	-	-	-	-	-	-	-	12	15	27
Total	-	-	-	-	-	-	-	1	14	28	43
Total Exempt	155	147	89	89	-	46	97	391	406	818	2 238
Total Other	347	352	558	260	12	77	275	1 289	920	2 221	6 311
Grand Total	502	499	647	349	12	123	372	1 680	1 326	3 039	8 549

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MANUFACTURING DEPARTMENT

SEPTEMBER 1953

October 12, 1953

METAL PREPARATION SECTION

The net production for the month was 238 tons which was 15% over the July forecast. A total of 207 tons was canned as 8-inch material and 31 tons as 4-inch. The overall canning yield was 81.8% which was an increase of 1.6% over the yield of August. Eight-inch canning yields were about the same as last month while a reduction in the stain rejects for 4-inch slugs contributed to the increased 4-inch yield from 78.7 to 82.6% in September.

There were one 4-inch and two 8-inch autoclave failures during the month.

REACTOR SECTION

The total reactor input plutonium production for the month was 96.4% of forecast. The most significant difficulties affecting production were the large number of slug failures, dropping of 3X balls at H reactor and continuation of the moderator drying operation which was in effect at the H reactor at the end of August due to a process tube rupture.

The tota. reactor output production was 25% greater than forecast since advantage was taken of outage time by discharging material previously scheduled for October.

The established maximum operating levels of C, F and D reactors were increased 40 MW (maximum included 10 MW of "C" metal burnout), 15 MW and 5 MW. The gain at the C reactor resulted from replacing the "C" metal in four enrichment tubes with fresh, undepleted "C" metal; at F reactor from placing the central orifice zone on trip before boiling limits, and at D reactor from improved control techniques.

There were nine regular uranium slug failures (one 8-inch and eight 4-inch) during this period. The outage time for these failures was 218.9 hours which includes 74.4 hours for moderator drying. In addition, nine other failures occurred (five "C" metal, three "E" and one 638 Al jacketed slug) with an outage time of 60.3 hours. The total time charged to slug failures for September was 279.2 hours.

The use of facilities at B reactor for charge-discharge of poison columns during operation continued to result in significant production gains. During the month, these gains amounted to an estimated 1220 MWD. A total of 94 individual charge or discharge operations was completed with this equipment.

During the month, 23 reactor scrams occurred. Twelve of these were attributed to the panellit system with an outage time of 4.3 hours. The balance of the scrams

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REACTOR SECTION (Continued)

caused total lost time of 54.2 hours with 31.9 hours being caused by a broken vertical safety rod at B pile when the brake failed to function as the rod was inserted.

SEPARATIONS SECTION

The Redox production for the month was 96% of the forecast, while the T Plant production was 97% of the forecast.

The operating rate at the Redox plant was 3.9 tons per day with an 82% efficiency. The monthly rate was retarded due to such items as column flushing, reworking of both product streams and replacement of the H-4 oxidizer. The latter item necessitated a plant shutdown from September 10 to September 16. After start-up, a 6 tons per day rate was effected until September 21 when the rate was increased to 7.5 tons. This rate was maintained until September 24 when it became necessary to replace the centrifuge feed jets. A 7 to 7.5 rate was resumed on September 27 and continued at this rate for the remainder of the month.

The TBP Plant maintained an excellent time operated efficiency with only twelve hours lost time. The average operating rate was 7.0 tons per day and production was 20% over the revised July forecast (87% of the July annual forecast). In addition, 20 tons of Redox UNH were decontaminated during the month and 12.5 tons of TBP material were reworked. The feed rates on each extraction line varied between 2.5 and 6.5 tons with an average total daily operating rate of 6.9 tons for the month. The waste losses averaged 3.5%. The condenser vent blower motor failed on two occasions which necessitated the only shutdowns for the month. A gradual buildup of metallic impurities in the uranium product dictated a return to the dual scrub operation for the RA columns on September 15 after a two weeks trial run on single scrub.

The removal of metal waste from the tank farms proceeded well during the month. Tank 101-T was declared empty. One Nagle pump motor failed on September 24.

The UO_3 operation was normal with 106% of the revised July forecast being attained (96% of the July annual forecast). A 10.6 ton daily rate was averaged for the month. Ten carloads of powder were shipped offsite.

The September commitment of buttons and 106% of the shape commitment were delivered to the AEC.

The West Area evaporator operated the entire month with a volume reduction of 42%. The East Area evaporator resumed operations on September 11 and achieved a reduction of 37%. Feed for both evaporators was TBP waste.

GENERAL

Effective September 1, J. E. Maider was appointed Manager-Manufacturing, C. A. Priode was appointed Manager-Production and W. P. McCue was appointed

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GENERAL (Continued)

Manager-Manufacturing Administration. In the Reactor Section J. H. Warren was appointed Manager-Reactor Section and R. O. Mehann was appointed Production Superintendent. The position of Superintendent-Reactor Process Sub-Section was left unfilled. The vacancies which gave rise to these moves were created by the appointment of C. N. Gross as Manager-Employee and Public Relations, and the transfer of E. P. Lee to another site.

Personnel

Total on Roll September 1, 1953	3322
Accessions	39*
Separations	44*
Total on Roll September 30, 1953	3317

*Does not include intra-department transfers.

J. E. MAIDER, MANAGER

MANUFACTURING DEPARTMENT

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MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY
FOR
MONTH OF SEPTEMBER 1953

Richland, Washington
October 12, 1953

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
R. Overson, Separations Section	Remote Stud Cutter

J. E. MAIDER, MANAGER

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V. D. Donihee

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

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Richland, Washington
October 12, 1953

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
SEPTEMBER 1953

I. RESPONSIBILITY

Responsibility for operation of the Spectrochemical Laboratory was assumed by this Section on September 1, 1953. Laboratory equipment and personnel were included in the transfer from the Engineering Department, Technical Section.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

	September	August	Year To Date
Acceptable Pieces Canned (4")(Tons)Gross	32	32	219
Acceptable Pieces Canned (4")(Tons)Net	31	31	212
Canning Yield (4")(%)	82.6	78.7	68.5
Acceptable Pieces Canned (8")(Tons)Gross	209	214	1462
Acceptable Pieces Canned (8")(Tons)Net	207	213	1447
Canning Yield (8")(%)	81.6	81.8	73.6
Total Acceptable Pieces Canned(Tons)Gross	241	246	1681
Total Acceptable Pieces Canned(Tons)Net	238	244	1659
Acceptable Pieces Canned (4" and 8") (% of forecast)	115	119	107
Autoclave Frequency (4")(No./M)	.06	.05	.03
Autoclave Frequency (8")(No./M)	.04	.00	.02

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1. Statistics (Continued)

	September	August	Year To Date
Oxide Burned (Weight out tons)	5	3	44
Poison Canned (Number Pieces)	0	0	4450
Chemical 68-56 Canned (Number Pieces)	0	0	0
Chemical 10-66 Canned (Number Pieces)	0	0	1713
"J" Slugs Canned (Number Pieces)	213	0	12333
C-3 Slugs Canned (Number Pieces)	504	0	504
Special Requests (Man Hours)	414	1474	12419
305 Routine Tests (Man Hours)	147	189	1284
305 Special Tests (Man Hours)	1261	972	9888
Average Steam Generated (M lbs/hr)	23.0	19.6	
Maximum Steam Generated (M lbs/hr)	55.0	56.0	
Total Steam Generated (M lbs)	16,600	14,600	
Coal Consumed (Tons)	1,108	976	
Sanitary Water from 3000 Area (Million gals.)	53.4	51.6	
Total Water Average Rate (gpm)	1237	1155	
Chlorine Residual (ppm)	.41	.40	

2. Activities

The net production of acceptable slugs was 239 tons of which 87% was eight-inch. The combined canning yields remained at a high level. Reductions in the frost test and AlSi reject categories for eight-inch slugs were compensated by increases in poor bonding and non-seating rejects. A reduction in the stain rejects for four-inch slugs is largely responsible for the increased four-inch yield.

There was one four-inch and two eight-inch autoclave failures during the month. Causes of the failures remain undetermined.

The 305 Test Reactor went to one-shift operation on 9-28-53 because of reduced requirements of the graphite testing program.

Destructive examination of a large number of non-seats detected at the inspection fluoroscope revealed that a considerable number of these pieces were actually acceptable and that an even larger number were only barely outside the specified limits. It was indicated that generally the dimensions of acceptable pieces are closely grouped near the minimum base thickness and another "family" of base thicknesses are closely grouped near the maximum non-seat limit, with only a few pieces falling within the intermediate area. The study is being continued in collaboration with the Engineering Department to determine the advisability of raising specification limits for non-seating.

Experimental canning by long preheat-short submerge methods was conducted during the month.

Results of the test

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2. Activities (Continued)

indicated that a shorter preheat can be used with resultant thicker can walls, good bonding and low non-seating frequency. Further testing of various preheat times and submerge cycles will be necessary to determine an optimum cycle.

Preliminary tests have indicated that some improvement in slug quality may result from eliminating the vertical agitation in the bronze bath. Further testing is being done in cooperation with the Pile Fuels Sub-Section. Elimination of this motion would simplify mechanization of this phase of the operation.

In an effort to reduce the number of spectrochemical analyses required for adequate control of tin in AlSi canning bath samples, a potentiometric measurement method has been developed by the Technical Section. Agreement between spectrochemical and potentiometric methods has been within 0.02%. Adoption of the potentiometric analysis has eliminated the need for a 4-12 shift in the spectrochemical laboratory.

3. Special Operations

There were 125 acceptable enriched uranium-aluminum alloy fuel slugs for the present P-10 program canned in standard eight-inch thick wall cans using a shrink-fit process for inserting the slug. The balance of the bare and reject material on hand will be returned to Oak Ridge for recovery.

The first shipment of "C-3" enriched uranium-aluminum alloy fuel slugs for pile enrichment was received and 504 pieces were canned with a canning yield of 86%. Welding continued to be the chief cause for rejection, accounting for 95% of the total rejects. A program for maintaining a quality control record of each lot of C-3 slugs processed was instituted. It is hoped that data can be obtained concerning the effect of welding variables upon the rejection rate.

4. Schedule Variance

Acceptable slug production exceeded forecast by 15% as a result of improved canning yields and higher operating efficiencies than expected.

B. Equipment Experience

1. Operating Continuity

A minimum of production time was lost due to failures of canning equipment. Only four furnace failures occurred as compared with five for August and eleven for July.

Repairs to the frost test machine resulted in an outage of 16 hours which temporarily backed up production material in process.

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B. Equipment Experience (Continued)

2. Inspections, Maintenance and Replacements

The faulty screw in the power house recovery conveyor was replaced with a new screw provided by the Link Belt Company. The new screw is operating satisfactorily.

The cleaning of the north leaching trench and excavation of the south retention basin was completed during the month.

C. Improvement Experience

1. Production Tests

PT-313-105-18M "Irradiation of Ultrasonically Tested Salt Bath Heat Treated Alpha Rolled Uranium Slugs" (HW-26759). A total of 2925 four-inch slugs remain to be shipped to Reactor for pile loading.

PT-313-105-19M "Irradiation of Triple Dip Canned Uranium Slugs from Rods Rolled at Fernald" (HW-26851). Approximately 6400 four-inch slugs were canned during the month with a yield of 86%. Approximately 139,500 slugs have been shipped to Reactor for irradiation.

PT-313-105-23M "Evaluation of Fillerwelding of Eight-Inch Triple Dip Canned Slugs" (HW-27934). Canning on this test was completed early in the month. Welding statistics indicated the frequency of poor bonds to be about twice that of normal material and bad welds exceeded the normal material experience by a factor of 5. It is felt that this relatively poor performance may be attributed in part to lack of familiarity with this process and due to difficulty in establishing inspection standards. Penetration and general quality of the acceptable welds appeared comparable to or better than that produced by the present welding process.

PT-313-105-25M "Lead Dip Canning and Irradiation of Uranium Slugs Machined from Salt Bath Heat Treated Fernald Rolled Rods" (HW-28149). A total of 16,300 slugs have been shipped to Reactor for irradiation.

2. Process Tests and Revisions

MMP-313-3 "Slug Recovery by the Use of 50% Caustic". Slug recovery under this test has been satisfactory to date. No hydrogen evolution from the caustic reaction could be detected and no adverse effects on slug pickle acid were observed. Canning results and yields were satisfactory.

On the basis of a six month test, it was determined that the use of cast iron crucibles in the AlSi, tin and lead furnaces in place of silicon-carbide crucibles would save $6000 per year. Cast iron crucibles will be used in these furnaces as soon as the present supply of silicon-carbide has been exhausted.

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2. Process Tests and Revisions (Continued)

The practice of fracturing slugs to determine phase transformation has been discontinued and has been replaced by the ultrasonic testing method. An annual savings of $17,000 will be realized from this change in testing methods.

Part of the conveyor system removed from the machining operation was installed in storage building 303-A as an aid in final inspection of slugs.

3. Inventions and Discoveries

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

D. Events Influencing Costs

1. Labor Variance

As a result of a shorter work period (21 days versus 23 days in August), direct labor costs for slug preparation decreased slightly. Even with a 4% decrease in production, this will decrease unit costs for this period.

2. Material Variance

Processing of all slugs by the triple dip process during this month increased material costs per unit significantly. Material requirements for August were lower due to lead dip canning of about 282,000 units.

3. Other

A five-week accounting period for maintenance increased other costs slightly. This increase is partially offset by a credit for an overcharge on premium overtime for supervision for August.

E. Plant Development and Expansion

1. Project Status

Project CA-514 "Expansion of 300 Area Production Facilities". Detailed design of the 313 Building is 63% complete and construction 13%. The erection of structural steel is about 72% complete. Some difficulty has been experienced by the contractor due to some footings being improperly aligned.

Necessary revisions were completed and the corrected drawings were received from the Architect-Engineer for the second phase contract on 313 Building. The General Electric design portion will be completed early in October. Negotiations for a construction contract will follow immediately thereafter.

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1. Project Status (Continued)

Construction of the new operations change house is 96% complete. Installation of the supply ventilation unit, exhaust fans, master fire alarm box, and the insulation of steam and hot water services constitute the major items remaining to be completed. Since exhaust ventilation equipment is not scheduled for shipment until October 19, beneficial occupancy will probably be delayed until November.

Design of all other non-process facilities is about 46% complete and construction 2%. The extension of the road and walks from 3701-L gatehouse to the new operations change house is essentially complete.

The Technical Section now plans to vacate the 3702 and 3703 Buildings as well as the 3706 Building. Decontamination and renovation of 3706 to house administrative and engineering personnel of Metal Preparation, First Aid, Patrol, SF Accountability and others has been estimated at $170,000. With the additional space becoming available in 3702 and 3703 a further estimate is being made to determine the cost of renovating these buildings instead of 3706 to provide the space required.

2. Plant Engineering

Work is being continued on the review and revision of labor and material cost standards. These, as well as I.M.E. cost standards for triple dip canning are being prepared in a simplified form. Cost standards for the lead dip process will be added later.

An evaluation of the direct and indirect costs involved in Manufacturing phases of the current SF Accountability system indicates that approximately $45,000 is expended annually for operator and clerical labor. In addition, about 2500 manhours of supervision are required per year. An appreciable reduction in cost appears feasible from the proposed system now being developed.

Fabrication and shop testing of the spray type basket assembly for the mechanized quenching unit was completed. The unit is currently being installed on a quench tank for evaluation. Design has been established and detailing is in progress on the tank and lift-type conveyor to be used in conjunction with the quench basket assembly. Operations testing of the prototype semi-automatic capping unit is planned for early next month. A combined carriage and furnace mounting frame is being designed for the proposed molten metal pumps to be applied in the transfer of canning baths.

F. Significant Reports Issued

1. Routine

Number	Title	Author	Date
HW-29164	Monthly Report, Process Sub-Section, Metal Preparation Section	E. W. O'Rorke	9-1-53

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1. Routine (Continued)

Number	Title	Author	Date
HW-29212	Metal Preparation Section Evaluation of FMPC Material, July-August, 1953	S. M. Gill	9-2-53

2. Non-Routine

HW-29194	General Analytical Control Program I, Analytical Results	W. G. Hudson	8-31-53
HW-29344	Uranium Accountability in Metal Preparation Process	W. G. Hudson	9-14-53
HW-29449	Uranium Content in Discarded Bronze Crucibles	W. G. Hudson	9-25-53
HW-29303	Suspected Discrepancy of SF Material in Slug Recovery Process and Reprocess Storage Area	F. E. Jochen and J. A. Cowan	9-10-53
HW-29414	Project CA-514 "313 Building Expansion Proposed Slug Recovery Process"	J. W. Nageley	9-22-53

III. PERSONNEL

A. Organization

No change.

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	4	4	0
Operations	207	208	1
Power & Maintenance	250	252	2
Process	32	32	0
Plant Engineering	19	18	-1
Radiation Monitoring	3	3	0
Section Total	515	517	2

C. Safety Experience

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

D. Radiation Experience

No exposures in excess of 300 mrep per week were reported during the month.

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III. PERSONNEL (Continued)

E. Personnel Activities

1. Visits and Visitors

George W. Wunder of National Lead Company of Ohio visited Metal Preparation on September 18 and 19. The purpose of his visit to the Metal Preparation Section was for a discussion of mutual problems relative to feed materials.

2. Information Meetings

Presentation of the second topic of the discussion "Principles and Methods of Radiological Protection" was completed during the month.

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Richland, Washington
October 12, 1953

MANUFACTURING DEPARTMENT
REACTOR SECTION
SEPTEMBER, 1953

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Operating Experience

The total reactor input plutonium production during September was 96.4 percent of forecast and 12.7 percent less than the record established in August. The most significant difficulties affecting production were the large number of slug failures, inadvertent dropping of 3X balls at H Reactor and continuation of the moderator drying operation which was under way at H Reactor at the end of August due to a process tube rupture.

Reactor output production was 25.3 percent greater than forecast since advantage was taken of outage time by discharging material scheduled for October.

The established maximum operating levels of C, F and D Reactors were increased 40 MW (maximum included 10 MW of "C" metal burnout), 15 MW and 5 MW, respectively. The gain at C Reactor resulted from replacing the "C" metal in four enrichment tubes with fresh, undepleted "C" metal; at F Reactor from placing the central orifice zone on trip-before-boiling limits; and at D Reactor from improved control technique.

A total of 18 slug failures were experienced during September at B, C and H Reactors. Data regarding these failures are given in the table below:

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A. Operating Experience (Continued)

Slug Type	Number of Failures by Reactors B	C	H	Outage Hours For Removal
Regular metal - 4", Group 8	4	4*	-	124.2
Regular metal - 8", Group 9	-	1	-	20.3
"C" Metal	-	1	4	7.3
"E" Slugs (PT-105-532-A-2)	-	3	-	29.9
638 Aluminum Canned Uranium (PT-313-105-14-M)	-	-	1	23.1
Total	4	9	5	204.8**

*These failures occurred in "C" Metal tubes.
**An additional 74.4 hours of outage time for moderator drying during September was chargeable to a slug failure on August 30 at H Reactor.

The details of reactor and water plant operation are set forth below:

1. Statistics

	B	C	D	DR	F	H	Total or Average
Reactor Time Operated Efficiency (%)	78.8	80.4	92.6	99.9	87.4	65.0	84.0
Reactor Outage Time (Hrs.)							
Plutonium Production	133.2	101.6	39.7	0.8	80.0	141.2	496.5
Special Irradiations and Tests	19.7	39.6	13.4	-	10.5	110.9	194.1
Total	152.9	141.2	53.1	0.8	90.5	252.1	690.6
Reactor Unscheduled Outage Time (Hrs.)	152.9	92.2	53.1	0.8	-	212.1	511.1
Metal Discharged (Tons)	32.3	46.3	29.0	-	34.9	45.4	188
Water Quality (ppm Iron)							
Raw Water - Average	0.05	0.06	0.06	0.12	0.05	0.08	-
Raw Water - Maximum	0.08	0.08	0.10	0.19	0.06	0.11	-
Process Water - Average	0.013	0.006	0.004	0.004	0.005	0.018	-
Process Water - Maximum	0.023	0.014	0.009	0.014	0.012	0.030	-
Water Pumped (MM gals.)							
Bldg. 190 to reactor	1466	2807	1953	1858	1540	1721	11345
Bldg. 182 to 200 Areas	386	-	-	-	-	-	386
Bldg. 181	5322		4636		1864	1982	13804
Steam Generated (MM lbs.)	120		222		113	80	535
Coal Consumed (Tons)	7341		12540		6379	4594	30854

2. Activities

Completion of the moderator drying operation at H Reactor, which was in progress at the end of August, required 74.4 hours outage time during September. A total of approximately 860 gallons of water was removed

2. Activities (Continued)

during operation of the hot water recirculation system and subsequent reactor operation. The water had entered the moderator on August 30 when a process tube rupture occurred in connection with a ruptured slug.

On September 8, during an outage initiated by the panellit, the 3X balls were dropped at H Reactor as a result of improper switching when the ball 3X electrical system was being set to begin a scheduled shutdown. An outage of 141.2 hours was required for ball recovery. This work was complicated by the presence of fission products in the moderator, apparently from previous process tube and slug ruptures and, due to the short time limits, required a large amount of overtime. The outage was also utilized to discharge approximately 45 tons of metal and to make horizontal rod and process tube repairs.

The B and F Reactors were placed on trip-before-boiling limits in the 0.240 orifice zone during September. As a result, the established maximum operating level of F Reactor was increased 15 MW. Similar gains had not been established at B Reactor since equilibrium operation had not been attained at month end.

The use of facilities at B Reactor for charge-discharge of poison columns during operation (PT-105-4-MR) continued to result in significant production gains. During September, these gains amounted to an estimated 1220 MWD. A total of 94 individual charge or discharge operations were completed. Two incidents occurred during the month in connection with these facilities. The front ball valve on one tube was broken off at the nozzle when the elevator was raised, striking the charging cylinder adapter which had been inadvertently left on the ball valve. In the other incident a spring loaded stop, which was provided to prevent the charging cylinder from coming off the ball valve adapter, failed causing newly installed dummies to be washed onto the elevator. Modifications aimed at minimizing difficulties from these sources are in progress.

Difficulty was experienced during the month in unloading coal supplied by Independent Coal and Coke Company, a new HAPO vendor. This was caused by excessively fine, wet coal and the mechanically inferior condition of the railroad cars. Steps have been taken to correct these problems.

Coal inventories in the 100 Areas have been reduced from a six to a four months supply as of September 30 and will be nominally held at this level.

Removal of the sand deposit in the Building 181-H forebay was begun on September 8 by the Oregon Marine Dredging Company. The deposit, reported several months ago, is being pumped onto the riverbank some 600 feet downstream.

Irradiation of P-10 material at DR Reactor progressed satisfactorily during September with the reactor having a time operated efficiency of 99.9 percent for the second consecutive month. Reactivity losses due to

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2. Activities (Continued)

uranium 235 burnout were approximately 1.4 inhours per day. Recalculation of the tube power on several tubes with partially plugged cone screens and more uniform addition of helium permitted slightly higher power levels during the month.

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

	Tubes Charged	Tubes Discharged	Casks Shipped
Chemical 10-66	7	3	-
Chemical 72-60	0	0	8
Production Tests	47	33	5
Total	54	36	13

B. Equipment Experience

During September, 23 reactor scrams occurred. Twelve of these were attributable to the panellit system, 5 to Beckman electrical difficulties at C Reactor (B Reactor was shutdown simultaneously through the high level tie circuit in two of these three instances), two to improper valving of water on production test tubes, and one each to damaging a front face poison column nozzle, failure of a Ball 3X system relay, and changing from normal to emergency instrument power necessitated by erratic power supply believed to be caused by faulty generator brushes. Outage time charged to the panellit scrams was 4.3 hours. Total outage time charged to the other scrams was 54.2 hours, 31.9 hours of which occurred at B Reactor when a vertical rod tip broke off following one of the C Reactor Beckman scrams. This damage was apparently caused by free fall of the rod when the brake failed to function on the scram.

At H Reactor, "B" horizontal rod, reported out of service due to a leaking tip last month, was repaired by installation of a new tip. Number 2 horizontal rod was removed from service during September due to a leak in the rod tip.

Repairs to the east Building 107-C retention tank baffles were completed during the month in accordance with C. T. Main Company recommendations. Failure of the welds between baffles and the tank walls were noted during August.

Work by Minor Construction forces aimed at correction of vibration in Building 190-C piping was completed and has resulted in considerable improvement. Future experience with piping failures will determine whether or not additional corrective action will be needed. Failure of an instrument impulse line on No. 8 process water pump unit was attributed to vibration.

The No. 9 process water pump inboard bearing at Building 190-C failed on September 28 as a result of a faulty pressure relief valve on the lubrication system. The unit was repaired and returned to normal service the following day.

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B. Equipment Experience (Continued)

External repairs to No. 2 chimney at Building 184-F were completed by Custodis Construction Company during September. This concludes the 100 Area portion of the current chimney inspection and minor repair program. Chimneys at Buildings 184-B, D and F were inspected and repaired.

The Traveler's Insurance Company representative inspected one boiler in Buildings 184-D and 184-H. This concluded the annual power house boiler inspection program.

C. Improvement Experience

The most significant Production and Process Test activities are reported below:

PT-105-4-MR (Evaluation of Poison Column Control Facility)
See item above in "Operating Experience." A document, HW-29190, was issued summarizing operational utilization and production effects of the poison control facility. Specific recommendations regarding this installation at the other reactors are included.

PT-313-105-12-M (Exposure and Behavior of Unbonded "C" Metal Slugs)
Five "C" Metal tubes were discharged at C Reactor during the month due to suspected ruptures. Four of these contained regular metal ruptures and one contained a "C" Metal rupture. Four tubes were recharged with this material for a month end total of 25 such loadings at C Reactor.

PT-313-105-14-M (In-Pile Evaluation of 63-S Aluminum Process Tubes and Slugs)
One of the 63-S aluminum canned uranium slugs failed during the month. Since this is the second failure of this type slug, the discharged pieces are being examined to determine the advisability of continuing irradiation of such slugs.

PT-105-513-E (100 Areas Process Water Quality Evaluation Tests)
As reported last month, in connection with this test, the alum process replaced the ferric sulfate process as standard for 100 Area water treatment. A rough draft of the project proposal covering installation of required activated silica-alum facilities for B and H Water Plants was being reviewed by the Manufacturing Department at month end.

Non-chlorination of process water supplying one-half of the tubes at DR Reactor, as specified in Supplement A of this test, is believed to have been the cause of high retention basin effluent activity during the latter part of

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C. Improvement Experience (Continued)

September. Chlorination is known to reduce the amount of manganese. The maximum 24-hour dose was 415 mrep compared to the normal limit of 360 mrep.

PT-105-526-E (Elimination of Lime as a Process Water Additive)
This test was begun at the F Water Plant on September 18. One-half of the plant is being operated without lime addition.

PT-105-531-A (Enrichment at H Pile)
Four "C" Metal ruptures occurred at H Reactor during the month. Five tubes were recharged with this material making a total of 49 tubes at month end. The reactor power level continues to be limited by a 410° C graphite limitation.

PT-105-532-A-2 (Preliminary Irradiation of Enriched Uranium Slugs)
Two tubes containing a total of three ruptured "E" slugs (Enriched uranium metal) were discharged during the month at C Reactor. Five of the six remaining tubes of this material were also discharged.

PT-MR-105-14 (Unit Cost Reduction by the Use of Supplemental Orifices)
Inspection of several of the venturis and supplemental orifices installed at B and D Reactors indicated satisfactory performance from the standpoint of corrosion and erosion following four to six weeks of service. Plans for installation of venturis and supplemental orifices on all reactors were firmed up during the month. Details relative to this program are contained in document HW-29281. Off-plant bids for materials are being received.

Forty approved Standards for inclusion in the new manual "Process Standards - Reactor", HW-28522, issued in July, 1953, were sent to Classified Files for distribution. The "Operating Standards" manual which they replace will be recalled at the time these are distributed.

There were no inventions or discoveries reported by Reactor Section personnel during September.

D. Events Influencing Costs

Establishment of a new electrical consumption peak on August 21, will increase electricity costs approximately $4,200 per month in the Reactor Section.

The large amount of reactor outage time during September resulted in decreases in coal and water treatment chemical costs and an increase in overtime. The

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D. Events Influencing Costs (Continued)

Cost Standards, under development during the past several months, were utilized to explain the August Reactor Section costs to Department Management.

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 September 18, 1953.

CA-431 (100-C Plant)
Principal work at Building 105-C on this project was toward completion of the metal examination facility and the hot water recirculation system. The AEC has approved funds to replace the present cadmium filled horizontal rod tips with boron filled tips. At Building 190-C installation of the revised design recirculating flow control and associated piping on the process pumps was completed.

CG-438 (Ball 3X Facilities for B, D, F, DR and H Piles)
Operational aspects of these facilities are reported above under "Operating Experience". During September, revisions were made in the electrical circuitry at F Reactor. These included changes necessary to make the low water pressure and hopper door solenoid circuits more reliable.

CA-512 (100-K Facilities)
Design criteria (Document HW-29055) for the cross-tie piping system between Buildings 105-KW and 105-KE was approved by Engineering and Manufacturing Department representatives. The cross-tie system will transfer 35,000 gpm of water between the two buildings as backup to guard against failure of one water plant. The over-all design completion of CA-512-R is approximately 96.5 percent; that of CA-512-W approximately 85 percent.

CG-558 (Reactor Plant Modification for Increased Production)
Several tests of existing 100 Area Water Plant equipment were conducted during the month to aid in the design for this project. Economic justification for this project as presented by the Reactor Design and Development Unit is being analyzed by the Manufacturing Department.

IR-144 (Modification for Temporary Poison Discharge During Operation - B Reactor)
This project was completed during the month. A total of 18

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1. Project Status (Continued)

tubes were provided with necessary equipment for charge-discharge during reactor operation. However, actual installation was made on only 13 tubes since location of the remainder will be dependent on operating conditions.

2. Plant Engineering

A number of engineering and development studies were active in the Section during September. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in documents HW-29505 and HW-29506. Several items of interest are reported below.

A test to determine the pump and driver characteristics for increased flows at Building 190-C was completed. It was concluded that process water flows of 85,000 gpm at 483 psig could be obtained with nine of the ten units in operation.

A study aimed at installation of several horizontal rods with the boron coating removed from the near side one-half has been made. Plans are being made to install two such "half-rods" at H Reactor in the near future in order to obtain better reactor flattening.

A permanganate method for determination of iron in process water was used on a trial basis during September. This method appears to provide faster and more accurate control of water quality than the present boil-down method of iron analysis.

F. Significant Reports

1. Routine

Monthly operating reports issued for August were:

HW-29229-A	Reactor Section	J. H. Warren	9-10-53
HW-29299	Operations Sub-Section	J. H. Warren	9-2-53
HW-29137	Process Sub-Section	R. O. Mehann	9-1-53
HW-29197	Plant Engineering Sub-Section	F. A. R. Stainken	9-1-53
HW-29233	Radiation Monitoring Sub-Section	P. C. Jerman	9-3-53
--	Maintenance Sub-Section	E. E. Weyerts	9-3-53
--	Power Sub-Section	J. C. McLaughlin	9-2-53

Other routine reports issued during September were:

HW-29403	"Monthly Progress Report - Reactor Section Expansion - Sept., 1953"	H. T. Wells	9-25-53
--	"Status of Reactor Section Projects Informal Requests, and Budget Items"	F. A. R. Stainken	9-18-53
HW-29234	"Reactor Section Radiation Monitoring Technical Report for August, 1953"	P. C. Jerman	9-3-53

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F. Significant Reports (Continued)

2. Non-Routine

HW-29138	"Program for Use of Venturis and Supplemental Orifices to Increase Production in Hanford Reactors"	J. E. Robb & R. B. Hamilton	9-8-53
HW-29190	"Interim Report No. 1 Production Tests 105-4-MR and 105-4-MR, Supplement A, Evaluation of Poison Column Control Facilities"	R. D. Schilling	9-10-53
HW-29250	"Production Test 105-5-MR - Use of Helium Gas to Reduce Reactivity Transients on Minimum Time Startups"	D. E. Crouter	8-31-53
HW-29171	"Process and Operational Evaluation of a Proposed More Economical Method of Producing Polonium"	H. C. Smith	8-28-53
--	"Power Level Calculator Changes"	T. M. Clement	9-21-53
--	"Witness Test of Secondary Process Water Pumps, Project CA-512-W"	D. N. Mathis, D. J. Quigley & C. F. Quackenbush	9-21-53

III. PERSONNEL

A. Organization

Effective September 1, 1953, J. H. Warren replaced E. P. Lee as Manager, Reactor Section. Mr. Lee was transferred to the General Electric Knolls Atomic Power Laboratory. Also effective September 1, R. O. Mehann replaced J. H. Warren as Production Superintendent, leaving his former position as Superintendent - Process vacant pending appointment of his replacement.

Instrument craftsmen were assigned to cover the P-10 Facilities in Building 108-B on a four shift basis during September. One craftsman is assigned to each shift.

B. Force Summary

	Beginning of Month	End of Month	Net Change
Section General	2	3	1
Operations Sub-Section	269	267	-2
Maintenance Sub-Section	475	478	3
Plant Engineering Sub-Section	26	30	4
Power Sub-Section	414	412	-2
Process Sub-Section	39	38	-1
Radiation Monitoring Sub-Section	60	58	-2
Section Total	1285	1286	1

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B. Force Summary (Continued)

Changes during September consisted of 6 terminations, 2 new hires, 1 deactivation, 8 transfers out and 14 transfers into the Section.

C. Safety Experience

There were no Major or Sub-Major Injuries or Near-Serious Accidents in the Section during September.

D. Radiation Experience

There were no Class II Radiation Incidents during September. Three Class I Radiation Incidents occurred. No. 80 involved an exposure of 250 mrep to the thigh of an Operations employee due to contamination penetrating the slit in the side of his coveralls during the ball recovery operation at H Reactor. No. 81 occurred when an uncontrolled contaminated flashlight bulb was found at the 100-D-DR Area burning ground during a routine survey. No. 82 occurred at B Reactor when the special charging head dropped off a poison column facility tube while charging a dummy column during reactor operation. Slightly irradiated dummies washed onto the charge elevator resulting in momentary exposures in excess of 5 r/hr. Maximum personnel exposure was 60 mr. Investigation of these incidents are reported in documents HW-29381, HW-29496 and HW-29494, respectively.

At H Reactor, bubbles were observed rising from a ruptured "C" Metal slug in the storage basin. Investigation revealed dose rates of 22 rep/hr at 2-inches from the water surface as the bubbles broke the surface. A sample of the gas is currently being analyzed by the Bio-Physics Section.

E. Personnel Activities

At month end, 19 employees are receiving on-the-job training for engineering or supervisory assignments in the Section; 14 of these are on assignment under the rotational training program.

Employee communications continued to be stressed during September. No meetings of Section-wide significance were held but plans were underway for future meetings of this scope. Sub-Sections continued to hold meetings for their personnel. These included the following:

a. A two-day Ball 3X system training program conducted for Mechanical Unit craftsmen.

b. Showings in all 100 Areas of the film "Stacking of Graphite, 105-C," for Maintenance Sub-Section supervisors and craftsmen.

c. A special session of the training and Development groups program on "Conference Leading" for Maintenance Unit supervisors.

d. Meetings for Operations Unit supervisors on union relations policies and practices.

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E. Personnel Activities (Continued)

G. W. Wallace and R. S. Fasoldt of the General Electric Knolls Atomic Power Laboratory visited the Reactor Section during the week of September 21 to study maintenance and plant engineering problems, methods and organization.

R. C. Theil attended the annual meeting of the Instrument Society of America in Chicago during week of September 21st.

J. D. McCullough visited the Panellit Company in Chicago during the period September 17 to September 22, to review designs and expedite approvals of instrumentation furnished by that company. He also attended meetings of the Instrument Society of America.

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Richland, Washington
October 12, 1953

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
SEPTEMBER, 1953

I RESPONSIBILITY

Responsibilities of the Separations Section were essentially unchanged during the month of September.

II ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	September		August	
	Normal	Acid Wash	Normal	Acid Wash
Charges started in Canyon Bldgs.	26	0	21	1
Charges completed in Conc. Bldgs.	30	0	18	1
Special charges - Conc. Bldgs.	17		25	
Charges completed - Isolation Bldg.	199	0	160	1
Average Waste Losses, %	2.4		2.4	
Special charges - Isolation Bldg.	42		55	
Material balance, %	101.3		101.2	
Yield through Process, %	98.9		98.8	
Average cooling time (days)	74		68	
Minimum cooling time (days)	65		59	

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1. Statistics (Continued)

b. Redox Operations

	September	August
Equivalent charges started	173.1	174.2
Charges completed	165.8	157.7
Tons Uranium delivered to storage	118.9	125.1
Average Production Rate per operating day, Tons	6.2	5.7
Average Daily Operating Rate for the month, Tons	3.96	4.0
Average yield, %		
Uranium	97.9	100
Plutonium	98.0	99.95
Total Waste Loss, %		
Uranium	1.43	1.21
Plutonium	1.53	1.22
Average cooling time, days	83	79
Minimum cooling time, days	77	63
Percent down time	36.4	29

c. 234-5 Operations

	September	August
Batches completed through Task II	329	274
Runs completed through Task III	303	230
Reduction yield, RM	93.9	94.0
Reduction yield, RG	97.0	
Waste Disposal, units	5.44	3.06

d. UO_3 Operations

	September	August	To Date
Uranium drummed, Tons	320	298	3631
Uranium shipped, Tons	334	263	3575
Average cooling time, days (Redox)	88	99	
Minimum cooling time, days (Redox)	80	83	
Waste loss, %	0.1	0.1	

e. TBP Operations

	September	August	To Date
Tons received from Metal Removal	216	173	2059
Tons shipped to UO_3 Plant	210	166	1958
Average Production Rate per operating day, Tons	7.11	6.18	

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e. TBP Operations (Continued)

	September	August
Average Daily Operating Rate for the month, Tons	6.99	5.35
Average yield, %	95.79	95.91
Total Waste Loss, %	3.58	4.09
Ratio Waste Volume returned to Volume removed	1.28	1.31
Percent down time	1.72	13.50

f. Power

	200 East	200 West
Raw water pumped, gpm	1 478	7 347
Filtered water pumped, gpm	474	1 112
Steam Generated, lbs/hr	23 528	148 337
Maximum steam generated, lbs/hr	32 000	202 000
Total steam generated, M lbs.	16 940	106 803
Coal consumed, tons (est.)	1 217	6 661

g. Waste Storage

	Equivalent Tons U
Metal Waste reserve storage capacity - T Plant	312
1st Cycle reserve storage capacity - T Plant	293
Metal Waste reserve storage capacity - B Plant	145
1st Cycle reserve storage capacity - B Plant	4
Redox Waste reserve storage capacity	445

2. Activities

a. Redox Processing

The Redox Plant operated at an average rate of 3.96 tons per day at 82% efficiency. The extraction batteries were shut down on September 4 for 1A, 1S, and 2D column flushes. After start up on September 5, poor decontamination of both product streams necessitated shutdown of the first cycle for rework of high gamma uranium and plutonium product. Plutonium rework was successful, but uranium rework failed to meet specifications, and about 20 tons of this material were transferred to the TBP Plant for further processing. Blanking the leaking H-4 oxidizer steam coils permitted feed preparation to continue until September 9 by using a cold oxidation technique. This resulted, however, in ruthenium removal which was insufficient to permit the extraction batteries to produce specification product, and it was necessary to shut down the plant on September 10 for replacement of the H-4 oxidizer. Operations were resumed on September 16 with a feed rate of 6 tons per day, and this was increased to 7.5 tons per day

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a. Redox Processing (Continued)

on September 21. The latter rate was maintained for the balance of the month except for a two day shutdown starting September 24 for replacement of the centrifuge (H-4 to H-2) feed jets.

b. TBP Processing

The TBP Plant operated at an average rate of 7.1 tons per day at 120% production efficiency. Feed rates to each extraction system varied between 2.5 and 6.5 tons per day with RA column waste losses averaging 3.5%. Failure of the condenser vent blower motor on two occasions was responsible for the only extended shutdowns experienced during September. Gradual buildup of metallic impurities in the uranium product dictated a return to the dual scrub operation for the RA columns on September 12. It was necessary to rework 12.5 tons of uranium product produced prior to the return to dual scrub operation, since the concentration of metallic impurities in this material precluded producing uranium oxide that would meet specifications.

c. UO_3 Processing

Plant operations were essentially normal and the July (revised) production commitment was exceeded without difficulty. Redox uranium product is currently being blended with TBP uranium product to provide a feed of about 9% UNH to the primary concentrator. The blending procedure provides a higher ratio of uranium to nitric acid in the concentrator feed stream and should reduce concentrator corrosion.

d. Waste Metal Removal

An adequate supply of feed was provided the TBP Plant by the tank farms with CR and UR farms producing most of the feed. Tank 101-T was cleaned out during the month, and TBP wastes are currently being received in Tank 101-C and then pumped overland to Tank 103-C. Pumping is necessary due to a plugged cascade line between Tanks 101-C and 102-C.

e. T Plant Processing

Operations were essentially normal in both the Canyon and Concentration Buildings and forecasted production was essentially attained.

f. 234-5 Processing

The September commitment of buttons and final shapes was delivered to the AEC. Alcohol inadvertently ignited in Hood 13 (Task III) of the RMA Line caused sufficient differential hood pressure to rupture two hood gloves and spread gross contamination in Zone III. This incident interrupted production for two days and necessitated activation of Task III of the RG Line for eight days, while maintenance and decontamination was in progress on the RMA Line.

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f. 234-5 Processing (Continued)

In September, the first buttons for off-plant shipment were removed from the line, sealed in plastic bags within commercial type "tin" cans, and delivered to the AEC for shipment. The packaging and canning operation worked very satisfactorily and will be followed for subsequent shipment of button material.

3. Special Operations

a. Waste Evaporation

September 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	254 000	161 000	93 000	37
242-T	476 284	276 750	199 534	42

The 242-B waste evaporator started operations on September 11 after an extended shut down for maintenance work. Feed for both evaporators was recent TBP wastes.

b. Pu Recovery - 234-5

The equivalent of 29.4 bottles of product was processed in Metal Recovery (Hood 40), 1.9 bottles were processed in Powder Recovery (Hood 41), and 39.7 bottles of product were transferred to the Concentration and Isolation Buildings for reprocessing.

c. Regeneration of C-3 Silver Reactor - Redox

The emission of 12 curies of I^{131} from the stack on September 3 was traced to failure of the C-3 silver reactor. The reactor was regenerated successfully on September 5, and the iodine emission returned to normal.

4. Schedule Variance

Redox plutonium and uranium production were both low with 96% and 88% of the amount forecasted in July.

T Plant production was 97% of the amount forecasted. The combined plutonium production of the two plants was 97% of the forecast.

The TBP Plant produced 120% of the revised forecast without undue difficulty.

The UO_3 Plant produced 107% of the revised forecast.

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4. Schedule Variance (Continued)

B. Equipment Experience

1. Operating Continuity

The Redox down time of 262 hours was essentially due to the need for decontamination and replacement of the H-4 oxidizer, replacement of the vacuum jet in the PR cage, and replacement of the centrifuge feed jets.

The A Line and B Line in TBP were down 12 hours due primarily to the need for replacing the condenser vent blower motors.

2. Inspection, Maintenance and Replacement

a. H-4 Oxidizer - Redox

Installation of the spare oxidizer pot was completed on September 16 after considerable difficulty was experienced in decontaminating and removing the failed pot.

b. D-12 Waste Concentrator - Redox

Failure of the fourth D-12 pot (a modified D-4 pot) since start-up was detected on September 4 after 86 days in operation. Recent corrosion data indicate that the presence of sodium dichromate may be the reason for the rapid corrosion experienced with these vessels.

c. Nagle Pump #24 - BXR Farm

Nagle pump #24 failed in Tank 102-B on September 24 due to a short circuit in the motor after 801 hours of operation. Replacement was made on September 28 with pump #26 and the failed pump will be salvaged.

d. Feed Pump - Tank 106-B - BXR Farm

A 20 gpm Fairbanks Morse feed pump in Tank 106-B failed on September 10 due to corrosion on the pump torque tube. Replacement was made with a new unit obtained from spare parts.

e. Sluice Nozzle Failure - CR Farm

One sluice nozzle failure occurred in Tank 104-C on September 22 due to a pressure rupture of the hose. This was the second such failure of the elongated sluice nozzles since their original installation. New hoses of higher pressure capacity are on order and attempts will be made to salvage the equipment pieces by the replacement of the hoses when the new ones are received.

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2. Inspection, Maintenance and Replacement (Continued)

f. Tile Field Failure - 242-B

Complete failure of the sanitary sewer tile field occurred at 242-B late in the month, and it will require replacement in October.

g. Process Pump Failures - TBP

Four process pumps failed during the month. Of these, 3 were seal failures and one a seal failure resulting from slinger ring failure. Bearing failure was also involved in 2 of the cases.

h. Condenser Vent Blower - TBP

Excessive corrosion to the condenser vent blower fan caused this unit to fail on September 4. Replacement was made with a spare unit.

i. EB-1 Evaporator - UO_3

The E-B-1 60% UNH concentrator was out of service about 72 hours due to uranium leaks. Four leaking tubes were blanked bringing the total of the sealed tubes to thirteen.

j. Filter Bag Replacements - UO_3

The X-3 primary filter bag was replaced twice, and thirteen filter bags were replaced in the X-11-1 and X-11-2 secondary filters.

k. Furnace Gaskets - Task II - 234-5

Repeated incidence of contamination under one furnace (#6) led to the finding that the gasket between the furnace retort and hood wall had deteriorated. Inspection of all the furnaces revealed that all the gaskets were in poor condition and will require replacement in the near future.

l. Powder - Chemical Addition Funnel - Task III - 234-5

The stainless steel powder-chemical addition funnel which failed in August was replaced. Installation of the replacement funnel was impeded by decontamination work in Task III and necessary modification of the new funnel to fit the existing equipment.

C. Improvement Experience

1. Process Tests and Revisions

a. Semi-Continuous Dissolving - Redox

A return to the semi-continuous method of adding nitric acid to the

a. Semi-Continuous Dissolving - Redox (Continued)

dissolvers was made on September 25 after laboratory tests indicated that the method has no adverse effect on column performance. Under optimum conditions, a 20% savings in nitric acid consumption is expected. This is a continuation of the test started in August, and then discontinued when it was felt that the dissolving method might affect column performance.

b. Concentrated Flow Sheet - Uranium Cycles - Redox

A return was made to the concentrated flow sheet for the uranium cycles wherein the uranium feed is concentrated to a higher specific gravity so that a higher feed rate can be attained while keeping the same volume flow through the columns. Feed rates of 7.5 T/D were maintained without any appreciable adverse effect on decontamination.

c. Self-Concentration of Stored Wastes - Redox

Self-concentration of waste stored in the 104 tank has been continued throughout the month with the condensate draw-off rate tapering from 0.9 gpm to 0.5 gpm over a one month period due to decay of activity in the tank. This rate of condensation confirms calculations made at the end of August which indicated the condensate rate would taper off to essentially zero by the first week in November with a total condensate draw-off of approximately 40,000 gallons.

d. Uranium Stripper - UO_3

Approximately 95% of the uranium which was formerly lost to the underground cribs is now being recovered by means of the stripper activated in August. Uranium waste losses from the stripper averaged about 1.4 pounds per ton of uranium processed during September.

e. Use of Hydrogen Peroxide as Pre-reductant - 231

Effective September 1, 50% H_2O_2 instead of 30% $(NH_4)_2SO_3$ is being used routinely for pre-reduction of T Plant material. This makes the use of H_2O_2 as the pre-reductant uniform for all types of material and eliminates the need for the $(NH_4)_2SO_3$ reagent in the Isolation Building.

f. Reduction of T Plant Recycle - 231

Addition of 50% ANN solution to T Plant F-10-P solutions to a final aluminum concentration of 1 g/l was tested. Ten T Plant runs using ANN solution in the first peroxide cycle gave a recycle loss of 4.4%, while ten T Plant comparison runs processed without the addition of ANN solution resulted in erratic values averaging 14.1%. Based on these data, the addition of 50% ANN solution to the P-1 solution was adopted as standard operating procedure on September 11.

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1. Process Tests and Revisions (Continued)

g. Time Cycle Reduction - Task II - 234-5

An over-all processing time saving of 103 minutes per run has been demonstrated utilizing a faster fluorination and refluorination cycle and was made standard, effective September 25.

2. Inventions or Discoveries

There was one invention reported during the month:

Inventor	Title
R. Overson	Remote Stud Cutter

D. Events Influencing Costs

1. Labor Variance

Total force of the Separations Section dropped by eight, due to terminations and transfers.

Through judicious scheduling and distribution of manpower, the Operations Sub-Section has been able to take advantage of this time cycle reduction by transferring two men to other Separations Section facilities. This will amount to an annual savings of $10,000 in direct labor costs for the 234-5 Building.

2. Other

A revision to the method of rinsing glassware in the 222-S Building and the deletion of the radioassay of the final product sample for the 231 Building will result in an estimated annual savings of $2,500 in applied labor charges.

E. Plant Development and Expansion

1. Project Status

Rehabilitation of the metal line in the P-10 Facility is complete.

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1. Project Status (Continued)

Revisions are in process to the equipment used for on-line sampling, liquid nitrogen supplying, and plastic bag manipulations. The revised Project Proposal for the Reactivation of the P-10 Facility is awaiting A & B Committee approval.

Design of the necessary changes to the TBP Plant to effect two-cycle operation is 95% complete. Actual construction is 30% complete with work continuing on the changes which can be made with no interruption of operations.

Detail design and scoping for 234-5 Building Expansion (Project CG-551) has proceeded satisfactorily. An alternate location for the Final Inspection Facilities, consisting of utilizing the 234-5 Field Maintenance Shop, has been proposed. The equipment in the 234-5 Machine Shop would be located in the 272-W Machine Shop. Existing floor space for Final Inspection Facilities would then be available on the first floor of the 234-5 Building for a cost less than that in the original project proposal.

Construction on CG-538, Redox Waste Tie-Line to U Farm, is ahead of schedule at 88%. The official inspection report with 24 exceptions was approved this month. The waste line is essentially ready for use.

Over-all design is now 32% and construction is 1.5% complete on CA-535, Redox Phase II Expansion. It is anticipated that the Phase II columns and column jumpers will be ready for use March 1, 1954, but Phase II rates cannot be realized until the new G-3 and D-12 are installed. These items are scheduled for July, 1954.

In order to expedite construction on CG-560, First-Cycle Supernatant Cribbing Facilities, an Interim Work Authority and Field Release was issued pending the processing of the AEC directives authorizing construction. The drilling of the monitoring wells in both 200-E and 200-W Areas began on September 25; the digging of the trenches in 200-E Area was started on September 29. Barring unforeseen delays, completion of the well in 200-E Area is expected by October 19, 1953.

It is the general consensus of Separations Section personnel connected with construction of the Purex Facility that a more realistic estimate for completion is May 1, 1955 instead of the official AEC target date of January 1, 1955, due to the poor status of procurement of materials and equipment, and the progress made by the construction contractor to date. This delay in construction completion will affect Section production, manpower, and essential materials schedules, but may be compensated to a certain degree by a predicted delay in completion of the KW reactor.

2. Plant Engineering

Formulae for calculation of the approximately thirty standard costs for each of the eight cost centers of the Section were developed. These

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2. Plant Engineering (Continued

formulae were transmitted to Manufacturing Cost of the Financial Department in order that they may compute variances from standard for all accounts in the future and report these variances routinely in the Section Monthly Cost Report. After review of the formulae with Manufacturing Cost, a trial run of the calculations was made for the August cost report.

A study of labor utilization in the 234-5 Spectrographic Laboratory was completed. Possible savings of $10,000 per year in direct labor are indicated in this study.

An investigation was started to determine the number of masks which are being used by the entire Manufacturing Department for protection against radiological hazards, and to develop means for decontamination and sanitization. Procedures will be developed for three types of mask control; namely, individual assignment, building control, and central mask station.

F. Significant Reports Issued

1. Routine

Number	Title	Author
HW-29498	Separations Section-Operations Sub-Section Monthly Report	V. R. Chapman
HW-29499	Separations Section-234-5 Operations Monthly Report	V. R. Chapman
HW-29531	Separations Section-Plant Engineering Sub-Section Monthly Report	C. P. Cabell
HW-29503	Separations Section-Process Sub-Section Monthly Report	W. N. Mobley
HW-29517	Separations Section-Radiation Monitoring Sub-Section Monthly Report	A. R. Keene
Restricted	Separations Section-Power and Maintenance Sub-Section Monthly Report	R. T. Jessen
HW-29520	Separations Section-P-10 Extraction Unit Monthly Report	O. V. Smiset
HW-29487	Monthly Progress Report, Separations Section, Plant Engineering Sub-Section, September 1953	F. A. Hollenbach
HW-29545	Separations Section - Essential Materials	J. P. McBride
HW-29287	Separations Process Committee Minutes	O. F. Beaulieu

F. Significant Reports Issued (Continued)

2. Non-Routine

Number	Title	Author
HW-29318	Radiation Incident, Class I, No. 79	J. J. Kaigler
HW-29508	Radiation Incident, Class I, No. 83	D. R. Koberg
HW-29346	Emission of Crystals from Redox Stack	R. N. Donelson
HW-28918	Radiation Studies for Task III Design	G. L. Helgeson
None	Accomplishments of the Contact Engineering Group - Project CA-513	F. A. Hollenbach
HW-29203	Basic Information for Steam Standard, 224-U Building, P.E. Report No. 75	R. H. Silletto
HW-29204	Basic Information for Steam Standard, Waste Metal Recovery, P.E. Report No. 76	R. H. Silletto
HW-29359	Proposed Work Simplification, 234-5 Spectrographic Laboratory, P.E. Report No. 84	J. E. Fouts
HW-29235	Effect of Proposed Production Scheduled Changes on Economic Benefits of Advancing Purex Start-up Date, P.E. Report No. 85	V. P. Madsen
HW-29307	Waste Disposal by Means of Incineration, P.E. Report No. 86	S. G. Smolen
P.E. Report #87	Acetogen Gas Study	M. Pociluyko
P.E. Report #88	Forecast of Purex Manpower Requirements	B. E. Clark, Jr.
HW-29431	Material Balance and Isotope Correction Factors	L. M. Knights
HW-29251	Review of Metal Fabrication Policy and Position	W. N. Mobley
HW-29242	Separations Section - Waste Status Summary August 31, 1953	D. McDonald - G. K. Carpenter

III PERSONNEL

A. Organization

There were no organizational changes in the Separations Section during the month of September.

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II PERSONNEL (Continued)

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	5	5	0
Operations Sub-Section	597	587	-10
Power and Maintenance Sub-Section	569	566	-3
Process Sub-Section	200	200	0
Radiation Monitoring Sub-Section	73	73	0
Plant Engineering Sub-Section	30	30	0
P-10 Extraction Unit	25	30	5
Section Total	1499	1491	-8

C. Safety Experience

There were no major injuries, but there was one sub-major injury in the Separations Section in September. This injury was sustained by a Utility Operator in the 224-U Building who suffered a separated tendon on his right index finger while attempting to close a slide damper. The digit was pinched between the ring of the damper handle and the bottom of a furnace, and required minor surgery. A complete report of the injury has been issued as an investigation of Sub-Major Injury #242.

One Separations Safety Stampede inspection was held in September and disclosed that area housekeeping has shown marked improvement, although some items still need correction. A significant fact noted in the first inspection was that no personal safety violations were detected by the committee, and this is indicative of a high degree of safety consciousness on the part of Separations Section personnel. The contest continues through October with the "Sioux" Tribe (S Area) currently in the lead for top honors.

D. Radiation Experience

In the Redox Plant, failure of the H-4 pot coils, which necessitated cold oxidation to prevent additional contamination of the Redox swamp, caused stack emission of 53 and 84 curies/day of ruthenium on two successive days. With replacement of the H-4 pot and resumption of normal head end treatment, ruthenium emission returned to its normal rate of less than 1 curie/day. Ruthenium emission averaged 6.3 curies/day and Iodine^{131} emission averaged 1.7 curies/day.

The burial of the defective H-4 pot proved to be the highest level radiation work ever performed in the Separations Section. The pot, which had been decontaminated for several days in place in the cell, showed a dose rate of 250 mr/hr at 500 feet. Excellent planning resulted in successful burial of the H-4 pot with exposure rates limited to 3 r/hr.

A major decontamination program was planned for the Redox canyon deck and

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D. Radiation Experience (Continued)

crane surfaces. The extreme dose rates, which exist on the canyon deck and crane, constitute a significant threat to sustained production in the Redox Facility.

Two Class I radiation incidents resulted in clothing contamination of a Utility Operator in the 221-B canyon (No. 83) and facial and other personal contamination of three employees in the 234-5 Building (No. 79). The latter incident was caused by the unauthorized use of alcohol in a process hood which caused a small explosion. Bio-assay samples from the personnel involved indicated no internal deposition of plutonium.

E. Personnel Activities

1. Non-Exempt Information Meetings

The sixth and seventh of the scheduled series of non-exempt information meetings were held in September with a total attendance of 250.

2. G.E. Supervisory Selection Program

Evaluation was completed for one Radiation Monitoring and five Operations personnel in September. Eight additional Operations personnel are currently in process of evaluation.

3. Conference Leading Training

On September 28, seven Separations Section personnel completed the Conference Leading Training conducted by Training and Development personnel.

4. Laboratory Technical Personnel

Four lecture courses were held during the month with a total attendance of 113.

5. Emergency - Disaster Training

Eighty Separations Section personnel have completed the basic rescue training course to date.

6. Visitations

K. K. Campbell attended the September Conference on Nuclear Engineering at the University of California, Berkeley, California, and presented an unclassified paper entitled "Maintenance Work in the Field of Nuclear Energy".

R. T. Jessen spent September 16 through 23 in Los Angeles consulting with personnel of the Peerless Pump Co. and Standard Steel Co. regarding design and operating performance of equipment manufactured by these vendors.

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ENGINEERING DEPARTMENT

SEPTEMBER 1953

TECHNICAL SECTION

Eight ruptures of normal uranium slugs occurred during the month. Three of these occurred in the central orifice zone at B Pile. One was a can failure of a four-inch Fernald slug. Two four-inch slug failures which were stuck in the tubes have not yet been inspected.

Eight ruptures of "C" type enrichment pieces occurred during the month. All of the ruptured pieces exhibited swelling near the cap end, four of them having can wall cracks near this end.

A pilot charge of three enriched slugs located under conditions designed to exceed the alpha to beta phase transitition temperature at the slug core was loaded into C Pile September 3.

The failure of the oxidizer (H-4) coil interrupted Redox production during the month and led to the evolution of abnormally large amounts of ruthenium with the stack gases. These conditions have accelerated revisions to the flowsheet to minimize corrosion attack at this point as well as in the waste concentrator (D-12); both conditions appear to be related to the concentration of chromium (VI) present. Trial of proposed revisions has been deferred until October in order to minimize any disturbance to production which was restored to values equivalent to 240 percent of design by the use of concentrated (2.5 M) uranium feed streams during the later part of the month.

Performance of the metal recovery and conversion facilities was uneventful except for a brief period of operation on the single scrub flowsheet which resulted in gross contamination of the product with iron, chromium and nickel resulting from corrosion in the 60 percent UNH concentrators. Following the return to dual scrub flowsheet the plant operated at rates equivalent to 120 percent of design producing specification grade UO_3. Rework of some high gamma content UNH from Redox successfully decontaminated the material and resulted in a lower net loss of uranium from the metal recovery plant.

The Purex prototype facility demonstrated that the introduction of "louver" plates into both the scrub and extraction sections could be utilized to minimize channeling effects without adversely limiting the flooding velocity. The Purex HA column was operated at rates equivalent to 2 to 20 tons of U/day with waste losses of less than 0.1 percent. The metal recovery plant flowsheet was investigated over the range of 4 to 10 tons of U/day with waste losses of less than 0.5 percent.

The decision has been made to convert from triple dip canning of slugs to salt bath heat treatment of rods and lead dip canning of the slugs machined therefrom. A series of grain size (transformation) standards are being prepared for use at Hanford and the Feed Materials Production Center. Use of

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equivalent standards will insure uniformity between the ultrasonic tests at the two sites.

Specifications for chemical composition, reactivity, rolling, and beta heat treatment of uranium have been drawn up. These will be included as part of the lead dip canning process specification which is to be issued shortly. The Feed Materials Production Center should be able to produce salt bath heat treated rods on a production basis by June 1954.

The Redox IIA-IIB reflux flowsheet was tested in a continuous 33-hr. Mini run. Steady state conditions were a product concentration of 75 g Pu/l, 0.1% waste loss, a maximum acidity of 0.75 M in the organic phase, and a gamma DF of 600 across the cycle--enough to permit elimination of the third plutonium cycle. In a 3½ hour extension of the run under slightly modified conditions a steady-state acidity of only 0.4 M in the organic phase was obtained without detriment to the other performance characteristics.

Infrared studies of the structure of U(VI) oxide show that it may exist as a dehydrated chain structure or as a partially hydrated monomer. This work may explain the large variations in reactivity of UO_3 in K-25 processing to UF_4 and the observed beneficial effect of storing Plant UO_3 in a humid atmosphere. Work, planned cooperatively with K-25, is continuing.

In the future Hanford is expected to receive large amounts of metal derived from recovered and sweetened uranium. Since the isotopic composition of this material will vary from 0.68 to 0.71% U-235, a large scale accountability problem arises. An apparent solution lies in the use of a gamma scintillation spectrometer to selectively count the low energy gamma emission from U-235. A precision of 0.0035% (standard deviation for one determination) was obtained with material containing 0.70% U-235.

The mechanical properties of uranium rods which had been rolled at 250, 350, 450, 550, and 650° C have been determined. These data show that the tensile properties of uranium metal are reduced as the fabrication temperature is raised. Additional samples from the same rods are being vacuum annealed to determine the effect of annealing on the mechanical properties of uranium metal.

A series of tests to determine the rate of creep of sections of horizontal control rod thimbles have been completed. The sections were centrally loaded to simulate in-pile pressures of three and twelve inches of water. The limiting temperature and pressure determined from these tests appears to be 450° C and three inches of water.

The relative corrosiveness of chromic ion and dichromate ion in boiling nitric acid solutions on types 304ELC and 309SCb stainless steels have been determined. Concentrated nitric acid solutions (40 to 60%) containing 100 to 1000 ppm Cr(VI) are approximately ten times more corrosive than corresponding chromium (III)-nitric acid solutions. Further, in both environments, the corrosion rate is proportional to the chromium concentration. Corrosion tests are in progress to evaluate systems in which CR(VI) has been reduced by treatment with Fe(II).

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Use of small solid slugs is of interest as a means of achieving high power densities at tolerable slug core temperatures that involves a minimum of excursions into unproven areas of fuel element assembly design. Using data from two experiments with the 0.925 inch diameter slug and the calculation scheme and constants which have been derived from exponential pile data on standard size slugs, the buckling and other lattice constants using the 0.925 inch diameter slug have been calculated. The lattice spacing of greatest interest is that at which wet and dry buckling are equal. This occurs at a spacing of 5.3 inches, where the buckling is 79 microbucks, k is 1.039 and the graphite to uranium mass ratio is 3.69. Comparable quantities for the K Pile lattice are 79 microbucks, k = 1.040 and mass ratio = 3.51. Conversion efficiencies appear to be about the same in the two cases. Thus it appears possible to enjoy the two signal advantages of a higher power density at a given core temperature and safety in the event of lost cooling water without having to enrich and without having to accept a lower conversion ratio than that given by K Pile.

DESIGN SECTION

During the month direct engineering effort for the Section was distributed approximately 60% to Expansion Program activities, 21% to research and development studies and 19% to other projects and design orders.

Over-all design on Project CA-512-R, 100-K Reactor Facilities was advanced to 96.5%, an increase of 0.6% during the month. Progress for September is based on 1960 drawings, whereas the previous monthly report reflected progress based on approximately 1920 drawings.

Detail design of the 200 Area Expansion Program, Project CA-513, was concentrated on the Purex Waste Facility. Detail design of this facility is approximately 93% complete, an advance of 18% during the month. The design of the Outside Facilities was advanced to 95% completion and design of the Metal Conversion Plant Expansion was advanced to 99% completion.

Detail design on the 300 Area Expansion Program, Project CA-514, was advanced 2% during the month to 63% complete. The small percentage increase in completion reflects the added design work of renovating buildings 3707-A, 3707-B, 3719 and 3706. This previously had been scheduled to be performed by an architect-engineer. Design activity continued to be concentrated on the 313 Building process equipment.

Design work on Project CG-551, Expansion of Building 234-5 Facilities, was advanced 6% during the month to 36%.

Design work on Reactor Plant Modifications for Increased Production, Project CG-558, was started during the month. Research and development activity on this project resulted in the issuance of a document setting forth the basis for the preparation of scope design.

Design work on Reactivation of P-10 Facilities, Project CG-550, advanced to

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89% complete, an advance of 22% during the month.

Design work on TBP plant revision for series operation of the process lines, which was started last month on emergency basis, is 95% complete. A project proposal, CG-562, was prepared for design and procurement funds for the installation of new columns in the TBP Plant and the project was authorized by the Commission on September 14, 1953. This work is being expedited so that the columns can be installed at the same time the plant is converted to series operation as well as to obtain the benefits from reduced waste losses.

The installation in Building 314 of the prototype fuel element canning machine is nearly complete. Mechanical testing and adjusting are underway.

Research and development work on the installation of facilities for conversion of 100-D, DR, B, F, and H water plants to the activated silica-alum water treatment process has been essentially completed and a project proposal for design and construction is being prepared.

PROJECT SECTION

Completion status of major projects at month's end was as follows: CA-187-D-II, Redox, 6%; CA-431-A, 100-C Waterworks, 99.9%; CA-431-B, 100-C Reactor, 99.9%; CG-438, Ball Third Safety System, 97%; CG-496, Recuplex, 22%; CA-512, 100-K Area Facilities--Water Plants, KW, 32%, KE, 26%--Reactor Buildings, 105-KW, 27.9%, 105-KE, 14%; CA-513, Purex Facility, Part "A," overall 10.4%, Part "B," 50%, Part "C," 100%; CA-514, 300 Area Expansion, overall, 13.5%.

The warehousing program at G. O. Carlson for Purex materials is not yet progressing satisfactorily. To date neither a formal contract nor purchase order has been accomplished for the warehousing of stainless steel. Material is not arriving at the warehouse as was planned, and the G. O. Carlson Company is holding material with their own stock until fabricators' requests are received.

The limonite contract, previously reported as cancelled, was modified. Later shipments of limonite have not been of satisfactory quality for aggregate. An inspection at the mine revealed that the limonite is useful only as sand; however, additional laboratory tests are being made. Investigations of other mines are being conducted.

A court injunction brought to a close on September 25 the work stoppage by machinists in the 2101-M Building. Asbestos Workers' Union has continued to withhold men because of no contract at Hanford. Plumbers and pipefitters have apparently made little progress in their agitation for special hazard pay. An unfair labor practice charge was filed by machinists against Kaiser Engineers. The hearing has been scheduled for October 12.

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An employee of Kaiser Engineers was fatally injured by a fall from a scaffold at 105-KE on September 19. A fire started at 3:10 p.m. September 23, over the inner rod room at 105-KW and caused $15,000 damage.

The overall construction completion for 100-K Area, including General Facilities and the 2101-M Building, was 26.9% as compared to scheduled completion of 34.8%. The 105-KW Building was 27.9% complete, or about 17% behind schedule.

Construction of 100-K Waterworks was hampered by labor disputes; however, satisfactory progress was made on structural work of Filter Plants and the 165 and 190 Buildings. Earthwork on the jetty for outfall lines was nearly completed, and laying of pipe was begun. Factory acceptance tests of the first primary pump for the 190 Building were conducted September 15, and results are being reviewed.

The subcontract for installation of siding on both 105 Buildings was cancelled. Kaiser will complete the work. The first and second tiers of crates in 105-KW have been packed with the shielding material.

Deliveries of graphite have continued ahead of schedule, and far above present output at the fabrication shop. Mock-up of the first 30 layers has progressed through four layers.

Construction of Part "C," Purex Prototype was completed. With construction of Part "B," UO_3 Conversion, about 50% complete, it was decided to suspend work until all critical equipment has been delivered. Architect-engineer design of Part "A," Purex Facilities, was 74% complete, or 6% behind schedule. Development of the 40-inch centrifuge was successfully completed; and scale-up for the 48-inch prototype was begun immediately. Construction of 202-A Building was 5.8% complete, as compared to 9.2% scheduled completion. Only about half of the scheduled concrete placement has been accomplished.

Progress of construction on 241-SX Tank Farm was delayed by late delivery of steel for tank liners and by cancellation of contract with the roofing subcontractor who was to install the bottom membrane. A new subcontractor has been obtained. Overall construction was 17% complete.

ORGANIZATION & PERSONNEL

Total on Roll, September 1, 1953	1,571
Accessions	23
Separations	64
Total on Roll, September 30, 1953	1,530

R. J. Schiewe for A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

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ENGINEERING ADMINISTRATION SUB-SECTION

SEPTEMBER 1953

A list of approximately 125 operation employees to receive publications and information of a strictly scientific, technical, or engineering type has been established. This list will be reviewed periodically by the Library and kept up-to-date. The list has been set up on the plant Addressograph and will be used immediately to provide improved Hanford distribution of a number of Schenectady technical publications which should be of wide interest here. Arrangements have been completed with Schenectady to have these publications delivered in package lots directly to the Addressograph unit so that prompt and efficient distribution of them can be made. Requests for research reports, books, periodical articles, etc., generated by the distribution of these publications, will be funneled to Technical Information rather than direct to Schenectady.

Regrouping of work functions continued based on a recent redefinition of the scope of activities of Classified Files. OPG 15.9 was issued which relieved the Classified Files of the routine disposition of classified scrap. Under the new arrangement, this function will be performed by the area patrols. Transfer of this responsibility will save many hours of Files' time and eliminate an assignment which was difficult for female personnel to handle. On September 28, 1953, the handling of Registered Delivery packages, previously a Files' function, was transferred to the Plant Auxiliary Operations Department. Other changes to be embodied in future OPG's include transferring the responsibility for assembly and destruction of reproduction masters to Plant Printing and Duplicating Services, the handling of rough drafts, and the elimination of the present quarterly inventory requirement. Drafts of these proposed Organization and Policy guides are being circulated for approval.

The audit of Vitro's accountability records for classified documents created on Job 15 was completed by S. B. Badgett in accordance with Classified Files procedure. Vitro's accountability records were reported in excellent shape. Receipts have been received from Vitro for the Job 15 classified documents which they plan to retain, as well as for the Job 11 classified documents for which accountability was temporarily accepted by the General Electric Company. Vitro has subsequently supplied to Hanford a complete set of file record cards giving the final disposition of all documents created under sub-contract G-148. Some further checking of these records will be carried out by Files personnel as a further test of Vitro's record keeping.

During the month the following major contract activities were handled:

Bid documents and specifications have been prepared for advertising for the work of processing, editing and finishing documentary films to be taken at Hanford. Notice of Invitation to Bid was executed September 29. Invitations will be mailed to prospective bidders October 7 with bids for the work to be received October 21.

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Special Agreement No. G-32 between General Electric and Teaching Film Custodians, Inc. covering the rental of short movie subjects for the Safety & Fire Protection Unit was executed by the contractor and transmitted to AEC for approval September 21.

Special Agreement No. G-26 between General Electric and General Telephone Directory Company for the printing of the Richland telephone directory was approved by AEC September 23. Conformed copies have been distributed.

Special Agreement No. G-30 between General Electric and Charles Bruning, Inc. covering the quarterly servicing of Whiteprinting reproduction equipment was approved by the Commission September 17. Conformed copies have been distributed.

Special Agreement No. G-31 between General Electric and Abadan-Spokane covering the quarterly servicing of Ozalid equipment was executed by the contractor and transmitted to AEC for approval on September 21.

Consultant Agreement No. 109 between General Electric and George W. Watt covering consultant services was approved by the Commission September 25. Conformed copies have been distributed.

Modification No. 4 to Special Agreement No. G-21 between General Electric and Bird Machine Company covering an extension of time to the agreement for redesign and modification of a centrifuge was transmitted to the Commission for signature on September 18.

Modification No. 1 to Special Agreement No. G-13 between Battelle Memorial Institute and General Electric, covering an extension of time of the Agreement, was transmitted to AEC for approval September 25.

Modification No. 2 to Special Agreement No. G-22 between General Electric and Future Farmers of America, Inc., covering the transfer of title of certain sheep, was transmitted to the Commission for signature September 15.

Modification No. 6 to Special Agreement No. G-5 between General Electric and Union Carbide and Carbon Corporation, covering changes in process specifications, was sent to the contractor for execution September 24.

Modification No. 4 to Special Agreement No. G-12 between General Electric and Union Carbide and Carbon Corporation, covering changes in process specifications, was sent to the contractor for execution September 24.

Rental Agreement No. G-33 between General Electric and The McBee Company, covering the rental of a Key Sort machine, was sent to the lessor for execution September 22.

Modification No. 1 to Special Agreement No. G-17 between General Electric and the University of Washington School of Nursing, covering an increase in

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fee to be paid by the University for field training of student nurses at Hanford, was sent to the University for execution September 28.

Modification No. 2 to Subcontract No. G-396 between General Electric and Reed College, covering an extension of time of the Agreement, was executed by General Electric and transmitted to AEC on September 25 for approval prior to being sent to the contractor for execution.

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PILE TECHNOLOGY SUB-SECTION

MONTHLY REPORT

SEPTEMBER, 1953

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VISITORS AND BUSINESS TRIPS

R. C. Boldt visited here September 17, 1953, from the Westinghouse Atomic Power Division, Pittsburgh, Pennsylvania, to discuss radiation experiments.

T. F. Fisher visited here from Knolls Atomic Power Laboratory, Schenectady, New York, September 28 through October 9, 1953, for consultations on KAPL-180 irradiations.

R. F. Koenig visited here September 23 and 24, 1953, from Knolls Atomic Power Laboratory, Schenectady, New York, for discussions on KAPL-114.

J. C. Ballinger visited the University of Chicago, Illinois, September 10 through 14, 1953, to attend a Conference on Calorimetry.

J. A. Berberet and G. E. Wade visited Phillips Petroleum Company, Arco, Idaho, September 30 and October 1, 1953, for consultations regarding MTR slug exposure facility.

L. P. Bupp, W. C. Riley, A. T. Whatley, and R. E. Woodley attended a Symposium on Irradiations Effects in Graphite at Brookhaven National Laboratory, Long Island, New York, September 14 through 16, 1953.

W. C. Riley visited National Carbon Company, Clarksburg, West Virginia, September 17, 1953, for technical consultations on the manufacture of graphite-reactor grade.

R. E. Johnson and R. H. Purcell attended the American Institute of Chemical Engineers Meeting in San Francisco, California, September 13 through 16, 1953.

W. C. Riley visited Battelle Memorial Institute, Columbus, Ohio, September 17 and 18, 1953, for coordination of Hanford and Battelle graphite programs.

J. M. Skarpelos visited the South District Filtration Plant, Chicago, Illinois, and attended the American Chemical Society Meeting there September 4 through 12, 1953.

A. W. Thiele visited Los Alamos Scientific Laboratory, Los Alamos, New Mexico, August 31 and September 1, 1953, to discuss technical problems regarding neutron spectrum measurements.

ORGANIZATION AND PERSONNEL

Personnel totals are as follow:

	August	September
Administrative	4	4
Pile Engineering	83	78
Pile Materials	65	60
Special Irradiations	24	24
Total	176	166

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Pile Engineering: One Engineering Assistant transferred in from Manufacturing-Metal Preparation, one Technical Graduate - Rotational transferred in from Fuel Technology Sub-Section, one Technical Graduate - Rotational transferred to Manufacturing-Reactor-Process, one Secretary B terminated, two Junior Engineers, two Engineering Assistants, and one Technical Graduate terminated to return to school.

Pile Materials: Two Engineering Assistants and one Technologist C terminated to return to school, one Junior Engineer went on Leave of Absence for three months, and one Steno-Typist was re-assigned to Special Irradiations Sub-Unit.

Special Irradiations: One Stenographer transferred to Radiological Sciences, and one Steno-Typist was re-assigned from Pile Materials Unit.

PROCESS TECHNOLOGY

Power Level Limits

D Pile operated during the month under production test conditions and was limited by tube outlet water temperatures. B and F Piles were limited by vapor binding or corrosion limits, DR by maximum tube power limits for the DR-10 Program, and H by graphite temperature limits, even with 30 per cent helium addition. C Pile continued to operate on fixed maximum tube power limits.

Process Changes

The central zones of B and F Piles were placed on trip before boiling tube power limits following the necessary adjustments of the pressure monitoring system.

Slug Rupture Experience for September

Normal Uranium: Eight ruptures of normal uranium slugs occurred during the month. Three of these occurred in the central orifice zone at B Pile; a cap failure of a four-inch Fernald slug and two four-inch slug failures which were stuck in the tubes and have not yet been inspected. Five uranium cleavage failures occurred in central orifice zone tubes at C Pile. One ruptured piece was an eight-inch Fernald slug from a normally loaded column. The other four were Group Eight Metal slugs which had been charged in enrichment columns to center the aluminum-uranium alloy "C" pieces. Two of the ruptured Group Eight slugs had been charged adjacent to "C" pieces and were among the highest powered uranium slugs in these tubes. The positions of the other two ruptured pieces are not known. The uranium pieces in these enrichment columns had exposures substantially higher than those in comparable positions in normal uranium columns at time of discharge.

The four-inch cap failure at B and eight-inch uranium cleavage failure at C occurring this month were the first ruptures of slugs from the Fernald plant. This metal was first charged in quantity in the spring of 1953. Rupture rates based on these two ruptures are now being analyzed.

A side failure of a four-inch 63 S aluminum jacketed slug occurred during the month in the central orifice zone at H Pile. There have now been ruptures of two 63 S aluminum jacketed slugs out of the approximately 40 tubes which were charged with this material. Both of these have been side failures.

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One slug rupture occurred in the central orifice zone at B Pile in a tube containing four-inch alpha canned uranium slugs from rods salt bath beta heat treated at Fernald. This tube was charged under Production Test 313-105-7-M. The ruptured piece was stuck in the tube and has not yet been inspected. This was the first rupture to occur in the approximately 290 tubes which were charged under this production test.

The over-all rupture rate for normal uranium columns in C Pile continues to be comparable to those for the other piles. The uranium cleavage failure rate at C, however, is considerably above that of any other area. All of the ruptures which have occurred at C Pile have been of this type, as compared with an average of 20 per cent of the total failures at the other piles being cleavage failures.

Performance of the Group 9 Metal, from the slug rupture standpoint, continues to show improvement over that of the best Group 8 Metal.

Al-U^{235} Alloy Slug Failures: Eight ruptures of "C" type enrichment pieces occurred during the month. Seven of these failures occurred in four tubes in the central orifice zone at H Pile. The other occurred in the central orifice zone at C Pile. All of the ruptured pieces exhibited swelling near the cap end, four of them having can wall cracks near this end. On one slug, the swelling extended to a crack about one-fourth inch from the can end. The other three ruptured pieces showed no obvious break in the cap or jacket, but the marked swelling of these pieces indicated that water had penetrated to the active metal.

To date 21 "C" slug failures have occurred in 12 out of the approximately 85 tubes charged with this type of material.

Enriched Uranium Slug Failures: On September 5, slug ruptures occurred in two C Pile central orifice zone tubes. These tubes were two of the three which contained "E" Metal, uranium slugs enriched to 1.75 per cent U^{235}, in thin walled cans. Six other tubes of similar exposure history contained "E" slugs in thick walled cans.

Inspection of the metal from the rupture tubes disclosed two slug ruptures from tube 1463-C and one from tube 3766-C. All three were uranium cleavage failures of "E" slugs. These slugs had been operating at powers comparable to those of the highest powered four-inch "E" pieces in the other tubes and at 80 per cent of the highest powers obtained with eight-inch piece loadings. These powers were above those of any normal uranium slugs in the pile. They were at exposures, calculated on the basis of heat generation in the slug, appreciably higher than the exposures of normal uranium slugs at time of discharge.

Higher Specific Power Operation

Production Test 105-532-A-2, "Irradiation of Enriched Uranium Slugs": Increased specific slug powers were obtained by the irradiation of slugs enriched to 1.75 per cent U^{235}. Following ruptures in two tubes, discussed in the preceding paragraph, the four remaining tubes were also discharged. Two ruptured pieces

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were removed from tube 1463-C. The ruptured pieces were the first and third "E" slugs from the front of the tube charge and both were uranium cleavage failures. The "E" charge in tube 1463-C had been operating for 110 days at an average tube power of 500 kw. The first "E" slug had been operating for the over-all exposure period at a calculated power of about 15 kw, and during the last month, at calculated values of 18 kw per slug. (With C Pile flux distribution, the highest four-inch slug in a tube at 820 output is calculated to produce 14 kw.) This ruptured piece had an exposure calculated on the basis of heat generation within the slug, equivalent to that of the highest powered slug in a normal four-inch metal slug at a tube exposure of about 650 MWD/T. The piece had been operating with an average calculated surface temperature of about 55 C so that on the basis of corrosion data from tubes previously discharged, it should have had about 0.02 times the corrosion of the "E" pieces having the highest corrosion rates. The surface of this piece appeared to be in good condition.

The other "E" slug from tube 1463-C had been operating at a power six per cent higher than the first ruptured piece and had an exposure six per cent greater. This piece had been operating with an average surface temperature of about 60 C and would have had a total corrosion about 0.025 times that of the "E" slug having the highest corrosion rate.

The ruptured piece from tube 3766-C was removed from the process tube with great difficulty, and when finally discharged was in at least five pieces. However, the rupture was identified as being a uranium cleavage type failure, the fifth enriched slug in the tube, and adjacent to the normal uranium segment of the tube charge. Power and exposure are comparable to the third enriched piece in tube 1463-C, but surface temperatures were about 4° higher.

Production Test 105-532-A-3: A pilot charge of three enriched slugs located under conditions designed to exceed the α to β phase transition temperature at the slug core was loaded in C Pile on September 3. Operation has been satisfactory during the month with the highest power four-inch piece at an output calculated to be 70 kw per foot of uranium. Based on the methods of calculation shown in HW-27930, the core temperature exceeds the transition point.

Production Test 105-533-A: The effects of increased tube powers localized in a central region of about 100 tubes in C Pile are being investigated by changes in the poison arrangement. Fifty tubes are now being operated at from ten to 17 per cent above the 700 kw per tube limit outside the experimental zone. Two process tubes were removed and the slugs set aside for inspection, but no results have been obtained at month end.

Operation of D Pile with Maximum Panellit Protection

Operation with the reduced trip ranges continued to be satisfactory during August under Supplement A to Production Test 105-534-A. Recent preliminary results of the monitoring program indicate no undue wear and tear on the slugs and tubes at the increased water velocities and tube powers, but do indicate that the graphite may be expanding along the entire length of the tube at a rate comparable with expansion rates in 1946-1947. A further indication of graphite damage is the apparent necessity of adding more and more helium to

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maintain constant maximum graphite temperature at constant power level. At the present time the helium concentration at D Pile is about 40 per cent whereas two months ago about 25 per cent helium was all that was required. The helium concentration shows a cyclic variation, however, and this may be a temporary maximum. In addition, the graphite mining data from two central zone tube channels tend to confirm the deleterious effects of helium addition. This information is still somewhat preliminary and subject to verification.

Additional Studies

Preliminary work has been initiated to determine the effect on pile processes of "combined operations", where irradiation, separation, and diffusion plant operations would be coordinated to achieve maximum uranium utilization and minimum unit product cost.

Additional process analyses work has been performed in connection with preparation of the pile and water plant improvement project.

PILE PHYSICS

Pile Enrichment

Following AEC approval to proceed with large scale fringe enrichment at C Pile, a document has been issued discussing the technical factors involved.(1) In addition to indicating the method and results of calculations used in planning this loading for the third lattice unit from the reflector, recommendations are presented concerning the modifications to pile components required in order to carry out this program.

The final report on the H Pile enrichment experiment, which has been written in collaboration with the Process Technology Sub-Unit, is now in rough draft form. This report will cover all phases of enrichment from the theoretical basis to the observed operational effects.

C Pile Start-Up Report

The formal report which summarizes the comprehensive C Pile start-up program and presents the technical data obtained is in final form and is now awaiting publication.(2) Fundamental pile data obtained from other pile start-ups have also been included in the attempt to make this a more complete reference document. The data obtained at the C Pile start-up include the wet and dry critical bucklings, the relation between inhours and buckling units; the reactivity effects of various column loadings encountered in pile operation; the effectiveness of the rod systems; and the results of special tests including the reactivity effect of air in the pile atmosphere, the effect of a water annulus on control rod strength and the reactivity effect of a particular hollow slug design.

(1) HW-29430, "Technical Aspects of Large Enrichment of C Pile", DK McDaniels - GC Fullmer.
(2) HW-29034, "C Pile Start-Up Technical Data", DK McDaniels - GC Fullmer.

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Scram Transient Studies

Transients following test pile scrams from equilibrium conditions have been obtained whenever possible during the past month. It is felt that the technique and equipment are sufficiently refined that test pile measurements can be reproduced to satisfactory precision. A production test will be prepared soon outlining the program required to establish the feasibility of this method in the production piles.

An analysis of the errors inherent in the measurement due to the uncertainty in the various delayed neutron periods indicates a maximum probable error of ten per cent if the uncertainties are all assumed to exist in the same direction; the inherent error due to uncertainties of the delayed neutron groups, if assumed random, would be much less. Evaluation of the safety control systems by this method will therefore be dependent on the experimental techniques employed rather than being limited by uncertainties in the physical constants employed.

Exposure Calculations

A production test has been prepared in rough draft form to determine the long term metal gains curve from individual slug data. After receiving exposures ranging from 50 MWD/ton to 2000 MWD/ton in a production pile, these slugs will be returned to the test pile for making comparison measurements; the magnitude of the effect in a Hanford pile can be calculated using the conventional weighting theorem.

Several conferences have been held recently with people both at Hanford and in the Washington AEC concerning the complexities involved in attempting to predict the Pu^{239} and higher isotope yields from irradiated metal. The purpose of the meetings was to investigate the possibility of improving present procedures for predicting yields and for obtaining radio-assays in the 200 Areas. Since February of this year a consistent discrepancy on the high side has existed between the final weighed output of plutonium and the amount predicted on the basis of exposure figures.

Plant Expansion Calculations

A study is under way to determine as precisely as possible the reactivity status of the existing piles as a function of specific tube power limits at much higher levels than are presently encountered. Following this study the effects of enrichment in conjunction with the higher power levels will be considered in close detail.

Preliminary study of the various possible methods of measuring a dry temperature coefficient at K Pile start-up is under way. The possibility of heating the lattice by means of a heated circulating pile atmosphere has been discarded as impractical due to the long time involved (of the order of three days or longer). Three alternatives will be investigated. These are:

1. Use of steam in the empty process tubes surrounding the dry critical region.

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2. Use of fission heat in the dry pile operating at a very low power level.

3. Use of fission heat and/or steam in the wet pile followed by drainage of the process tubes.

Reactivity Effects of Water in Pile Graphite

Experience with pile water leaks has shown that a relatively small amount of water in the pile can cause a large loss in pile reactivity; flooding of the pile as a "last ditch" control method has been suggested at various times in the past. A thermal utilization calculation was therefore made to establish the order of magnitude of the effect of "soaking" the pile graphite. The effect varies from a small number of inhours with pure steam to the order of 25 per cent δk in the water-saturated graphite, several times the control effect of the present safety systems.

SHIELDING STUDIES

Attenuation Measurements

A development test involving the removal of masonite from the inner three cycles of the iron-masonite test slabs in the DR Pile Shield Facility is currently being circulated for approval.(3) This shield configuration is intended to simulate the effect of partial masonite burnout resulting from significant increases in the flux load on the shield. Neutron and gamma measurements made during the test will be compared with equivalent data obtained earlier using normal thicknesses of masonite and iron. The results of the initial test will be used in planning further simulated burnout configurations.

Use of the C Pile Side Shield Facility has been temporarily delayed because the T-seam shields installed following pile start-up do not permit operation of the facility in the intended manner. The necessary alterations are expected to be completed during the next month.

Radiation Damage Studies

Two experiments to determine masonite deterioration as a function of heating were performed during the month; post-exposure strength measurements are yet to be performed. The first experiment was conducted in the region of 250 C to 300 C for a period of six days in a helium atmosphere, whereas the second is being conducted in the region from 150 C to 250 C in a helium atmosphere and will run for three weeks or longer. The data from these experiments will aid in establishing the physical constants associated with masonite deterioration equations and in determining the equivalence of the effects of extended moderate heating to those of short intensive heating.

Considerable time was spent during the month in preparing a report on the masonite damage data obtained to date and its interpretation.

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(3) HW-29385, "Development Test 105-548-A, The Effect of Masonite Burnout on Shield Attenuation Properties", RL Tomlinson.

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Detection Techniques

A method for improving the sensitivity of sulfur as a fast neutron detector is being investigated. The method under consideration consists of molding sulfur into disks in the solid form, rather than using sulfur as a powder and mixing it with an elastomer following irradiation. The solid sulfur disks have approximately the same mass per unit area of foil as do the elastomer disks but a higher concentration of sulfur per unit volume; the beta activity per unit area of foil is therefore increased. The technique for casting thin foils that have uniform consistency and constant diameter is being developed.

A formal report giving the results of thermal and fast neutron traverses in the E Test Facility at F Pile has been completed and is now awaiting publication.(4) It is intended that this report provide a reference for use of the E Hole Test Facility as well as to show absolute thermal flux and relative fast flux data from the pile reflector.

HEAT TRANSFER STUDIES

Tube Flow Studies

Additional tests were conducted in the hydraulics laboratory to determine the process tube flows which can be obtained with modified inlet fittings. One series of tests indicated that tube flows of 38 gpm could be attained in standard annulus tubes with 380 psig header pressures for one inch I.D. inlet and outlet fittings. For the existing fittings a 540 psig header pressure would be required to attain the same flow rate. At the C Pile, a tube flow of 55 gpm could be attained with a 430 psig header pressure if one inch I.D. inlet fittings were utilized. (The outlet fittings at C Pile are much larger than those at the other piles.) With the present inlet fittings, a 580 psig header pressure would be required to attain the 55 gpm flow. All of these flows are (a) for a standard tube loading, (b) for isothermal, low temperature flow conditions, (c) for the case without a cone screen and orifice assembly, and (d) approximations which do not apply directly to pile conditions. However, these tests indicate that significant savings may be made if the tube fittings are modified. Additional tests were made to determine the relative flows through a standard annulus tube for various combinations of Parker fittings, pigtails and nozzles. The data from these latter tests are being analyzed and will be issued in a separate document.

To be able to study process channel cooling in a more accurate and detailed fashion, special full scale mock-up heater tubes are being procured. The components of an aluminum, "cosine" tube have been constructed and successfully welded in a plant shop. Preparations are being made to leak test the tube. A requisition has also been issued to procure a nickel, "cosine" tube. This tube will permit operation at much higher temperatures than will the aluminum tubes which have been used to date.

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(4) HW-29125, "Interim Report Production Test 105-440-P, Measurement of Neutron Fluxes in Graphite Reflector", RL Tomlinson.

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Several aluminum heater tubes have failed in the past due to corrosion at the end of the tube. This corrosion effect can occur in as short a time as 15 minutes under the worst conditions. The apparatus is being modified to prevent further tube losses.

Following a power surge of sufficient magnitude in a process tube, boiling will occur, the tube flow will be reduced and the upper trip on the Panellit will be activated. It is probable that the pile will be shutdown with sufficient rapidity that no damage will result to the slugs; however, some uncertainty exists on this point for the case of high tube powers. Consequently, tests are being conducted on the full scale mock-up which will help to answer the problem. Should it be shown that serious damage will result, additional emphasis will be placed on the use of automatic temperature scanning equipment to detect such power surges before they become serious.

Work is continuing on the preparation of two documents which will report the results of experiments on two-phase flow through tubes. One document, relating to small-diameter tube tests, is essentially complete. The other is about 50 per cent complete.

Fuel Element Studies

A formal document "Status Report, Thermal Stress Cycling of Hanford Four-Inch Slugs", R. Neidner, HW-28672, July 1, 1953, was issued during the month. Basically, the document discusses the results of slug thermal cycling tests in which the slug axial temperatures were limited to about 340 C. A second document is being prepared covering the cases in which slug axial temperatures were taken as high as 725 C. An attempt was made to obtain a picture that would depict the shape of the region in the slug which had exceeded the alpha-beta transformation temperature (about 665 C) during this type of testing. For this purpose a slug specimen which had not been beta-heat-treated was subjected to one 30 second cycle. The specimen was then sectioned and photographed by Metallurgy Unit personnel. The resulting picture showed very clearly the transformed region and its relative position within the slug. The configuration of the transformed core was cigar shaped and was about two inches in length and one-half inch in diameter. The picture will be included in the report which should be completed early in October.

Discussions were conducted with various personnel from the Fuel Technology Sub-Section to obtain recommendations on the types of thermal cycling tests to be conducted in the immediate future. It was concluded that priority should be given to tests involving (a) high surface temperatures (200 C range), (b) specimens of reduced diameters such that axial temperatures greater than 665 C could be maintained for relatively long periods of time with the present experimental equipment and (c) the use of eight-inch specimens for future testing rather than the four-inch specimens which have been used in the past.

Additional electrical generation facilities which will aid in both thermal cycling and process tube cooling tests are being procured. Specifications were written and a requisition was issued for (a) a 375 KW, 7500 ampere motor generator set, (b) a motor starter, (c) a circuit breaker and the auxilliary bus components and (d) a field rectifier and control unit. This motor-generator set

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will be mounted in parallel with the existing set so that the available amperage will be about 22,500 and the available power will be about 1125 KW. It is anticipated that delivery of the major items will begin in about six months. The actual purchasing will be handled by the Atomic Energy Commission rather than General Electric since the equipment consists of items on which General Electric may bid as the manufacturer.

Tests to measure the thermal conductance between the jacket and uranium were conducted on one test specimen. The "bond" on this specimen was of the nickel plated, hot pressed type. The sample had been previously tested, but the initial results were questionable. The results of these tests are also questionable. It was found that the temperature drop across the bond varied from about 3 C on the first test to over 10 C on the fifth and final test for heat loads equivalent to about 25 KW per foot pile operation. There appeared to be a deterioration in the bond conductance for each successive run, but, even though specially calibrated thermocouples were used, the thermocouple readings appeared inconsistent to an extent which could account for much of the apparent bond conductance variation. These data are not firm enough to permit the formulation of conclusions and further tests will be conducted.

During the same tests, data on the conductivity of uranium were also taken. The initial conductivity value was about eight per cent higher than the commonly accepted value in the range of 300 C. The value at the end of the fifth and final test was an additional ten per cent above the accepted value. The data, although not final, are less subject to question due to thermocouple inconsistencies than those of the bond tests. Thus, from a preliminary standpoint, it would appear that the conductivity of the uranium depends upon heat treatment. Previous extensive studies at Chalk River have indicated that such was definitely the case for at least some samples of uranium. It is planned that additional tests will be conducted along these lines.

A slug having two thermocouples mounted on the can wall and one on the end cap was charged in 1586F on September 16. The couple wires were insulated with both asbestos and glass and were enclosed in an aluminum sheath. In addition, each couple was specially calibrated for the anticipated temperature range. However, all three couples are giving erratic readings for some unknown reason. The surface couples are indicating temperatures on the order of 225 C whereas the calculated values are on the order of 90 C; the indicated end cap temperature is below the temperature of the local water. An investigation is being made to determine the cause of the apparent discrepancy.

Plans have been made to insert an Eisenhower slug with an axial thermocouple into the C Pile. Thermocouple holes have been drilled in two slugs, and it is anticipated that they will be canned shortly. However, further planning will be delayed pending the results of the thermocouple investigation discussed above.

Additional calculations to determine the effect of the use of smaller slugs in a standard tube are being made. It was found that the previously reported preliminary results of surface temperature calculations may be questionable to the extent of a few degrees; these few degrees may be relatively significant. The problem is complicated by the fact that a very small change in slug diameter (on the order of mils) will cause a large change in surface temperature.

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Simplified expressions for the temperatures in slugs with insulated end caps have been developed and checked against the values given in "Temperature Distribution in a Slug with Insulated End Caps", D. E. Amos, HW-28770, July 20, 1953.

Moderator and Control Rod Studies

"Calculated Temperature Distributions in a Graphite Lattice - Report No. 2", S. R. Fields, HW-29232, September 3, 1953, was issued. The purpose of the report is to present the results of calculations of temperature distribution in a graphite lattice of D Pile under conditions of (a) different gas atmosphere compositions, and (b) similar rod configurations and poison loadings. The calculations were made on the Electrical Analogue.

Estimates were made of bore temperatures which can be expected at the H Pile as a result of higher powers, higher graphite temperature limits and/or various quantities of helium. These values will be used in planning the production test which will authorize the changes.

Informal recommendations were made concerning the best location at which to install thermocouples in a horizontal control rod thimble. It is anticipated that the thimble and thermocouples will be installed in the H Pile during October.

Study was given to the effect of purging the horizontal control rods at F Pile. The purge, conducted by Reactor Section, caused an increase in flow through each rod of about 1.5 gpm. It seems desirable to give consideration not only to further purging of the control rods but also the thermal shield cooling pipes.

MECHANICAL DEVELOPMENT

Charge and Discharge Studies

Document HW-29448, "Continuous Charging Studies", is in the process of being issued. This document is a summation of all of the work conducted on continuous charge-discharge equipment in general, and includes the results of tests of the machines and equipment designed and built as part of the "G" Pile development program.

In brief, the report concludes that the economics involved in a continuous charging process have changed sufficiently since inception of the program to invalidate the original assumptions.

Work is continuing on the improvement of the present charging machines to permit their use on "quickie" rupture discharges and on the poison column pushing techniques developed by the Process Improvement Sub-Unit.

A design test has been accepted to conduct slug and poison column flushing tests on K Pile tubes. Work will commence as soon as the tubes are received.

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Horizontal Rod Studies

Fabrication of the modified horizontal rod tip is continuing at the 100-B maintenance shop. Expected completion date is October 5, 1953. The transition piece to connect this tip to the round rod of the external thimble assembly was completed during the month. A transition piece is also being made to connect the tip directly to the rack, in case the seal, developed for use on the tip, proves successful. The pressing and sintering of the boron carbide rings to be used as the control element in the new tip is continuing and a complete set is expected to be available when the fabrication of the tip is complete.

Further delays have been encountered in obtaining the collapsible sphincter seal to be used on the rectangular rod. Testing will commence as soon as the seal is received from the vendor. At the same time a similar seal is being tested for its operation on a round rod. Twenty thousand cycles have been completed, and the seal disassembled and examined. Excellent results have been obtained.

The thimble to be used for the horizontal rod conversion program, consisting of short sections of flexible hose, was received during the month. Excessive gas leakage was found to occur upon installation and testing of this thimble. Alternate designs have been made specifying allowable gas leakage, and orders placed.

Vertical Rod Studies

Further tests of the air accelerated safety rod have been conducted at the White Bluffs Test Tower during the month, with continued favorable results. With 100 psi air pressure the drop time has been decreased approximately 42 per cent below that for an unpressurized drop. Tests will continue until the K Pile rod arrives and can be installed for its design tests. The 3X tie-in switch for the K rod has been tested during the month. The original design was found to be faulty and alterations are being made to the switch to permit operation.

A molded washer seal has been ordered for the vertical rod. Testing will begin as soon as the new seal is received.

Design Test 105-547-A, "Washer Seal and Seal Leakage Tests for the K Vertical Rods", has been approved and issued. This test calls for the installation of a washer seal on one of the rods at C Pile to determine the suitability of the washer seal for application on the K Piles.

Supplemental Control

The samples of BF_3 being irradiated at C Pile were discharged early this month. To date, the radiation levels have not decreased enough to permit the samples to be analyzed on the Mass Spectrometer. It is expected that this work can be done within the next two weeks. Various methods of controlling the pressure in a BF_3 control system are being studied. A mockup has been designed and the various components are being assembled. Most of the necessary parts have been fabricated and purchased. Assembly will begin shortly.

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One engineer has been assigned to the study of tamper-proof reactor safety devices. It is anticipated that a program will be initiated for the design, development, and testing of those devices which appear promising. The operation of such a device is to be independent of mechanisms or circuitry external to the pile which could be tampered with or sabotaged.

Process Tube Assembly and Piping

The program of out-of-pile pressure testing of process tubes recommended in HW-28853, "Allowable Tube Inlet Pressures", has been approved. Work has started with the preparation of samples and the design of testing equipment for this program.

The pressure testing equipment for irradiated process tubes was completed during the month and turned over to the Sub-Unit performing this work. The process tube examination equipment has also been redesigned and fabricated during the month. Equipment is being made to permit complete process tube examination work at each of the 105 areas.

Materials Testing Reactor Test Facility

Work was continued on the design of a test facility to irradiate Hanford fuel elements at the Materials Testing Reactor. A detailed design has been completed on the adaptation of one of the Beryllium "A" pieces to this work. The design is essentially complete and is being presented to the Materials Testing Reactor personnel for comments and approval. The facility has been redesigned to operate at higher water temperatures and pressures. The necessary funds have been allocated for constructing the test facility. Fabrication will commence as soon as approval of the detailed design is received.

Physical Constants Testing Reactor

The preliminary design of prototype components for the Physical Constants Testing Reactor was continued during the month. The principle effort during the month has been directed toward obtaining building designs and site locations that are compatible with the amount of money available for this work.

Other Engineering Development Work

Fabrication of the P-13 pressure assembly removable mockup has been completed and is now being used to train maintenance personnel in its operation.

The television equipment has been installed in the rear face of B Pile and was used to assist in the control of poison column pushing during the most recent startup.

The Graphite Sub-Unit core boring device is being redesigned to improve its operation. A method of providing a more positive feed to the cutting teeth is being incorporated in the new equipment.

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The prototype gamma monitoring turret assembly has been redesigned during the month to permit a higher ratio between counting rate and background rate, and the mechanical drive mechanism has been simplified and altered to give an intermittent rotation to the shield turret. Provision has also been made for forced air cooling and for calibration of the detector tube.

Investigation is being made of the three water-hammer incidents at C Pile to determine the cause and possible effects. Consideration is being given to the possibilities of water-hammer occurring at the older piles at contemplated water flows.

EXPERIMENTAL PHYSICS

Slug Rupture Detection

The prototype two channel gamma ray spectrometer fuel element rupture detector operated continuously without incident at H Pile during the month. Effluent water from nine crossheaders and both risers are now being routinely monitored in parallel with the existing beta system to obtain additional performance data and maintenance experience on this improved system in support of projected plans to replace the beta systems at all areas. Over a year of experience has been accumulated on this basic gamma sensitive system and six months on the major portion of the detailed circuitry, with no unusual maintenance requirements.

Refinements to the prototype system continue to be made. The most significant is the addition of flow regulators. This system is inherently flow independent relative to the beta sensitive systems but it is believed that the small flow dependence which does exist can be economically removed by a simple method of flow regulation. Efforts to further simplify the electronic circuitry are continuing.

Gamma Ray Absorption Coefficient Measurement

Theoretical work has been completed on the measurement of N^{16} gamma radiation transmission by materials of ranging atomic number. Corrections for the presence of the low intensity 7.1 Mev. gamma in the primary 6.13 Mev. beam have been calculated, as have small angle scattering corrections. It is hoped to achieve at least 0.5 per cent accuracy in the coefficients in every case; this information contributes substantially to the formal as well as practical aspects of gamma ray shielding.

Neutron Distribution in a Hanford Lattice Cell

Measurements of neutron distribution through various graphite-uranium lattice cells have continued. The techniques employed are sufficient to yield accurate, reliable values of the thermal utilization and fast effect, and appropriate methods of data normalization will yield a measure of the conversion ratio. This work is of particular significance because it demonstrates techniques which will permit the determination of a portion of the lattice constants pertinent to the use of modified fuel elements, e.g. enriched, alloy, cladded or hollow slugs, in the existing piles as well as in support of a new lattice design.

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Complete measurements of the thermal neutron distribution, the distribution of plutonium producing reactions, the fast effect and the thermal utilization have been made with standard fuel elements in an 8.5 inch graphite lattice. Similar data are available, in part, in the case of Eisenhower slugs, i.e. fuel elements containing 1.75 per cent U^{235} by weight. Measurements are now under way in the study of hollow fuel elements with water cores.

Exit Water Temperature Activated Safety Systems

A brief study was made in cooperation with the Heat Transfer group to ascertain the feasibility of providing high temperature alarm and scram activating scanning devices on the present exit water temperature monitors. It was hoped that a system could be devised which would provide adequate backup for the Panellit pressure monitoring system but which would be appreciably less expensive than the pressure or flow sensitive systems now under consideration by Heat Transfer.

A thermocouple-voltage sensitive scanning network which would sense each tube temperature every two seconds could be provided for about one-half the cost of the proposed pressure sensitive systems. However, the relatively slow thermocouple response to temperature changes resulted in a substantially reduced protection. Slower scanning rates can be obtained at even lower cost but the nuclear safety requirements of essentially instantaneous scram is lost. Equipment of this type does not appear to be suited to the back-up instrumentation function.

Instrument Development

A prototype of the pile period sensitive safety circuitry as specified for K Pile was reviewed. This design, which was developed by Oak Ridge for use at Arco, is not compatible with the K Pile type safety circuit and will require appreciable modification to effect compatibility. The degree of gamma compensation realized in the neutron sensitive chambers designed for use with this pile period meter has been determined to be 98 per cent for low level exposures, but high level gamma exposures for this chamber are contemplated at K Pile. The General Electric gamma compensated high temperature ion chamber exhibited poorer compensation for collimated beams incident end on - as in a Test Hole irradiation - but possesses a more durable construction and more desirable saturation properties than the Oak Ridge design.

The GECL Mark I high temperature ion chamber was tested following an exposure of about 10^{20} thermal neutrons per square centimeter which was accumulated during the past three years in the F Pile reflector. The chamber exhibits little evidence of radiation damage following this high exposure and still saturates at an ion current of four millamperes or in a flux of about 10^{12} neutrons cm^{-2} $second^{-1}$.

Fast Neutron Spectra Measurements

Discussions were held during the month with Los Alamos personnel to assess the techniques employed routinely at that laboratory in fast neutron spectra measurements. Nuclear emulsion techniques have been developed to a high degree

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and appear to be the most promising for accurate work at Hanford. The utility of threshold detectors is limited by the lack of cross section versus energy data; these data are best known for certain of the fission cross sections. It is planned to utilize emulsions where possible and to utilize threshold detectors only where masses of approximate data are of value.

Automatic Tube Outlet Water Temperature Recording Facilities

The Flexowriter automatic tube outlet water temperature recording facilities at B and H Piles operated routinely. The coding plate in the analogue to digital converter in the B Pile system was silver plated to increase the life of the contacts. The specifications for the Flexowriter to be used in the three digit recording system for the K Piles were approved.

Test Pile Routine Tests

Regular metal testing proceeded routinely. Sixteen lots of Mallinckrodt billet eggs were tested yielding TDS values ranging from 12 to 15. Ten lots of Fernald billet eggs yielded TDS values ranging from 12 to 14.

Test Pile - Graphite Tests

Two hundred seven heats of TS-GBF graphite were tested during the month with 49 allocated blue and the remainder allocated green. The testing results to date are tabulated as follows:

Index Range	September		Total to Date	
	Purity	Effective	Purity	Effective
80	—	—	1	3
81-85	—	1	4	7
86-90	—	9	2	20
91-95	12	39	41	107
96-100	95	78	200	192
101-105	100	60	246	145
105	—	20	11	31

Express shipments from three heats of GBF graphite produced by Speer were tested. The material tested continues to yield a nuclear purity quite comparable with National Carbon material.

Test Pile - Special Tests

Uranium-chromium alloy slugs, containing 0.08 weight per cent chromium, were tested via danger coefficient techniques to ascertain that a 105 Pile would suffer a 60 inhour loss if fully loaded with this material. These results are in good agreement with calculations.

Numerous tests of a service nature were performed and the results reported to the interested groups.

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Physical Constants - Testing Reactor

Efforts in scoping an economical version of the Physical Constants Testing Reactor have continued. A sub-grade concrete structure to house both the prototype reactor and the thermal test reactor has been designed for a 303 Area location. The prototype reactor design is progressing from the scope into the detailing phases. Some testing of central components has been initiated by Mechanical Development. A project proposal for building construction funds has been prepared and is circulating for signatures.

SPECIAL IRRADIATIONS

Studies pertaining to the effects of radiation on the creep rate of fuel pins (KAPL 105) and on the electrical characteristics of P-type germanium crystals (KAPL 115) have been completed. Analysis of data for transmittal to KAPL is in progress. Assemblies for continuing both studies are awaiting charging.

Approximately 0.16 cc (STP) of fission gases have been released from the 93 per cent enriched uranium foil containing 0.079 grams of U^{235} (KAPL 108) after an unperturbed exposure of 3.1×10^{20} n/cm^2.

The assembly for studying the effects of pile radiation on boron control rods and shield cans for SIR (KAPL 114) in C Pile developed an in-pile leak. This leak has been attributed to the failure of a stainless steel weld in the cooling system. Carbon dioxide has been substituted for air to keep the assembly in the pile until the desired exposure has been completed.

Due to the failure of scram instrumentation, the P-13 Loop (KAPL 120) was operated on process water for a portion of the month. No serious damage to the test section now being exposed in the facility is anticipated because of this operation. Duplicate instrumentation is being provided in the event of similar occurrences in the future. One pump in the loop failed and was replaced.

Out-of-pile studies with the experimental assembly pertaining to the creep rate of zirconium (WAPD 111) show a failure of the assembly to operate satisfactorily at high temperatures. Charging of the assembly into B Pile will be delayed until this difficulty has been eliminated.

Out-of-pile engineering investigations pertaining to the irradiation of special thorium slugs to determine their dimensional stability (DPI 103) have been completed. Charging of these slugs will take place in the near future.

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A new thermocouple slug is being fabricated to continue work pertaining to the in-pile calibration of thermocouples. A high intensity gamma irradiation facility using a cobalt source is being designed. A meter intended to measure gamma dosage rates of high intensity is being fabricated for use with this facility and other gamma work.

Satisfactory operation of the irradiation facility in the B Test Hole at DR Pile at elevated water temperatures using steam heating has been achieved. The irradiation facility in the D Test Hole at F Pile has been replaced. Liaison pertaining to the design of facilities for the K Pile and water piping for the test holes at C Pile continues.

Isotope production and extended assistance in the irradiation of materials in support of other off-site and Hanford programs continue.

GRAPHITE STUDIES

K Pile TS-GBF Graphites

As indicated in a previous report, the TS-GBF graphite which constitutes most of the graphite in the K Piles, was found in August to have a high percentage of internally cracked material. As also previously indicated, it is considered necessary to zone the tube blocks so that an absolute minimum of cracked tube blocks will be used in the upper regions of the pile. Improvements have been made in the technical methods which are used to predict the percentage of cracked material in a given heat and the graphite machining operations are now being scheduled on the basis of findings from these methods. It now can be predicted that the entire upper half of KW Pile will be made of uncracked tube blocks. Results now being obtained and projected into the future predict that the top three quarters of the KE Pile will be made of uncracked tube blocks.

Evaluation of New Cleves Graphite

A graphite has been prepared from the current production of Cleves coke. The material has been produced on a full heat basis. The interest in the material is for use in the K Piles or for possible use as trunnion material in future piles. The preparation of the material differed from previous preparation of Cleves graphites in that a swelling inhibitor was required for use in the new Cleves coke. The graphite has been evaluated for low exposures in Hanford cooled test holes and for high exposures obtained from the Materials Testing Reactor at Arco. The graphite has also been examined on the basis of machinability, density, nuclear purity, internal cracks, and thermal conductivity. It has been concluded that the new Cleves material prepared with the swelling inhibitor is comparable in all respects to the Cleves graphite produced in 1948. Specifically, the new Cleves material retains the property of being relatively stable to change in the parallel direction under irradiation.

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Energy Distribution of Flux in a Test Hole

A general program is in progress to determine the energy distribution of flux in the pile positions in which graphite exposures are made. It is hoped that this will allow a firmer correlation of data obtained from different exposure locations and a resulting clearer picture of graphite damage in piles. As a part of this program, a loading of flux monitors and graphite has been made into a test hole at the F Pile. The loadings are made in such a way that a perturbing effect of the flux monitors upon the charged graphite can be detected. If no serious perturbation occurs, it will be possible to charge similar monitors at any time into an otherwise normally loaded test facility.

Stored Energy

An apparatus has been constructed and is being perfected for measuring the temperatures attained in the adiabatic release of stored energy. This work is of considerable importance in that when it is possible to obtain cores from the piles in sufficient quantities, a direct measurement of the highest temperatures attainable by stored energy release can be made from studies on these cores. With the present apparatus, adiabatic stored energy release from cold test hole samples has resulted in temperature rises as large as 250 C. Results obtained from this method agree very well with the temperatures predicted for cold test hole samples from data obtained with the Twin Crucible Calorimeter and with a knowledge of the specific heat curve of graphite.

Pile Monitoring

X-ray data obtained on mined powder samples from D Pile indicate a decided increase in the expansion of the Co spacing has occurred in the bore graphite over the duration of Phase I operation of Production Test 105-534-Supplement A. These data are in agreement with the vertical bowing traverses made on Tubes 4453-D and 4494-D. The bowing traverses indicated an expansion in the fringe regions equivalent to 0.03 inches per month over the last three months of operation. Calculations of the effect of this expansion on the process tube radius of curvature are being made. All of the data relating to the physical expansion of the fringe zone graphite are being analyzed and predictions of the effect of Phase II (15 per cent increase in tube power) will be made.

Production Test 105-530-E, which authorizes a full pile burnout experiment, is being circulated for approval. This production test proposes to operate H Pile on relaxed graphite temperature limits to determine the validity of extrapolating laboratory type data obtained by controlled inpile experiments to full-scale pile operation.

Graphite Burnout

As part of the program to monitor graphite conditions at D Pile under Production Test 105-534-A conditions (410 C graphite up to 50 per cent helium concentration) small laboratory samples were exposed to pile radiation and atmosphere in tube 3478-D for the last three months of operation on Phase I. The approximate exposure temperature of these samples was 450 C. These data indicate that the burnout rate is less than one per cent per 1000 days.

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The second heater assembly of Production Test 105-514-E was discharged and the third assembly recharged without difficulty at F Pile. Data obtained from weight loss measurements of samples exposed for one month's operation at 630 C indicate an abnormally low burnout rate. In view of the magnitude of the exposure temperature, the low burnout rate is indicative of insufficient gas flow through the heater assembly. These results are being checked.

Surface Area Studies

To test the hypothesis that the initial increase in surface area of graphite which results upon slight oxidation is caused by the oxidation of intra-crystalline material, the surface area of a series of non-bonded coke flours graphitized to 3000 C was studied as a function of oxidation. It was found that after an initial small increase, the surface area of the coke flours remained fairly constant up to about 20 per cent oxidation in contrast to the rapid and continued increase in surface area of bonded graphite samples. Data obtained on Kendall, Cleves, and Texas cokes show the same trend. The results indicate that the bonding material or poorly crystallized material is oxidized rapidly and thus results in a rapid increase in surface area.

WATER PLANT DEVELOPMENT

Flow Laboratory Studies

The five in-pile water quality experimental tubes operated during the month. Some film formation was experienced in the tubes; in order of decreasing film severity the water qualities were as follows: "floating" pH with two ppm dichromate, caustic pH adjustment with two ppm dichromate, and caustic pH adjustment with 0.2 ppm dichromate. The tests are scheduled for completion next month; the next series of tests will evaluate raw water and controlled low pH water by means of both in-pile and high temperature mock-up tests.

Mock-up tests of raw water continue to show encouraging corrosion results. On the basis of these tests the addition of five ppm dichromate and pH adjustment with acid to 7.5 pH is planned for the initial in-pile tests.

Testing of the K downcomer model as requested by Design Section has been completed. Current efforts are directed toward observation of the downcomer performance at high temperature; installation of the required heating system has been completed. Testing of the K rear face thermocouples as to their ability to withstand high water velocities was begun.

Detailed design of the 100-K Flow Laboratory, now called the Water Studies Semi-Works, progressed satisfactorily.

Water Quality Evaluation Tests

The plant test at 100-DR continued to evaluate chlorine requirements for water treatment and the effect of chloride concentration on slug and tube corrosion. Film buildup and effluent activity increases were noted; evidence to date is

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not conclusive as to the effects of chlorine in causing these increases. The plant test at 183-C to improve the activated silica preparation process was delayed by maintenance difficulties in reactivating the equipment.

A plant test at 100-F was begun to evaluate the operating effect of eliminating process water pH adjustment. During the September shutdown, lime was eliminated from one-half of the filter plant; lime-free water is thus furnished to the far side of the pile. Regular procedures of slug and tube corrosion monitoring are used to determine any differences in corrosion effects on the two sides. No unusual trends in corrosion, film formation, or effluent activity have been noted to date.

Recirculation Studies

The in-pile recirculation test using condensed steam for process cooling was terminated because of equipment failure. The test operated for slightly over five months and the slugs reached an exposure-concentration of about 500 MWD/T. Examination of the discharged tube and slugs is now in progress. It is next planned to study the effects of recirculating alum-treated water. This test will provide data on the lowest water quality considered to be feasible for use in a recirculating system.

Results from the out-of-pile recirculation loop showed an aluminum corrosion rate of 0.0037mg/cm^2/day in 22 ppm impurity water at 80 C; this rate is roughly 20 per cent of that in normal process water. Repair of steam lines has delayed further testing work with this loop. Installation of the high temperature recirculation loop proceeded; the system was pressure tested and final electrical hook-ups are being made.

Water Plant Expansion Studies

Further tests of hydraulic limits were conducted at 183-D, showing a limiting raw water flow of 84,000 gpm. It is estimated that a flow rate of 104,000 gpm could be attained by providing additional flow passages in between the basin outlet and filter distribution flumes; this provision requires merely knocking several holes in the wall common to the flumes. Full plant testing of the feasibility of maintaining a throughput of 96,000 at 183-D is planned to obtain information on water quality effects at high filter rates. Studies are also under way to determine maximum process water flows which could be obtained while still utilizing the installed 190 pumps. Further calculations were made of effluent piping flow limitations.

PILE COOLANT STUDIES

Plant Corrosion Studies

Corrosion data were obtained from the six tubes of Production Test 105-519-E that were discharged last month. These H type tubes operated in C Pile with a maximum outlet water temperature of 98 C and a flow of 30 gpm. The weight losses indicate that the corrosion rates are not excessive for pile operation with this outlet water temperature limit. The tubes were recharged with weighed metal and are now operating in the temperature range 97 to 107 C.

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As a result of the data from these six tubes, Production Test 105-529-E has been written and approved to allow H Pile to operate with a 95 C corrosion limit. This test should begin at the October shutdown.

Inspection of the 100-C settling basin Mono-Rake sludge removal equipment disclosed pitting of both the frame and bolt heads. The bolt heads were anodic to the structural material. It has been suggested that painting the bolt heads would retard their corrosion. Should they be replaced, brass or stainless steel was suggested. The pitting on the frame appeared to take place under sludge deposits. This attack should be minimized by occasional hosing down of the equipment.

Pile Tube Examinations

Thirteen process tubes were removed from the pile during the month. Ten tubes from F, D, DR, and H Piles were completely examined. Tube 1277-D which was installed under Production Test 105-534-A and operated for two months under the conditions of that test showed no pitting or excessive corrosion. Tube 1577-D which had been in the pile before the production test and operated under it for three months showed pitting and ledge type attack.

The section of tube 2483-H (standard Alclad 2 S tube) containing the hole caused by the recent rupture of a 63 S canned slug was examined in an attempt to determine the cause of the damage. The hole, which is located between the ribs and adjacent to one of them, appears to have been the result of a severe blow from the inside of the tube. The edges of the tear may have been melted. This will be determined from metallurgical examination. A scale deposit indicating local boiling was found on the top of the tube directly opposite the hole. A similar scale deposit was on the top of the tube at the point corresponding to the adjacent slug. It is postulated that these deposits formed after the rupture when the slug had swelled in the tube and blocked the water flow. Slug junctions in the vicinity of the hole appeared as bright, shiny bands.

The two anodized tubes that were removed from F Pile showed no corrosion on either the inside or the outside. The anodic coating on both tubes was found to be one mil thick.

In the remaining tubes, all of them with long pile exposures, there were found slug junction pitting and deposits of scale apparently from boiling. The maximum depth of slug junction pitting was found in tube 0988-DR and extended 11 mils into the 2 S aluminum. The majority of the pits were from one to three mils deep. Large areas of 72 S removal were also observed in these tubes.

Laboratory Corrosion Studies

The high temperature apparatus to determine corrosion rates and film-forming properties of 2 S aluminum under heat transfer conditions has been operating successfully for 20 days with an outlet water temperature of 140 C. No appreciable drop in heat transfer efficiency has been noticed to date. The test is scheduled for completion at 30 days exposure when a second test will

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be started with an outlet temperature as close to 200 C as the equipment will allow. The corrosion testing apparatus using small scale tubes and slugs is now ready to start operation. It will be used to determine aluminum corrosion rates in the range of 95 to 175 C at linear velocities of 25 feet per second. The electrically heated apparatus for studying the potential-current relationships of slugs and tubes in simulated pile heat fluxes is ready to put in operation as soon as the tungsten rods which will be used for electrical leads are received.

Examination of the 50-tube mock-up after four months' operation confirmed previous conclusions that an insignificant number of barnacles are formed in tubes containing dichromate in the range 0.1 to 2.0 ppm. Those tubes with dichromate-free water have a high rate of barnacle formation which appears higher than tubes that were exposed for four months during the spring of 1953. Two of the tubes in the mock-up are being operated with water at 0.1 ppm dichromate at 90 C to obtain slug weight loss data.

Additional data on the corrosion rate of slugs which have been autoclaved for different periods of time show the greatest difference between no autoclaving and six hours of autoclaving. Increasing time of autoclaving beyond six hours does not result in much decrease in the corrosion rate. The preliminary test on the corrosion of slugs with abrasion resistant coatings was completed and reported in HW-29332. The data show that the coatings did not accelerate the corrosion rate of the slugs. Some slight reduction in the initial rate may have occurred.

INVENTIONS

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

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

RBR:mvt

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SEPARATIONS TECHNOLOGY SUB-SECTION

MONTHLY REPORT

SEPTEMBER, 1953

VISITORS AND TRIPS

A. G. Blasewitz visited Los Alamos Scientific Laboratory, Los Alamos, New Mexico, September 21 through 23, to attend air cleaning meeting sponsored by the A.E.C.

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J. T. Stringer visited the Bird Machine Company, Walpole, Massachusetts, September 15 through 18, for technical consultation with vendors; and Baker and Company, Neward, New Jersey, September 14 for consultation with vendors.

R. F. Maness attended the American Chemical Society Meeting at Chicago, Illinois, September 5 through 11.

W. S. Figg visited the Institute for Atomic Research, Ames, Iowa, September 28, to discuss continuous fluorination methods; and the Mallinckrodt Chemical Company, St. Louis, Missouri, September 29 and 30 to discuss continuous fluorination methods.

G. R. Kiel and A. M. Platt attended the A.I.Ch.E. National Meeting held at San Francisco, California, September 17 and 18; and visited the University of California Radiation Laboratory, Berkeley, California, September 17 and 18 to discuss engineering and chemical technology pertaining to separations processes.

G. R. Kiel visited the California Research and Development Corporation, San Francisco, California, September 17 and 18 to discuss separations process development.

ORGANIZATION AND PERSONNEL

Personnel totals are as follow:

	August	September
Administrative	2	2
Chemical Development	95	90
Plant Processes	52	53
P-10 Process Studies	10	10
Analytical Laboratories	41	39
Total	200	194

Chemical Development: Two Technical Graduates - Rotational were transferred in from Technical Personnel, one Secretary "B" returned from Leave of Absence, one Stenographer was transferred to the P-10 Process Studies Sub-Unit, four Engineering Assistants were terminated and one Chemist was terminated.

Plant Processes: One Mechanical Engineer was transferred to Advanced Technology.

P-10 Process Studies: One Stenographer was transferred in from Chemical Development Unit and one Secretary "C" went on Leave of Absence.

Analytical Laboratories: One Supervisor Analytical III was transferred to Manufacturing and one Laboratory Assistant "C" was terminated.

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PUREX DEVELOPMENT

Purex Plant Design Liaison

Purex piping layout drawings prepared by the Vitro Corporation are in the process of review. Approximately 65 per cent of the scheduled number of piping prints have been checked. This work is being done in cooperation with members of the Design and Project Units.

Chemical Engineering Development

Prototype Pulse Column Tests - Fourteen Purex-process test runs with "cold" uranium in a full-scale (24-inch diameter) prototype HA Column and associated HC Column were carried out during the month. These runs included two in which the HA Column was operated under IB Extraction Column conditions. Stream compositions and flow ratios approximating those of Purex Chemical Flowsheet HW #2 were employed. The highlights of the new findings are as follows:

1. Increase of the HA Column extraction-section louver-plate redistributor free area from six per cent to 12 per cent resulted in (a) unimpaired extraction performance (0.001 to 0.1 per cent U loss at 3 to 15 tons U/day with a 40 to 70 cycle/minute pulse at 0.92-inch amplitude), and (b) improved flooding characteristics (over 90 cycle/minute flooding frequency with 0.92-inch amplitude at ten tons U/day with 12 per cent free area, as compared with about 50 cycle/minute flooding frequency with six per cent free area louver plates). The louver plates were located 14, 40, 80, and 120 inches from the top extraction-section sieve plate. A six-inch high section above and below each redistributor was left free of sieve plates.

2. A 32-inch diameter HA Column scrub section containing louver-plate redistributors with 18 per cent free area operated stably at a processing rate as high as 15 tons U/day and a frequency as high as 90 cycle/minute (with a pulse amplitude of 0.5 inch in the scrub section). Three louver plates were used, located at the bottom of the scrub section and 70 and 128 inches above the bottom. Visual observation through glass bull's-eyes in the column wall indicated improved dispersed (organic) phase distribution across the cross-sectional area of the scrub section as a result of installing the louver plates.

3. A 24-inch diameter IB Extraction Column with 12 per cent free area louver plates located 14, 40, 80, and 120 inches below the top of the 13.5-foot high plate section operate stably at 10 tons U/day at frequencies of 30 to 50 cycle/minute at a 0.92-inch amplitude, but cyclic dispersed-phase coalescence was encountered at 60 cycle/minute. The superficial processing rate used in the 24-inch diameter column corresponds to 13 tons U/day in a plant-size (27-inch diameter) IB Extraction Column.

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Mechanical Development

Pump Development - The 5 H.P. G.E. and C.L. submerged motor pump (graphitar bearings and stainless steel journals) has operated on life test as an in-line pump for 7400 hours (308 days) pumping Purex 2EU solution at 18 gallons per minute at a pressure of 11 pounds/square inch. The total operation logged for this pump, both submerged and in-line, is 9100 hours (380 days).

A fractional-horsepower Chempump, 3/4 horsepower, "canned" motor-type centrifugal pump was tested for 1268 hours pumping water at 21 gallons per minute against a discharge head of 28 feet. Throughout the test the shut-off head remained constant at 47 feet. Inspection after the test showed that only negligible (0.0007 inch maximum) bearing wear had occurred.

A Johnston 7BS eight-stage, deepwell turbine pump with a 17-foot-5-inch shaft has operated for 1950 hours pumping water at 130 gallons per minute against a 64 foot discharge head. The shaft of this pump is guided by 11 Pyrex No. 7740 glass bearings lubricated by the pumped solution.

Bearing Development - Gold bearings fabricated from three different alloys, 75 per cent gold-25 per cent silver, 75 per cent gold-25 per cent copper, and 75 per cent gold-15 per cent silver-10 per cent copper, have been tested on the bearing test machines against stainless steel journals with RAX (12.5 per cent TBP in Shell Deodorized Spray Base) as the lubricant. The copper-gold alloy which was hardest (125 Brinell) had the lowest coefficient of friction and the highest load carrying capacity. Copper-silver-gold was second in performance and silver-gold bound before a load could be applied. Preliminary corrosion tests, using gold-alloy shavings, indicate that the alloys will resist hot nitric acid. Additional tests are under way using harder journal materials (stellite) and poorer lubricants such as water and other aqueous solutions.

Instrumentation - Purge-Type Column Interface Instrumentation - The use of air-purge-type dip-tube instruments to control the column interface by measurement of the apparent specific gravity of solution over a short length of column has not proven satisfactory in the case of pulse columns. In three-inch, 27-inch, and 32-inch diameter prototype columns, purge-type instruments appear to be sensitive to frequency changes in the pulse generator, to the extent that erroneous and erratic interface control is obtained, starting at frequencies of about 70 cycles/minute in the HA Column and 40 cycles/minute in the HC Column. The effect appears to be relatively independent of the location of the dip tubes in the column (high for top-interface control, low for bottom-interface control). Preliminary calculations indicate that the difference in acceleration pressure of the pulsing liquid in the column at the locations of the two dip tubes may become significant somewhere in the range of 50 to 70 cycles per minute. The investigation is continuing.

Concentrator - Water boil-up tests were conducted in the Purex prototype facility uranium concentrator (647 process tubes, 1 inch O.D. x 10 feet long) to determine the variance of heat-transfer coefficient with heat duty over the range of 4,000 to 24,000 B.T.U./(hr.)(sq.ft.) and with tube submergence over the range of 30 to 90 per cent (3 to 9 feet in the 10 foot tubes).

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The heat-transfer coefficient increased rapidly with heat duty up to 16,000 B.T.U./(hr.)(sq.ft.) and slowly at higher heat duties. A maximum heat-transfer coefficient of approximately 450 B.T.U./(hr.)(sq.ft.)(°F.) occurred at a tube submergence of 50 to 70 per cent, falling off rapidly below 50 per cent and slowly above 70 per cent.

REDOX DEVELOPMENT

Process Studies

Report HW-29447, "Effect of Recent Plant Flowsheet Modifications on Redox Phase II", is being prepared for issuance. In this document the "concentrated flowsheet", employing a 2.45M uranium feed in the second and third uranium cycles, is presented. Since this flowsheet results in lower volume velocities in the second and third-cycle columns, it now appears possible to attain the Phase II uranium processing rates without arranging the second and third uranium cycles in parallel as previously recommended in HW-28424, "Redox Plant Alternative Flow Schemes".

The "concentrated flowsheet" combined with complete waste backcycling in the conventional column arrangement is recommended as the plant arrangement to be used when the Phase II equipment is installed. This operating method replaces the co-decontamination arrangement (Scheme 10) presented in HW-28424. With the first uranium cycle operating at conventional flowsheet (2.0M uranium) conditions and subsequent uranium cycles operating at concentrated flowsheet conditions there is no economic incentive for converting to the co-decontamination scheme since the ANN consumption of the first uranium cycle is controlling, i.e., the ANN required for operation of the first uranium cycle is greater than the ANN present in the combined backcycled waste of the second uranium and second and third plutonium cycles. Conventional 2.0M operation is required in the first cycle since centrifugation efficiency would be impaired with the denser feed solution. Also, overconcentration of the slightly acidic feed as required to permit later feed adjustment could result in an undesirable increase in the freezing point of the dissolver solution to approximately the ambient cell temperature.

Process Chemistry

Effects of Oxalic Acid Head-End Procedure - The substitution of oxalic acid for chromic nitrate to reduce $KMnO_4$ and dissolve MnO_2, would substantially reduce Redox-Plant chemical costs and vessel corrosion rates, provided it can be shown to exert no adverse effects on subsequent solvent extraction. Laboratory one-cycle batch-contact data indicated no deterioration of solvent extraction performance due to oxalic acid. More conclusive proof is being sought in a series of two-cycle "Mini" mixer-settler runs currently, under way at the month's end. A seven-fold Zr-Nb decontamination across the head-end was obtained with the use of oxalic acid in head-end treatment, as compared with four-fold removal with chromic nitrate.

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URANIUM RECOVERY DEVELOPMENT

Process Studies

TBP HW-No. 6 Flowsheet - The TBP HW No. 6 Flowsheet (HW-29466) is currently being issued. This flowsheet, which contains the chemical conditions for two-cycle series operation, is being used as the design basis in determining the equipment requiring modification or replacement to permit plant operation at instantaneous processing rates as high as ten tons U/day. In HW No. 6 Flowsheet the first cycle is operated at conditions approximating HW No. 4 Flowsheet. Modifications include (1) the use of 30 per cent TBP instead of 12.5 per cent TBP as organic extractant; (2) provisions for introducing the back-cycled waste from the second cycle as the intermediate scrub of the RA Column; and (3) the use of demineralized water as the RAS (RA Column terminal scrub) solution. For the second scrub cycle a modified HW No. 2 Purex Flowsheet is used. Dual scrub streams are specified for the RD Column. Demineralized water is specified as the RDS to reduce the HNO_3 content of the RDU, thereby minimizing corrosion in the RDU concentrators (in 224-U Building) and reducing metallic impurities in the UO_3. The salting agent is introduced as 4M HNO_3 in the RDIS (intermediate scrub stream) together with the ferrous ammonium sulfate and sulfamic acid plutonium reductant.

Process Chemistry

Thermal Stability of RAIS - The proposed plant test of RA Column operation at 50 C has promoted an investigation of the stability of Fe^{++} in RAIS (RA Column intermediate scrub solution) as a function of temperature. It was found that in order to maintain a ferric/ferrous ratio of one or less, the maximum temperature at which the RAIS may be safely stored is approximately 40 C.

Metal Impurities in RCU - Results obtained in a half-inch diameter laboratory RA Pulse Column indicate that both hot carbonate washing of the ROO stream and elevated-temperature (50 C) operation of the RA Column were effective in reducing six to ten-fold the sodium contamination in the product uranium. RA Column operation at 50 C was also effective in reducing uranium losses (to 0.02 per cent as compared with 0.05 to 0.11 per cent at 26 C) with no adverse effect on decontamination.

Decontamination of 107-U RAF - A miniature mixer-settler run was made to determine the decontamination derived from underground waste storage tank 107-U (minimum age approximately four years). The run was made under single-scrub conditions with three extraction and two scrub stages. Analysis of the RCU gave beta and gamma activities of 250 and 365 per cent of that of aged natural uranium, respectively. This compares to beta and gamma per cents of less than 100 obtained under similar conditions with 5.5-year-old metal waste. Considerable difficulty was also experienced in making this run with 107-U RAF because of flooding tendencies. These effects may be due, in part, to the fact that 107-U tank included the "cold" uranium that was returned for storage during the U. R. Plant "shakedown" runs in 1952, and which was suspected to contain various contaminants, including solvent decomposition products.

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Silica in Demineralized Water - Laboratory tests indicated that replacement of the currently used weakly basic anion exchanger (Chempro-47) with a strongly basic anion exchanger (such as one of the quaternary amines Permutit S-1 and S-2) would reduce the silica content from the present average level of eight to ten ppm to about 0.2 ppm.

Chemical Engineering Development

Pulse Columns - Highly satisfactory large RA Column performance with louver-plate redistributors (less than 0.1 per cent U loss from a 24-inch diameter 13.5-foot high extraction section at rates up to nine tons U/day) was obtained in ten uranium recovery process RA-RC Column runs carried out during the month in the Purex Prototype HA-HC Column battery with "cold" uranium, employing 30 volume per cent TBP in Shell Deodorized Spray Base as solvent. The 24-inch diameter RA extraction section contained four 12 per cent free area louver plates (Figure 1) located 14, 40, 80, and 120 inches below the top plate. The 32-inch diameter scrub section contained one 18 per cent free area louver plate (Figure 1) located 70 inches above the bottom scrub plate, with one or two additional 18 per cent free area louver plates at the bottom of the scrub section and/or 128 inches above the bottom in some runs. Six inches of free space were allowed on each side of the louver plates. The RA and RC Columns used a "standard"-geometry sieve-plate cartridge (1/8-inch hole plates, 23 per cent free area, 2-inch spacing). The RA plates were stainless steel, while the RC plates were dual-face (i.e., stainless steel undercoated with Kel-F NW-25). All studies were made with a split scrub stream, employing water as the terminal scrub. On the basis of these favorable findings, it was decided to build new "A"-type (RA and RD) Columns for the Uranium Recovery Plant, in conjunction with the impending change-over of the Plant to two solvent-extraction cycle series operation for the processing of younger feeds. The new "A"-type columns, specified in Document HW-29254, will have an 11.2-foot long 27-inch diameter extraction plate section and a 6.5-foot long 34-inch diameter scrub section, with the over-all height remaining unchanged from the present 24 feet. Louver-plate redistributors will be employed in both the extraction and scrub sections. In the extraction section, 12 per cent free area louver plates will be located 14, 40, 72, and 104 inches below the top plate. The scrub section will contain two louver plates, one at the bottom and one approximately half-way along its height. The highlights of the results of the experimental studies leading to the new column specifications are as follows:

1. RA Column uranium losses of less than 0.1 per cent (with 13.5-foot high extraction plate section) were obtained at processing rates from four to nine tons U/day with TBP HW No. 4 Flowsheet feed at an amplitude of 0.92 inch and a frequency of 60 cycle/minute. An increase in the processing rate to ten tons U/day caused the losses to increase to 0.5 per cent.

2. The attainability of a less-than-one per cent RA Column uranium loss with a 20-g. U/l. supernate-type feed at approximately three tons U/day was demonstrated.

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3. Low losses in the 27-inch diameter RC Column with dual-face plates (< 0.01 per cent U loss with the 18-foot high plate section) were obtained at a frequency of 75 cycles/minute, amplitude of 0.8 inch, with the interface maintained at the bottom, at the top, and at an intermediate position (about four feet from the bottom plate) at uranium rates ranging from three to ten tons/day.

4. Intermediate samples taken 11 feet from the top plate of the (13.5-foot) RA extraction section and 14 feet above the bottom plate of the (18-foot) RC Column generally indicated approximately twice the terminal raffinate uranium concentrations.

HOT SEMIWORKS

Hot Semiworks Runs HR-10 and HR-11 were completed during the month, and Run HR-12 is now entering the first cycle. This run will conclude the Semiworks investigations of the Redox process, and decontamination of the equipment will start immediately thereafter in preparation for conversion to the Purex flowsheet.

The primary objectives of Runs HR-9 through HR-12 were to demonstrate satisfactory Redox first cycle decontamination, waste losses (uranium and plutonium), and operability for the dual-scrub IA Column flowsheet, and in the later runs of this series to demonstrate the above three process features while backcycling the concentrated 2DW and 2AW salt wastes to provide part of the aluminum nitrate salting agent for the IA Column. During periods of steady operation, IAW waste losses of 0.1 per cent or less were demonstrated for both uranium and plutonium during HR-9, and for uranium during HR-11. Run HR-11 was made in two portions, Part A as a single-scrub IA Column, and Part B as a dual-scrub IA Column. Gross gamma dF's (log values) were 4.0 for both the ICU and the IBP streams in single-scrub operation, and 4.1 and 3.8, respectively, for ICU and IBP in dual-scrub operation. Thus, there is essentially no significant difference in decontamination for the single vs. dual-scrub IA flowsheets. The 2DW and 2AW waste streams from Run HR-11 are being backcycled with the IAF during the current Run HR-12 to demonstrate the backcyled waste feature which is being planned for ultimate use in the Redox Plant.

Conversion to Purex

Over-all design for the conversion of the Hot Semiworks to Purex is 50 per cent complete. A review of promised delivery dates indicates that all materials for fabrication of engineering items will be on hand by October 15, 1953, and materials for cell piping installations will be on hand by December 1, 1953.

REDOX PROCESS TECHNOLOGY

Summary

Operation for the entire month was with a $KMnO_4$ Head-End oxidation of IAF, three Uranium Cycles, and three Plutonium Cycles. Elimination of one Uranium

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Cycle was not permitted because of low decontamination factors, primarily the result of two causes:

1. Complete failure of the H-4 Oxidizer coil, necessitating extensive modification to IAF oxidation procedures until a new pot was fabricated and installed, and

2. accumulation of highly-active solids in the Uranium Cycle columns and tanks.

Approximately three days were devoted to an unsatisfactory rework of contaminated uranium, and 18.9 tons of uranium were finally shipped to 221-U Building for processing through the RA Column. Following an additional six-day shutdown for replacement of the H-4 Oxidizer pot and flushes of the Uranium Cycle equipment, satisfactory operation was re-established, and a rate of seven tons of uranium per day was attained on September 21. Plutonium Cycle operation was satisfactory except for rework required because of poor over-all decontamination as a result of the modified IAF oxidation procedure. Satisfactory operation of the Plutonium Cycle was maintained at a rate equivalent to nine tons of uranium (600 MWD/T) per day for 26 hours, and a PR Cage rate equivalent to 8.5 tons of uranium per day was maintained for 2-1/2 days.

Process Performance

In general, the solvent extraction performance for plutonium decontamination was satisfactory during the month. The uranium decontamination performance was similar to that reported last month, with evidence of recontamination of the Second Uranium Cycle product with zirconium-niobium activity from the columns and tanks; thus, operation of three Uranium Cycles was necessary. Uranium and plutonium waste losses were normal with the exception of occasional high (two to five per cent) losses associated with IA and IS Column flooding.

Excessive fission product activities were present in both the plutonium and uranium product solutions from September 4 to September 10, and extensive rework operations were required. Rework of approximately 11 3BP batches was achieved successfully. On the otherhand, rework of 11.9 tons of uranium via normal methods was unsatisfactory, and 18.9 tons of uranium (having a fission product gamma activity 40 times natural uranium activity) were shipped to 221-U Building for further decontamination in the RA Column. The causes of the high fission product activities in the product streams are:

1. Cold potassium permanganate oxidation of IAF. (See Feed Preparation)

2. Accumulation of high-activity (primarily zirconium-niobium) solids in Uranium Cycle columns and tanks.

Operation subsequent to the installation of the new H-4 pot and the latter flushes of the Uranium Cycle equipment was satisfactory, but uranium decontamination performance was inadequate to permit by-passing the Second Uranium Cycle. Although hampered by the extensive difficulties, during the month, evaluations of the process variables discussed last month were continued.

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The following items summarize briefly the conclusions and observations made (based on additional laboratory and plant data) regarding the hypotheses previously proposed:

1. Recontamination of Uranium Cycle solutions has continued and has been particularly evident after 2D and 3D Column upsets.

2. Storage (for two weeks) of unoxidized dissolver solution apparently has little or no effect on solvent extraction decontamination performance under current flowsheet conditions; however, plutonium waste losses during subsequent processing are increased as a result of storage.

3. Semi-continuous acid addition during slug dissolution has little or no effect on solvent extraction decontamination performance.

4. Revised 2D and 3D Column flowsheets using 2.45 M UNH (vice 2.0 M UNH) in the feeds appears to give as good solvent extraction decontamination as the dilute flowsheet.

5. Revised Head-End treatment procedures utilizing low (0.01-0.02 M) permanganate concentrations and the "catalytic kill" technique (for residue permanganate after oxidation) were apparently satisfactory since a return to the original (0.02-0.05 M) Potassium Permanganate Head-End treatment has not improved the over-all decontamination performance.

The following tables summarize decontamination performance data by solvent extraction cycle for the periods indicated:

Period covering August 28, 1953, to September 4, 1953; nominal production rate of six to seven tons U/day, processing 83-day "cooled" metal with cold 0.01 M $KMnO_4$ oxidation of IAF and scavenging of Zr-Nb with MnO_2.

Cycle	Gamma Decontamination Factors (dF)		% to Waste	
	U	Pu	U	Pu
Feed Preparation	0.3	0.3	0.05	0.10
1st	3.7	3.8	—	—
2nd	1.8	1.8	—	—
3rd	0.8	0.8	—	—
Over-all	6.6	6.7	1.12	1.25

Period covering September 18, 1953, to September 24, 1953; nominal production rate of six to seven tons U/day, processing 92 to 100-day "cooled" metal with hot 0.02-0.05 M $KMnO_4$ oxidation of IAF and partial scavenging of Zr-Nb with MnO_2.

Cycle	Gamma Decontamination Factors (dF)		% to Waste	
	U	Pu	U	Pu
Feed Preparation	0.3	0.3	0.10	0.16
1st	3.6	3.8	—	—
2nd	2.1	2.1	—	—
3rd	0.8	1.0	—	—
Over-all	6.8	7.2	1.18	1.04

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Feed Preparation

The dissolvers were charged during the month with 4.95-ton charges of uranium having an average pile exposure of 594 (504 to 623) MWD/T. Because of the uranium decontamination difficulties experienced during the month, the conventional type of dissolving was used most of the month. However, on September 25, after additional laboratory data indicated that dissolving technique was probably not responsible for decontamination difficulties, the new dissolving technique was used again. Additional revisions are being made currently in order to obtain optimum conditions for acid consumption and time cycle.

All IAF batches were oxidized by a Potassium Permanganate Head-End treatment, but due to the complete failure of H-4 Oxidizer coil, 14 IAF batches were oxidized with a cold potassium permanganate treatment. With this procedure, a decontamination factor (D.F.) of two to three was obtained for both ruthenium and zirconium-niobium. However, on two specific batches (HE-7 and HE-8), the oxidation temperature was only 55 to 60 C, whereas temperatures during preceding oxidations were about 10 to 15 C higher. The result was incomplete "kill" of potassium permanganate and/or incomplete removal of the volatile ruthenium tetraoxide from the H-4 Oxidizer; thus, ruthenium tetraoxide was volatilized from the H-2 Centrifuge during centrifugation into the air vent system and was discharged in large quantities (approximately 136 curies Ru) from the stack. These two IAF batches were likewise poorly decontaminated during solvent extraction. Since the installation of the new H-4 Oxidizer (eight-foot diameter instead of former seven-foot), the IAF batch size was increased from 3.75 to 4.25 tons of uranium.

Uranium Extraction and Decontamination

In general, nominal conditions of the ORNL June, 1949, (acid-deficient) Flowsheet were employed for the First Extraction Cycle. The IAF temperature was reduced on September 23 from 70 C to 50 C in order to reduce the rate corrosion of piping, and no increase in IA Column plutonium waste losses has been noted. The Second and Third Uranium Cycles were operated on the 2.0 M UNH Flowsheet for a considerable period, but after continued testing, the concentrated 2.45 M UNH Flowsheets were adopted.

With the exceptions noted under Process Performance, the solvent extraction performance has been excellent, and no flowsheet changes have been tested. On several occasions after column start-ups, sudden rises in 3BP activity indicated the presence of highly-active solids at the 3A Column interface. At least one 3BP batch was reworked for this reason. Satisfactory operation of the Plutonium Cycles was maintained at a rate equivalent to nine tons of uranium (600 MWD/T) per day for 26 hours, and a PR Cage rate equivalent to 8.5 tons uranium per day was maintained for 2-1/2 days.

Waste Processing

Waste Concentrator (D-12) Pot No. 4 failed on September 5, but since the leak was small, continued operation has been permitted all month. Pot No. 5 is a nine-foot diameter pot, fabricated in 200-W Shops, and is ready for installation.

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PROCESS CHEMISTRY

Second Uranium Cycle Flowsheets - Batch contacts show that an increased U concentration (from 2 M to 2.5 M) in 2D Column feed results in decontamination at least as good as that obtained with the more dilute feed.

Entrainment in Uranium-Cycle Organic Streams - Laboratory examination of samples of 2DU and 3DU has shown the presence of small amounts of aqueous phase in these samples. Despite the fact that these samples are probably not representative of actual 2DU and 3DU overflow, the high activity of the aqueous phase (18 to 1000 times that of the organic phase) offers one possible explanation of the fact that the fission-product content of 2DU is always found to be less than that of 3DF and that 3DU samples are frequently less radioactive than 3EU concentrate.

Solids in U Cycles - Solids found in process streams and vessels were examined to determine, if possible, their source and contribution to decontamination difficulties. Two types of solids were differentiated by color: a black solid which gave a positive test for Mn, and is believed to be primarily MnO_2; and a gray solid, believed to be siliceous. The solids associated with a 2DU sample having 0.13 per cent entrained aqueous phase (see preceding paragraph) comprised only about 0.003 per cent of the sample volume, but contained 20,000 times the activity of the same weight of the aqueous phase separated from this 2DU.

URANIUM RECOVERY PROCESS TECHNOLOGY

Summary

Uranium aged from 4.3 to 7.6 years was supplied from four tank farms in acidified feed to give approximately 85 per cent of the feed processed through the solvent extraction batteries. Essentially TBP HW No. 4 Flowsheet conditions were employed using 20 volume per cent TBP in hydrocarbon diluent as extractant and employing either (1) the original single point RA acid scrub addition or (2) the modified two-point RA scrub addition whereby a final water scrub section is provided to lower the acid content of the product stream. Rework operations carried out to decontaminate high gamma RCU and Redox UNH batches, and to reduce metallic impurity content in 60 per cent UNH produced in the calcination plant primary evaporators supplied 15 per cent of the uranium in column feeds. Over-all solvent extraction operations were carried out at 95 per cent of the nominal design rates to process the above new feed and rework uranium. Product (RCU) from solvent extraction operations was transferred to the UO_3 conversion plant for concentration, and calcination along with UNH from the Redox process. The uranium recovery operation sustained an over-all waste loss of about 4.6 per cent of new feed uranium in salt wastes and condensates. Shipments of UO_3 averaged 23 per cent and 100 per cent of "aged natural uranium" beta and gamma (fission product activity basis) with less than five parts of plutonium per billion parts of uranium. Metallic impurities averaged 232 parts per million parts of uranium with a range from 147 to 387.

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TANK FARMS - METAL REMOVAL, FEED PREPARATION AND WASTE HANDLING

Metal Removal

Approximately 4400 gallons of stored metal waste per ton of uranium processed were removed by supernatant or water sluicing and by direct transfer of supernatant. Water sluicing operations added about 1430 gallons per ton of uranium in the dilute acidified feed. No major production curtailments were experienced due to equipment failure but required reduction in solvent extraction processing rates resulted in some down time to give an over-all operating time efficiency of only 68.4 per cent.

Feed Preparation

Routine acidification of the above feeds required about 12,700 pounds of 100 per cent HNO_3 per ton of uranium. An average boil-off of 36 volume per cent in the 221-U concentrators gave an average feed composition, with about 25 per cent of the feed being centrifuged and some rework uranium added, as follows:

	Components M (a)					
	U	SO_4	PO_4	HNO_3 (b)	Na	$K^{1/2}NO_3$ - (c)
Average Feed	0.234 (d)	0.178	0.269	2.71	3.00	3.7 to 5.2
TBP HW No. 4	0.27	0.26	0.26	2.7	4.06	5.5

(a) Balance of anion is NO_3^-.
(b) Titratable, includes two H^+ ions each from $SO_4^=$, and $PO_4^{\equiv}$.
(c) Not an average. Range is given to indicate variation.
(d) Includes U from rework RCU, and 60 per cent UNH

Waste Handling

Approximately 4340 gallons of concentrated neutralized waste, including rework contribution, was returned to underground storage for each ton of new uranium processed to give about 99 per cent of the volume removed. The above salt waste at an average pH of 9 contained 4.5 per cent of the new feed uranium. About 18,300 gallons of low activity waste containing ca. 0.1 per cent of new feed uranium was routinely cribbed for each ton of new uranium processed. Condensates from feed, waste and product concentration, and ROW were included. A test procedure (HW-29383) for nickel ferrocyanide scavenging of salt wastes was issued and testing is currently awaiting arrival of ferrocyanide salts.

Waste Evaporation

Repairs to the evaporation equipment at B Plant were completed and the evaporation of TBP Plant waste from Tank 112-C was commenced on September 10. Approximately 210,375 gallons of feed were processed into 112,063 gallons of concentrate and 105,273 gallons of condensate for a supernatant waste volume reduction of 46.7 per cent. Some difficulties have been experienced with scale buildup on coils, and with foaming.

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The waste evaporator at T Plant processed 499,729 gallons of feed into 272,001 gallons of concentrate and 265,587 gallons of condensate for a supernatant waste volume reduction of 45.6 per cent. Current feed is being obtained from Tank 106-TY, which is expected to yield a volume reduction of 38 per cent on the basis of laboratory tests.

SOLVENT EXTRACTION

Operating Conditions

The uranium processed by the solvent extraction batteries was 95 per cent of the nominal design input. Of this amount 15.5 per cent was rework. An overall solvent extraction waste loss of 4.5 per cent of new feed uranium was sustained. Essentially TBP HW No. 4 Flowsheet conditions were employed using 20 volume per cent TBP in diluent as extractant (RAX). During one-third of the report period the RA Column acid scrub streams were added as a single scrub stream at the top of the RA Columns and during the balance of the period the dual scrub flowsheet was employed; i.e., the acid was added in one-half of the water at the intermediate scrub feed points and unadjusted demineralized water was added at the top scrub feed point to give a low acid product stream.

General Performance

Average performance data for the report period are:

Period[c]	Line	Losses, Per Cent[a] of Feed U			F.P. Activity[b] Per Cent ANU		Pu per Billion Parts U	Log dF		
		RAW	RCW	ROW[d]	B	G		B	G	Pu
1	A	3.1	0.14	0.10	65	256	5	3.6	4.1	2.3
	B	1.7	0.15	0.12	120	254	5	3.7	3.8	2.3
2	A	4.3	0.21	0.11	123	258	6	3.4	3.9	2.3
	B	3.0	0.12	0.07	142	216	5	3.9	4.0	2.4
3	A	2.9	0.21	0.18	120	181	5	3.6	4.1	2.3
	B	3.7	0.11	0.09	75	163	6	3.8	4.2	2.2

(a) Grab sample average values based on total uranium in feed including both new and rework uranium.

(b) Fission product beta and gamma activity as per cent of comparable activity of unirradiated uranium in equilibrium with its daughters, viz. "aged natural uranium".

(c) "Periods" defined as:
(1) August 21 through 0600 August 31 using dual scrub.
(2) August 31 0600 through September 12 1800 using single scrub.
(3) September 12 1800 through September 25 0800 using dual scrub.

(d) Obtained by difference between RCW and ROO.

A casual inspection of the above tabulated data indicates no major differences in decontamination or waste losses between the alternative use of single or dual scrub type flowsheets. Factors of greater significance in determining decontamination, waste losses, and general operating stability are age of feed,

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solvent quality, and feed composition. Highlights of new information obtained during the report period are summarized below:

1. An approach to continuous carbonate washing of solvent, by batch treating on as frequent a schedule as feasible in plant equipment, has resulted in a gradual but significant decrease in residual gamma activity in the solvent with a corresponding improvement in decontamination.

2. Extraction efficiency of the RA Columns has improved, concurrent with the more intensive solvent washing, to give over two theoretical extraction stages whereas the major portion of earlier operation has indicated less than two stages.

3. It has been possible to process feeds with higher phosphate to uranium ratios without adverse effects on uranium waste losses under the more efficient extraction conditions experienced.

4. Processing of feeds containing over 30 per cent of the uranium aged 4.3 years or less from pile discharge in a single cycle may not be feasible to meet gamma specifications of less than 100 per cent "aged natural uranium" without modification to flowsheet and operating conditions.

5. Successful decontamination of Redox Plant UNH containing up to 2100 per cent of "aged natural uranium" gamma activity due to niobium-zirconium was achieved with niobium-zirconium in RCU product at negligible levels.

6. RCW losses were not significantly different when operating at RCX to RCF ratios as low as 0.85. RCF was at 83 per cent of flowsheet uranium concentration due to use of 120 per cent of flowsheet RAX and the RC Columns were operated at 425, and 425 to 570 gal./(hr.)(sq.ft.), at 82 and 85 cycle/minute pulse frequencies for A and B lines, respectively. The dual-scrub flowsheet was employed in RA Columns to give approximately 0.03 M HNO_3, 0.13 M UNH in RCF while RCX was 0.01 M HNO_3 in demineralized water.

SOLVENT HANDLING

Solvent losses were about 6.7 and 30 gallons of TBP and diluent respectively for each ton of uranium processed with these higher losses probably reflecting more frequent solvent washes. Two solvent batches washed with successive portions of one per cent NaOH, water, and one per cent HNO_3 gave uranium, beta, and gamma values lower than those attained by the standard two successive five per cent sodium carbonate batch washes used routinely since early in January, 1953. Substitution of two weight per cent sodium sulfate for the intermediate water wash in the caustic-water-acid sequence successfully minimized the tendency to form a fairly stable emulsion at this step. RO Column operation at ROS rates from 75 to 190 per cent of TBP HW No. 4 Flowsheet using five weight per cent sodium sulfate, and at 160 per cent of

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TBP HW No. 4 rates using three weight per cent sodium sulfate gave no large differences in solvent quality. Solvent quality has been generally good with dilute RC uranium $E^{o/a}$ values at less than 0.01 and uranium extraction transfer rates equivalent to new laboratory prepared c.p. solvent.

An estimate of ten gallons of TBP loss per ton of uranium processed under the two cycle conditions per TBP HW No. 6 (to be issued) has been made for purposes of planning procurement.

EQUIPMENT

Continuous uranium concentration monitoring of RAF and RAW appears to operate successfully. Continuous gamma monitoring of RCU is consistent with laboratory results. The RAW uranium monitor is a newly designed valveless replacement for an earlier installation and is currently being calibrated.

Design is essentially complete and fabrication about one-third complete on TBP Plant modifications for initial series operation using present pumps and columns.

URANIUM PRODUCT PROCESSING - ACID RECOVERY

General Performance

Calcination operations produced UO_3 containing uranium at 97 per cent of processing design capacity. This UO_3 product met specification values for plutonium and beta activity (fission product basis) in all cases but half of the material produced exceeded 100 per cent "aged natural uranium" fission product gamma activity by 20 to 40 per cent. Total metallic impurities in carload UO_3 composites ranged from 147 to 387 with an average value of 232 parts per million parts of uranium. No production curtailments due to equipment failure were experienced but high corrosion rates during concentration of high acid RCU resulted in the requirement for return of about 13 tons of uranium in 60 per cent UNH to 221-U for re-extraction to reduce the metallic impurities.

UNH PROCESSING

Steam Stripping

The requirement for maintenance of a steam-to-feed weight ratio of 0.4 or greater was reaffirmed when E-D-1 (6 to 60 per cent UNH concentrator) was operated alone with auxiliary steam. The maximum auxiliary steam feed rate, using the present equipment, was estimated at less than 8000 pounds per hour and thus the maximum feed rate is about 37 gallons per minute giving a capacity (TBP stripping limit) of 7.1 tons of uranium per day at Flowsheet RCX.

60 Per Cent UNH Concentration

High corrosion product pickup in primary evaporators giving iron contamination of product up to 700 parts per million parts of uranium was experienced when processing RCU produced under single scrub conditions. This value, which

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duplicates earlier experience when processing under comparable conditions, was effectively reduced two to three fold through reduction of the nitric acit to uranium ratio in the 60 per cent UNH by blending Redox UNH with RCU in the evaporator feed.

A test of E-D-1 (a 60 per cent UNH Concentrator) operating alone, with auxiliary stripping steam, gave lower HNO_3 and impurities in concentrate than comparable operation of E-B-1 (the other 60 per cent UNH Concentrator) alone with evaporator overhead used as stripping steam.

The E-B-1 evaporator was shut down to plug four leaking tubes to give a total of 13 or 1.7 per cent now plugged. Incipient failure of about 20 per cent of the remaining tubes was evidenced by detection of extremely low leakage under a 105 psig hydrostatic test. Failed tubes have occurred generally in the outer fringe while more centrally located tubes (above the single two-inch IPS feed introduction point) appear to be essentially free of corrosion. A new multi-point distributor to give more uniform feed distribution below the tube bundle might be of value in preventing localized high corrosion rates. The amount of scale and muddy deposit in the evaporator bottom was estimated to be about one-fifth of the amount previously observed when E-B-1 was dismantled for tube repair. The "Peerless Mist Separator", (original weight about 200 pounds) is about 95 per cent corroded away and it is believed that a similar condition may exist in the E-D-1 vapor section thus permitting about one per cent entrainment of E-D-1 feed uranium to the T-D-4 (fractionator) tower.

Nitric Acid Recovery

Organic-free water from D-3 (fractionator overhead condenser) was started as reflux water to T-D-4 (fractionator) on September 18, replacing use of solvent saturated condensate from C-5 (condensate receiver). The effect of this change on acid quality and acidified tank farm feed quality as received in the THP Plant has not been evaluated.

New Equipment

Essentially all materials required for the construction of F-Cell annex (eight-foot diameter Luckey pots) have been received on site and construction, resumed in September, is estimated at 45 per cent complete.

The installation of E-D-6 (second 100 per cent UNH Concentrator) is about 90 per cent complete and shakedown operation, initially using water feed, is expected to start in October.

Z PLANT TECHNOLOGY, ISOLATION, PURIFICATION AND FABRICATION

Aluminum Nitrate Addition to F-10-P Solutions Routinely

The aluminum content of F-10-P solutions is routinely being adjusted to 1.0 g/l by addition of 50 per cent aluminum nitrate, to reduce plutonium recycle caused by fluoride complexing. Recycle has been reduced from greater than ten per cent to ca. six per cent. Adjustment of the aluminum content from 3.0 g/l to 1.0 g/l appears to have avoided the problem of slow settling, fluffy precipitates.

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Iron and Uranium Removal by the Single Plutonium(IV) Oxalate Cycle

Analyses of iron in skull recovery and uranium in S-Plant E-3 (10 g/l product) solutions compared to the analyses of these elements in buttons using single plutonium(IV) oxalate cycle processing shows that the processing reduces the iron by a factor of 35 and the uranium by a factor of ten.

Reactor Shaft for Task I (Wet Chemistry)

A cold-rolled steel 3/4-inch diameter shaft, 5 feet and 6 inches from motor chuck to the single lucite bearing at the draft-tube bottom, was tested in the Task I reactor mock-up. Rotation speed measurements with a Strobotac showed that the shaft whipped in the range 800 - 1000 rpm but ran smoothly above 1000 rpm. The maximum speed observed was 1845 rpm. The design for this reactor specified one bearing in the draft tube which will be satisfactory.

Dry Chemistry (Task II)

Based on fluoride color, 20.8 per cent of the regular cycle runs required refluorination. This is comparable to 18.6 and 23.4 per cent in August and July, respectively.

Additional evaluation of the "fast" Task II cycle has indicated that refluorination rate is comparable to that obtained with the present "standard" cycle. These results led to the decision to convert all furnaces to the "fast" (cam controlled) cycle. The cycle will be: heat to 500 C, hold for one hour, heat to 600 C, hold for 30 minutes, cool. The hydrogen fluoride-oxygen mixture will be admitted 45 minutes after the start of heating and turned off when the furnace has cooled to 250 C. This cycle will require approximately 3-3/4 hours compared to 5-1/4 hours for the present "standard" cycle. Calculations have shown that even should 100 per cent refluorination of the short cycle be necessary, the over-all time cycle is still comparable to the 5-1/4 hour cycle with 20 per cent refluorination.

Initial studies of the hydrogen fluoride supply and metering equipment have verified that the equipment is not dependable. The major difficulties and inadequacies which need improvement are: (1) The PRV, which should supply a constant pressure to the measuring equipment, does not operate satisfactorily. (2) The measuring equipment is a rotameter with Fluorothene tube and Monel float; the soft Fluorothene tubes have been eroded by the floats at the regular setting, invalidating the original calibration. (3) The furnace pressure varies and the gas flow controller provided for this system will operate only on a system having a controlled pressure into which gas is being added.

The weld between the Hastelloy C body and Z nickel flange failed on two furnace retorts this month, on furnace No. 4 for a known fourth time and on furnace No. 1 for a third time. The furnace No. 1 failure was a hairline crack and detected at an early date. The furnace No. 4 weld separated approximately 1/16 inch, it is not known how long the crack existed before its detection.

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Although these were the furnaces operating on the "fast" cycle, these were the first failures since the change-over. Future experience will show whether or not the new cycle has any effect on the incidence of failures.

One "Hypalon", chlorosulfonated polyethylene, gasket failed after two runs. The failure was the result of flattening under heat and pressure. Resistance to HF attack appears to be excellent. Two "Hypalon" gaskets remain to be tested.

Reduction (Task III)

The average reduction yield for this period was 96.9 per cent as compared with 96.2 per cent and 94.1 per cent for July and August, respectively. This month's reductions included about two weeks production processed through the RG Line due to shut down of the RMA-Task III equipment. The reduction yields from the RG Line averaged 3.3 per cent higher than those from the RMA Line. It is thought that inherent design characteristics influencing temperature distribution and pressure-volume relationships contribute significantly to the difference in reduction yields.

The shutdown of the RAM - Task III equipment was due to an alcohol vapor explosion within the process hood. The explosive force ruptured a rubber glove spreading contamination about the Zone III area surrounding the Task III equipment. The alcohol was being used to clean piping and associated equipment of accumulated iodine. It is thought that an electric spark ignited the vapors. Nonflammable organic solvents such as carbon-tetrachloride and trichlorethylene are being considered for future use. Aqueous potassium iodide solution was considered as a solvent for iodine but it carries an undesirable secondary clean-up problem.

Four double-batch reductions were made in accordance with Production Test 235-10, "Evaluation of Large Batch Reduction of Plutonium Tetrafluoride", issued by the Process Control Sub-Section. One of these contained only plutonium tetrafluoride powder and three contained recycle turnings and plutonium tetrafluoride. The reduction yield for the all-powder run was 96.0 per cent. The reduction yields for the runs containing turnings averaged 95.3 per cent respectively.

The first lot of buttons were canned for off-site shipment during the last week of September. The buttons are unloaded from the line in plastic envelopes and are packaged into standard metal cans. Sealing is accomplished mechanically with a domestic-type can lidder. Preliminary tests made showed no detectable increase in button weight after 70 hours storage in the can under normal room conditions. Specifications covering the off-site shipment of the buttons have been written, Part II, HW-29354, "Product Specifications-Plutonium Metal, Unfabricated for Off-Site Shipment".

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Machining (Task V)

Since it has become necessary to again replace both the male and female forming tools because of wear, investigations have been undertaken to determine the reason for the increased tool-replacement rate experienced during the past six months. A method for inspecting contaminated forming tools using the cathetometer installed in the RM Line has been devised and a separate report detailing the method will be issued.

The installation of Hood 200B in the RMA Line is under way. This machining hood was moved from the RMB Line to facilitate the simultaneous fabrication of two models.

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RECUPLEX CONSTRUCTION

Construction of the Recuplex facilities in Rooms 221 and 337 of the 234-5 Building is approximately 25 per cent completed. The Reception-and-Blending hood pan and the four underground waste disposal lines have been installed. The erection of the Solvent extraction platform in the duct level has commenced.

234-5 DEVELOPMENT

Dry Chemistry (Task II)

Multiple Castings

A satisfactory cement for bonding and sealing the joints of crucibles when crucible components are assembled for "double casting" has been developed. The cement is a mixture of magnesium oxide sand and magnesium sulfate solution. Several molds have been prepared for trial castings.

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"Z" Area Technical Manual

The preparation of a technical manual for plutonium purification and fabrication operations is estimated to be 29 per cent complete. Outlines of the chapters are finished and two chapter manuscripts are complete in first draft form. Drafting of illustrative material has commenced, and four figures are completed.

P-10 PROCESS STUDIES

P-10 Process Studies were extended to A, B, C, D shift operation effective September 21, 1953. Process engineers will be assigned to shifts as long as it appears to be necessary to maintain close liaison with the shift activities of the P-10 Extraction Unit.

An alternative product specification has been proposed to the AEC-HOO which seems to be more practicable than the product specification used in the previous P-10 program at Hanford Atomic Products Operation. Plans for operation of the extraction plant are being formulated on the basis of the old specification pending the receipt of notification from the Atomic Energy Commission of the decision reached on the newly proposed specification. Atomic Energy Commission's approval of the new product specification will permit consideration of process improvements not otherwise possible.

ANALYTICAL LABORATORIES

The Analytical Laboratory in support of Chemical Development and Chemical Research continued the analyses of samples for Chemical Engineering Development, Process Scouting, Process Improvement, Process Chemistry, and Metallurgy. The bulk of the work performed for Chemical Engineering Development was in support of Purex Prototype Pulse Column Tests. Fission product analyses accounted for approximately 25 per cent of all "active" work performed. The Gamma-Ray Energy Spectrometer continues to be useful in evaluating various individual gamma fission products. The coulometer is under scrutiny for nitric acid and uranium measurement. Particularly promising results have been obtained for the former.

The Spectrochemical Laboratory functions were divided. Control functions in support of the 300 Area Metal Preparation Process and other manufacturing functions were transferred to the Manufacturing Department as of September 1, 1953. All other spectrochemical functions were retained. In addition to rendering service to the entire plant, assistance was given in transferring the uranium work from the B & L Spectrograph to the Jaco Spectrograph as the former instrument will be transferred to the 325 Building when this building is occupied by Technical.

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The Special Analytical Laboratory operated routinely during the month.

The Water Quality Laboratory continued to support the programs of Water Plant Development and Pile Coolant Effects. The work volume for this laboratory has been low, due to a temporary shutdown of Water Plant Development Facilities at 100-H and 100-F. This work is expected to resume in October.

The Mass Spectrometer Laboratory is on schedule for the start of the P-10 program. All phases of operation of the C-N Spectrometer have been checked and are in good condition. A better method of calculating results on the C-N has been developed by H. C. Mattraw (KAPL-902) and has proved satisfactory for our purposes. The results on four component mixtures have been excellent and indicate that the usefulness of the C-N Spectrometer can be greatly expanded. In line sampling for P-10 is being installed and should be completed next month. The General Electric Spectrometer was operated the entire month without any extended shutdown.

Work volume statistics for the Analytical Laboratories are as follows:

	August		September	
	No. of Samples	No. of Det'ns.	No. of Samples	No. of Det'ns.
Research and Development				
Applied Research	1048	2609	1015	2430
Pile Technology	358	1507	272	962
Fuel Technology	112	2840	90	740
Separations Technology	1012	1158	314	557
Process Assistance	356	835	1314*	1346*
Others	82	691	102	488
Total	2968	9640	3107	6523**

Standards and Calibrations	August	September
Number of standard solutions prepared	30	20
Stock solutions dispensed	97	57
Number of calibrations performed	1	4
Number of calibrated glassware dispensed	34	7
Number of checked glassware dispensed	233	116
Total	395	204

* Includes samples submitted by Chemical Engineering Development, and charged to the Purex Process. In previous months these have been tabulated under Separations Technology.

** The reduction in total determinations for the month is a reflection of the 300 Area Metal Preparation function (Spectrochemical analyses) being transferred to the Manufacturing Department.

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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
J. G. Bradley and G. Sege	Redistributor for Pulsed Liquid-Liquid Extraction Columns.
F. W. Woodfield	Jet Feed Distributor for Liquid-Liquid Extraction Columns.

V. R. Cooper

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

September 13, 1953

VRC:mvt

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October 8, 1953

APPLIED RESEARCH SUB-SECTION

September, 1953

VISITORS AND BUSINESS TRIPS

T. M. Snyder, E. R. Gaerttner and H. B. Stewart, and J. B. Sampson, Knolls Atomic Power Laboratory, Schenectady, visited Hanford on September 14-15, 14-16 and 14-19, respectively, to discuss reactor physics.

S. Board, Farrell-Birmingham, Buffalo, New York, spent September 15-16 at Hanford discussing radiometallurgy facilities.

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S. E. Dismuke and M. J. Feldman, Oak Ridge National Laboratory, Oak Ridge, Tennessee, were here September 16-17 discussing hot laboratory data.

A. F. Scott, Reed College, Portland, Oregon, spent September 30 discussing analytical chemistry.

W. W. Marshall, J. E. Meinhard and M. T. Walling attended the American Chemical Society National Meeting in Chicago, Illinois, on September 6-11.

W. W. Marshall spent September 8 at the Argonne National Laboratory, Lemont, Illinois, discussing spectrochemical analyses; September 10 at the National Spectrographic Sales Corporation, Cleveland, Ohio, and September 11 at the Bausch & Lomb Corporation, Rochester, New York, discussing the Echelle spectrograph.

M. T. Walling spent September 14-22 at the Argonne National Laboratory, Lemont, Illinois, and September 23-29 at the Oak Ridge National Laboratory, Oak Ridge, Tennessee, discussing separations chemistry.

J. E. Meinhard spent September 14 at the Argonne National Laboratory, Lemont, Illinois, and September 15 at Iowa State College, Ames, discussing electrochromatography.

G. E. Duvall attended the Berkeley Reactor Conference at the University of California, Radiation Laboratory, on September 9-11.

W. R. Smith spent September 14-17 with the General Electric Company, Portland, Oregon, receiving instruction on newly developed welding processes.

T. R. Cartmell spent September 21-25 in Chicago, Illinois, attending the Instrument Society of America National Instrument Conference.

J. J. Cadwell and D. C. Kaulitz spent September 30 with the Phillips Petroleum Company, Arco, Idaho, discussing the MTR slug exposure facility.

ORGANIZATION AND PERSONNEL

Personnel totals as of September 30 were as follows:

	Exempt	Technical Graduates		Non-exempt	Total
		Permanent	Rotational		
Physics Unit	24	3	1	7	35
Metallurgy Unit	41	3	1	22	67
Chemistry Unit	49	1	1	15	66
Equipment Design	6	-	-	3	9
Administration	2	-	-	2	4
Total	122	7	3	52	184

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CHEMISTRY UNIT

Separations Chemistry

A continuous, 33-hr, Redox-type run was completed on the Mini extraction unit to investigate the stability and steady state DF of a plutonium reflux extraction flowsheet. The feed to the 14-stage Mini unit was Redox 2AF, and the Chemistry Unit Reflux Flowsheet #1 was employed. A steady state activity in the waste was attained after eight hours. The product contained 75 g/l plutonium and the waste loss was only 0.1%. A decontamination factor of 600 was obtained as compared with the normal plant value of 200, and the gamma activity of product was within specifications and equaled that normally present in process 3BP. In this run the maximum acidity in the organic phase was about 0.75 M. In an attempt to reduce this acidity, the run was continued for an additional 3 1/2 hours with lower extractant rate and employing acid in the extractant. In this case a constant value of 0.4 M acid was obtained in all the extraction stage organic phases. Waste loss and decontamination were essentially the same, and although the product concentration built up to only 45 g/l, prolonged operation would undoubtedly have yielded essentially the same value as in the initial run.

Several extractions were carried out in the Mini unit to firm up the Purex Flowsheet and to investigate several modifications of it. An initial run established an operational base line according to Hanford Works Flowsheet #2. A second run investigated operation at a lower degree of saturation of organic in the H cycle. Although decontamination was adversely affected about tenfold, waste losses were reduced. The data are of value in determining operational leeway during process start-up.

Document HW-29383 was issued to present a revised cost estimate for use of ANN as scrub in the Uranium Recovery column. It was concluded that the uranium waste losses by 1% is the economic break-even point.

Some concern has arisen regarding the possible explosion hazard if the contents of the Purex HA or 1A column were inadvertently dumped into the waste concentrators. In such a case the TBP stripper would be flooded and TBP would be carried into the concentrator. Laboratory tests at the normal operating temperature of the concentrator resulted in no explosion, but rather led to a quiet evaporation to dryness. At a somewhat higher temperature some foaming occurred as the material went to dryness, but there was no violence of reaction.

Metallurgy investigation of press-fitted cans on uranium slugs suggests the possible use of such slugs at Hanford and thus opens the attractive proposition of total dissolving of can and jacket. Such an operation would eliminate separate jacket removal and handling of jacket waste, and further, would allow use of the dissolved canned material as a salting agent. As a result, tests of aluminum dissolution rates in various media have been undertaken. In high nitric acid concentrations, fluoride increases the dissolution rate, and the presence of mercury introduces an additive rate increase; the net rate, however, is unsatisfactorily low and is below that obtained in caustic. In moderate acid

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concentrations (4-5 M), mercury has an appreciable effect on the dissolution, the net rate being comparable to that obtained in caustic. It is known, however, that mercury tends to follow uranium and plutonium in the Redox Process, so this technique is not attractive at present. A somewhat parallel investigation is that of dissolving jacket, Al-Si bond, and uranium in acid in a single operation, the purpose being to employ the undissolved silica as a scavenging agent in the head-end separation. In the presence of mercury and fluoride catalysts, aluminum dissolves but not the silicon. The residual silicon -- and/or silica -- however, is extremely finely divided and settles very slowly.

Previous reports discussed the use of phenyl mercuric acetate as an agent for extracting chloride ion and thereby eliminating the corrosive behavior of this ion in the process. Tests of such an extraction with RAW solution (0.58 g/l chloride) showed a distribution coefficient of approximately one. Four successive, equal volume contactings removed greater than 98% of the chloride. A cost evaluation, however, shows the material to be too expensive for practical process use.

There has long been a need for a simple, small laboratory extraction unit to be employed analytical-wise and for process studies. An interesting proposal in this respect is a unit employing counter flow of films of the organic and aqueous phases. A dry-filmed glass rod, which is wet by the organic phase, supports the upward moving organic film was set up. Surrounding this with a clearance of 10-14 mils is a glass tube, which is wet on the inside by the aqueous phase, and on which the aqueous film moves downward. Pulsing the rod causes movement of the films. One such unit, 12 inches in height, was employed for a normal Uranium Recovery extraction and yielded a waste loss of only 1/2%.

Reports over the past number of months have described various aspects of a program designed to explain the mechanism of solvent extraction processes. Summarizing briefly, the components of this work included: 1) the study of dispersion and coalescence as affected by surfactants, including free TBP, at the interface, 2) measurement of the diffusion rate of TBP in the organic phase, 3) planned measurement of the diffusion rate of the TBP-uranium complex in the organic phase, and 4) determination of the diffusion rate for UNH through an aqueous phase of varying HNO_3 concentration. The latter data were collected during the present reporting period and were obtained through the use of tracer methods. The over-all program is expected to determine the limiting step in the extraction process, to define the factors influencing dispersion rate, and to enable predictions of the type of phase dispersion under a given set of conditions.

As part of the program investigating the causes of flooding in pulse columns, high speed movies were taken to show the behavior of the phases in the pulse column. The movies are taken at 1200 frames per second, thus affording a speed reduction factor of 50. Several such sets were obtained during the month and proved to be of considerable interest to research, development, and operation personnel. Qualitatively, it was quite evident that with larger plate holes but a net reduction of open area turbulence extended far into the region between the plates, whereas with smaller holes, turbulence was limited to the region directly above the plate. A backflow of liquid was quite apparent in the former

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case. The range of drop size in the column was shown to be appreciable. The larger drops were shown to suffer deformation on passing through the holes and also exhibited a greater net upward velocity. The fine drops, on the other hand, passed through the plate opening readily and tended to be held up in the column. The latter effect quite possibly contributes to flooding.

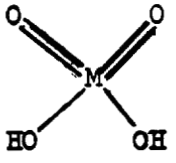
Ruthenium Chemistry

The bulk of the research work reported to date on ruthenium chemistry has dealt with the simpler systems that involved little complex formation. The information so gained allows the preparation of ruthenium compounds of known structure and thus serves as the starting point for investigating the many complex compounds of ruthenium. One or both of two ruthenium compounds are suspected of being the basis for malbehavior of this fission product in separations processes. These two are the nitroso complex and the tetroxide. The compound $K_4Ru(NO_2)_6$ is believed to be converted to the nitroso compound and is being investigated in some detail. Qualitatively, by observation of color, it is known to be soluble in an organic-TBP phase and to be converted to an aqueous soluble form by treatment with SO_2. Quantitative data will be obtained, employing tracer ruthenium, on rates of oxidation, extraction, and tetroxide formation, and on the behavior under electrochromatographic analysis. Similarly, ruthenium tetroxide is known to be soluble in carbon tetrachloride. Addition of TBP results in the discoloration of the solution, although the material remains organic-soluble. Subsequent addition of SO_2 converts the ruthenium compound to an aqueous soluble form.

Spectrochemistry

Separate work on ruthenium involves application of infrared spectroscopy to the study of molecular structure. It was shown that RuO_4 is tetrahedral in form and thus is comparable to compounds such as CCl_4, $TiCl_4$, $SnBr_4$, etc. The symmetrical non-polar arrangement, tends to explain the organic solubility of the compound.

Other infrared studies are directed at the elucidation of uranium oxide molecular structures with the objective of explaining the large variation in reduction reactivity of UO_3. It was reported last month that UO_3 has a chain-like structure in contrast to WO_3 but that the hydrates of these compounds have similar structures. Further work shows that the hydrates of both exist in the form



A set of uranium oxides and hydrides of widely different reactivity and origin have been received from K-25 and will be examined according to this technique.

Two applications of emission spectroscopy have been tested for the analysis of C and J slug material. In the first, a small diameter spark was employed to scan the outer and freshly cut inner surfaces of the slugs. The total uranium concentration varied widely from point to point; values of 6.5-8.5% uranium were

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obtained for a slug of nominal content 7.5%. There appears to be a difference in average concentration between the two ends of the slug, and the periphery was shown to contain greater uranium concentration than the interior. The method is definitely unsuited for application because of the non-homogeniety of the alloys. The other application involved determination of isotopic composition using the isotope shift technique. The relation between the U-235 and U-238 lines is unaffected by variation in total uranium, and for slugs containing uranium enriched to 93% U-235 and analytical precision of ± 2% was obtained.

The Chemistry Unit has been watching with interest for several years the development of Echelle grating spectroscopy by Bausch & Lomb Corporation. This development has culminated with a marketed diffraction attachment for a spectrograph that greatly increases the attainable dispersion. Spectrograms of several samples of uranium and graphite have been obtained at the National Spectrographic Laboratory and are currently being studied to determine the feasibility of direct spectrographic analysis of uranium and plutonium for impurity elements.

A troublesome maintenance problem in the C Pile involved the repeated formation of a deposit on the mirror of the dewpoint apparatus employed for monitoring moisture in pile atmosphere. In an attempt to explain the origin of the deposit, a sub-milligram quantity of the deposit was analyzed spectrographically and found to contain calcium, magnesium, silicon, and aluminum -- i.e., the components of normal dust.

In-Line Analysis

Operating experience with the polarograph for continuous analysis of Metal Recovery Process RAW for uranium revealed difficulties associated with maloperation of valves and the formation of maxima -- an electrode effect of obscure origin associated with polarograms. The difficulties appear to have been overcome by eliminating the use of valves and effecting several other modifications: the outgassing step was eliminated, the mercury pool was segregated from the sample stream to avoid reactions at that point, a separate reference cell was introduced as a counter-electrode, and direct polarograms are being recorded rather than the derivative polarogram. With these modifications the instrument has now operated successfully for one week. Although a consistent bias of + 0.004 lbs U/gal exists as compared to control analyses, the unit is a very sensitive measure of extraction column operation; adjustment of column operating conditions is normally reflected on the recorder within 10-15 minutes.

Corrosion difficulties with the continuous colorimetric monitor for uranium in Metal Recovery Process RAF were eliminated by rebuilding the unit and employing sealed electrical connections and enclosing the entire unit to protect it from contact with solutions employed to scrub down the sampling compartment. The unit was placed on line August 25 and has given continuous service for five weeks since that time. Agreement with laboratory results are excellent, nominal values of 0.50 lbs U/gal agreeing to within 0.01 lbs/gal. The instrument is more accurate than in-process specific gravity measurements and is proving of considerable

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The gamma monitor for Metal Recovery Process RCU streams continues to operate satisfactorily, although there is a continued problem associated with the process jet sampling system in obtaining a continuous sample. Low results associated with gas bubbles in the sample appear to have been eliminated by introducing a degasser in the line. The design of similar units for the Purex lines has been reviewed and approved.

It was previously reported that the continuous counting of low energy x-rays from plutonium could serve as an accurate and reliable method for monitoring plutonium in Recuplex wastes. Installation of such a unit is estimated to cost about $10,000. A proposal to use continuous color monitoring of plutonium at an appreciable reduction of cost is under investigation. It is shown feasible to monitor Pu(IV) in this manner, and suitable alarm circuits are being developed.

The design of in-line facilities for monitoring P-10 product and waste has been reviewed and approved.

A commercially-produced "Densitrol" for monitoring density of Purex streams in the sample gallery was received during the month and is being subjected to laboratory tests. The particular application is in connection with the determination of uranium in feed. A continuous monitoring refractometer has been designed and is under construction. When completed, it will be laboratory-tested as a means for monitoring acid in the Purex feed.

Miscellaneous

The solution potential method for determining tin in Al-Si is being employed in the 300 Area Manufacturing laboratory and has permitted elimination of swing shift operation of the spectrographic laboratory. Since the method is quite empirical, all samples were re-analyzed spectrographically on the day shift for several weeks. As a consequence, the frequency of check analyses is being reduced.

The method for determining dibutylphosphate in uranium solutions has been adapted to plutonium solutions and made available to the 234-5 Building laboratory where it will be employed in support of Recuplex studies. A parallel line of analytical work involves determination of the rate of hydrolysis of monobutylphosphate. It was shown, as expected, that there is no tendency for MBP to convert to DBP. However, the mono compound hydrolyzes in 0.15 M HNO_3 with a half-time corresponding to several weeks, in 2 M acid at 100° with a half-time of 23 hours, and in 6 M acid at 100° with a half-time of five hours.

In consideration of the prospects of Hanford employing sweetened uranium slugs, an investigation of non-destructive isotopic analysis of such slugs has been undertaken. Employing the gamma scintillation spectrometer and counting the weak energy gamma emission from U-235, it is shown possible to determine 0.70% U-235 with a precision of 0.0035%; the precision represents standard deviation for one determination.

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Other reportable items include introduction of a dual vacuum system on the research mass spectrometer that improves the vacuum ten-fold; introduction of separate volatilization and ionization filaments in the mass spectrograph source that improve the sensitivity for direct isotopic analysis of solids by five-fold; completion of the separation of lithium iodide and tritium from a neutron flux monitoring unit for Physics Research; and continued work on the recovery of enriched plutonium from a sample of normal plutonium that had been re-irradiated at MTR. Equipment difficulties were encountered in the latter operation but were overcome by month's end.

Waste Disposal and Decontamination

Approximately 900,000 gallons of retention waste from the Works Laboratory Area were processed to ground. Twenty-five waste cartons from Building 3706 requiring special handling were discarded via the burial ground. Nine trips were made to 222-S Building, 200 West Area, for the disposal of 42 gallons of liquid waste in various sized bottles and shielding containers.

Approximately 20,000 gallons of waste were collected in the "crib" waste tanks at Building 340. Analysis showed this liquid to be less than retention limits, making it possible to discharge it directly to ground without trucking it to the 200 Areas. A 30% increase in gallonage and the fact that the liquid collected was very rusty indicated that some construction water may be getting into the crib system. A survey of waste sources is being made to investigate this possibility.

Test work in concreting mixtures for liquid waste is being continued.

A cost study of the glassware discarded because decontamination facilities are not available in 3706 Building is being made. This study should aid in determining how much glassware it is economical to decontaminate in the Radiochemistry Building.

METALLURGY UNIT

Mechanical Testing

The mechanical properties of uranium rods which had been rolled at 250, 350, 450, 550, and 650 C have been determined. These data show that the tensile properties of uranium metal are reduced as the fabrication temperature is raised. Additional samples from the same rods are being vacuum annealed to determine the effect of annealing on the mechanical properties of uranium metal.

Bonding Studies

Efforts to determine the most desirable closure for mechanically bonded slugs are continuing. A die is being designed to permit a study of the type of cap to can closure that is obtained by impacting a cap into a can. In addition 50 four-inch mechanically bonded slugs are being prepared for evaluation purposes. These slugs will be subjected to non-destructive destructive tests and flow lab tests. In addition, an in-pile test to determine the effects of irradiation on

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the properties of the mechanically bonded slugs is being considered.

Production Tests

A satisfactory welding technique has been developed to insure adequate closure of production test assemblies. The method depends primarily upon keeping the assembly cold during the welding operation and employs a conventional "corner weld". The method is being used to can a number of preformed uranium specimens in order to obtain more explicit information concerning the effect or effects of fission, exposure rate, exposure level, and exposure temperature on the properties of uranium metal and promising reactor materials.

During the month a total of 22 mechanical and physical property specimens were canned and inspected. These specimens will be charged in a Hanford pile during October and are scheduled for discharging after reaching an exposure of 200 MWD/T. Six uranium metal specimens designed such that a temperature gradient ranging from 100-900 C will be obtained during irradiation have also been canned and four will be charged during October. The canning of additional preformed samples of U-Cr alloys, uranium metal representing a variety of crystallographic orientations, and uranium samples for low temperature irradiation studies is in progress.

In order to determine the suitability of arc-melted zirconium as a can material for proposed irradiations in the Materials Testing Reactor, three prototype capsules have been prepared, welded, and autoclaved. Examination of the capsules following autoclave testing indicated that the proposed capsule design can be welded satisfactorily if the operation is performed in an inert atmosphere.

Electron Microscopy

A plastic replication technique has been developed to supplement the study of uranium metal by electron microscopy. Studies to date indicate that Faxfilm replicas compare favorably with the aluminum oxide replicas and these techniques are being applied to examine by electron microscopy the structure of uranium metal and the compound layers present in Hanford slugs.

Reactor Materials

A series of tests to determine the rate of creep of sections of horizontal control rod thimbles have been completed. The sections were centrally loaded to simulate in-pile pressures of three and twelve inches of water. The limiting temperature and pressure determined from these tests appears to be 450 C and three inches of water.

A survey of the literature on uranium, aluminum, and zirconium alloys is in progress. The purpose of this survey is: (1) to provide a compilation of existing data concerning these alloys, and (2) to evaluate which alloys appear most promising for reactor use based on their mechanical, physical, and metallurgical properties.

Irradiation Effects

Irradiated "J" metal was successfully polished and etched to reveal the dendritic

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structure under polarized light. The metallographic structure does not appear to be affected by irradiation.

Three slugs from Production Test 105-313-3M (Lead Dipped Slugs) were observed to have donut type marks with dark deposits in the center of the donut. Visual examination in air revealed that the severe indentation on one slug resulted from mechanical action after discharge and that the observed damage has probably not penetrated to the uranium metal on any of the three slugs.

A single crystal sample, 1/4 inch diameter by 3/4 inch long, of synthetic sapphire (Al_2O_3) was irradiated to a total exposure of 17.5×10^{18} nvt to determine its usefulness in components for in-pile test instruments. Diameter and length measurements showed no change after irradiation; however, the initially clear specimen was amber colored after irradiation and was more brittle.

Service Failures

The upper six feet of various tubes in the EB-1 UNH evaporator were examined with a boro-scope after the recent failure of the tube bundle. No difference in external appearance was noted between the leaking tubes and the non-leaking tubes, thus indicating that the leaks had developed in the lower eight feet of the faulty tubes. It is presumed that the recent failure of the tube bundle resulted from cracks in the longitudinal weld seam of the weld drawn tubes.

As a result of the recent failure of the Redox H-4 Oxidizer, type 304 ELC and 309 SCb stainless steels are being corrosion tested in eight possible H-4 Oxidizer solutions. The compositions of these solutions have been supplied by the Redox Process Assistance Sub-Unit. All tests will be made at boiling temperatures for a period of 240 hours.

Six regular uranium slugs with split-type ruptures (one eight inch), three enriched uranium slugs with split-type ruptures (all eight inch), and one uranium-aluminum alloy slug with a split-type rupture were inspected. All were from C Pile. All ruptures from the C Pile have been split types and all have been from the central zone. Two other ruptured regular uranium slugs (four inch) have not yet been examined.

Ten cap assemblies from regular uranium slug ruptures and seven cap assemblies from alloy slug ruptures were prepared for radiographic examination. A few cap assemblies were radiographed and voids were recorded only in the weld areas where holes had been observed by visual techniques.

Radiometallurgy Facilities

Extended Special Work Permits and the Building Operating Procedures within the Radiometallurgy Building were placed in effect on September 21, 1953. A test of the shielding performance of the metallographic examination cell was conducted by using a slug which gave a radiation reading of 3.2 R/hr at 2 meters. Radiation readings of approximately 8000 c/m were obtained through the control panel and viewing window. The chemical stripping and the slug molding equipment were

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mounted on separate pallets and installed within the high level cell. Cold runs were made to observe operation of the control panel and to calibrate thermocouples.

Corrosion Studies

The relative corrosivities of chromic ion and dichromate ion in boiling nitric acid solutions on types 304 ELC and 309 SCb stainless steels have been determined. Concentrated nitric acid solutions (40-60%) containing 100-1000 ppm Cr(VI) are approximately ten times more corrosive than corresponding chromium (III)-nitric acid solutions. Further, the corrosion rate is proportional to the chromium concentration. In either the Cr(III) or Cr(VI) system, the corrosion rate increases by a factor of two to ten when the chromium content is increased from 100 ppm to 1000 ppm. These data indicate that plant equipment which must function in a chromium-nitric acid environment would have a much greater service life if the chromium were in the + 3 oxidation state.

A number of type 303 stainless steel tie rods are currently being used in the TBP RA column ("B" line). Although satisfactory use of the type 303 stainless steel rods can be realized at low operating temperatures, the use of these rods in process solutions at about 60 C is highly questionable. Laboratory tests show that samples of type 303 stainless steel which had been electrically activated in RAIS solution at 60 C corroded quite rapidly and did not regain their original passivity. In fact, the corrosion was so severe that the rod diameter was reduced from 0.44 inches to 0.42 inches during a 37 minute test. A similar test on type 304 ELC stainless steel indicated that passivity would be regained so rapidly in RAIS solution at 60 C that no serious damage would occur.

Tests are underway to determine the best material for the fabrication of heat transfer equipment. Type 304 ELC and 309 SCb stainless steels having skin temperatures of approximately 135 C, 150 C, and 165 C are currently being tested in boiling Purex 1 WW solution (Purex #1 acid concentrator bottoms). Titanium and types 310 Cb, 347, and Carpenter 20 stainless steels will also be evaluated.

Equipment is being designed to determine precise corrosion rates of heat transfer tubes in process solutions. The apparatus is being designed in such a manner as to allow the heat transfer tubes to extend into the vapor phase. Thus, the feasibility of operating a partially submerged heat exchanger can be determined.

The study to determine the corrosion resistance of various bearing materials for Purex submerged rotating equipment has been completed. A teflon product containing 25% graphite exhibited the greatest resistance to boiling 60% nitric acid and boiling 100% UNH.

The rapid deterioration of the stainless steel evaporator coils in the Redox D-12 waste concentrator is believed to be due in large part to dichromate ion. Since chromic ion has been found to be far less corrosive than dichromate ion, the corrosivity of simulated Redox D-12 solution which has been treated with ferrous ion on types 304 ELC and 309 SCb stainless steels is being determined. The addition of a suitable reducing agent to the D-12 solution prior to concentration may result in a substantial increase in the concentrator service life.

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234-5 Chemistry Research

Six batches of calcium plutonium (IV) fluoride were precipitated from a solution containing about 40 g/l Pu in a study of optimum conditions for washing, drying, and reducing the compound to metallic plutonium. Since water-washed calcium plutonium fluoride cakes badly upon drying, alcohol and acetone were investigated as possible wash solutions. Although the resulting cakes after drying were softer than water-washed cakes, powdering of the precipitate before reduction was still required. The bulk density of the alcohol or acetone-washed cakes after drying was about 0.6 g Pu/cc as compared to over 1 g Pu/cc for the water-washed cakes. The average plutonium yield for five bomb reductions employing alcohol or acetone-washed cakes was 85%. Reduction yields obtained from previous reductions using water-washed cakes average about 90%. One additional experiment was carried out to determine whether the physical properties of calcium plutonium (IV) fluoride would be improved if it were precipitated from a solution containing 72 g/l Pu. The product obtained in this experiment had good settling properties during the precipitation and water-washing steps and after drying at 300 C had a bulk density of 1.2 g Pu/cc. The dried salt was found to be caked and required powdering before reduction to metal, however. Reduction by calcium with a calcium-iodine booster resulted in an 86.3% button yield.

Phosgene in 234-5 Operations

The preparation of plutonium chloride from plutonium oxide by phosgene and the reduction of this chloride to metallic plutonium are being investigated for possible application to 234-5 Building operations. Since previous studies have indicated that phosgene is highly corrosive to most fabrication materials at elevated temperatures, the lowest temperature that can be used in the preparation of plutonium trichloride is of importance. Plutonium oxide can be converted to the trichloride at 350 C, but the conversion rate is quite low. The chlorination reaction appears, however, to be essentially complete after one hour at 400 C. The plutonium trichloride thus prepared can easily be reduced by calcium and a calcium iodine booster to metallic plutonium with yields of about 97%. Since 400 C appears to be the lowest practical temperature at which plutonium oxide may be converted to the trichloride, this temperature will be used when the corrosive effect of phosgene on fabrication materials is investigated.

234-5 Metallurgy

Plutonium-gallium alloys are being thermally analyzed in an effort to verify the preliminary Los Alamos phase diagram. Analysis of a plutonium alloy containing 0.5 weight per cent gallium resulted in the detection of the following phase transitions: α to β at 137 C, ζ to ε at 526 C, liquefaction of the ε phase at 625 C, and the liquidus at about 636 C. All phase transformations are in substantial agreement (± 5 degrees) with the Los Alamos data.

The first photomicrographs obtained on pure α phase plutonium show what is believed to be a work hardened structure. To verify this hypothesis, additional specimens which have been cold worked and then annealed at various temperatures are being prepared for examination.

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A cast plutonium tensile specimen was fabricated and tested. The tensile specimen was prepared by vacuum melting a 0.5 weight per cent gallium-plutonium alloy and pouring the molten alloy into a magnesia mold. Values obtained for the modulus of elasticity, yield point, and tensile strength were 4×10^6 psi, 8500 psi, and 20,300 psi, respectively. Tukon hardness measurements indicated that the cast tensile specimen was composed of δ phase plutonium. Previous tests on a tensile specimen fabricated from the same material and prepared in an identical fashion indicated that this specimen was composed of α phase plutonium. Attempts to initiate α phase growth in the δ phase tensile specimen by cold working has thus far been in vain.

Two specimens of Croloy 5, a steel formerly used for reduction bomb casings in 234-5 RG operations have been tested using the stress rupture machine. The specimens were stressed and then heated at a rate such that the temperature of the specimens reached 750 C at the end of 15 minutes. Once the specimens reached this temperature they were allowed to cool for 1 1/4 hours. This temperature cycle was repeated until the specimen failed. The stress applied to the first specimen was 902 psi while the second specimen was stressed at 3250 psi. The stress applied to the specimens is related to standard and off-standard pressures which have been observed in the reduction bomb during Task III operations. The first specimen failed after 137 cycles while the second failed after 17 cycles. The per cent elongation at rupture for the two specimens in a four inch gage length was 27 and 34.6%, respectively.

Stainless steels type 304 L and 309 SCb will be the next materials tested. They are being evaluated for possible use in the new 234-5 RM Task III facilities.

PHYSICS UNIT

Lattice Physics

A method for measuring the conversion efficiency of a test lattice relative to the standard Hanford lattice is being studied to determine its feasibility and possible accuracy. The method involves separation of neutron-induced activities in a thin cross section from a slug in a lattice into components due to U-235 fission and U-238 neutron capture. The gamma spectrum as taken with a scintillation spectrometer shows that the majority of fission product gamma rays, after relative short exposure and decay times, are about 300 kilovolts in energy, while the Np-239 gamma rays or Pu-239* gamma rays emitted in decaying to the ground

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state are nearly all below 300 kilovolts. If a two-channel, pulse-height analyzer is used in conjunction with the scintillation spectrometer to separate the gamma rays above and below 300 kev, the signals in the two channels will give a relative measure of U-238 neutron capture and U-235 fission. Pure foils of U-235 and U-238 will allow measurements of the error produced by fission gamma rays below, and Pu-239* gamma rays above, 300 kev. This allows correction of data by successive approximations to obtain a true signal due to U-235 fission and one due to Pu-239* gamma rays. The ratio of counting rates, due to U-235 for standard and test lattices, if counter efficiency and exposure-decay times are the same for each foil, will be a measure of the ratio of 235 atoms destroyed in each foil--assuming that the value of alpha for U-235 is the same for each lattice. Similarly, the ratio of counting rates due to Pu-239* decays in the standard and test lattices will give the ratio of plutonium atoms produced in the two foils. A constant flux, but not necessarily equal, is assumed in both lattices. With the conversion efficiency of the standard lattice and the above ratios, the conversion efficiency of the test lattice may be calculated.

The first measurement with the large hollow slugs (1.66 inch O.D. and 0.81 inch I.D.) was taken in the 7 1/2 inch lattice. The BF_3 counter and cylindrically mounted indium foils were used for measuring the relative density on the vertical center line of the pile. For the buckling measurements, four 1/2-gram, Ra-Be neutron sources are used to drive the exponential pile. The buckling for the 7 1/2 inch lattice was $(97.9 \pm 1) \times 10^{-6}$ cm^{-2} as measured with the BF_3 counter. The indium foils, which were used only as a check on the BF_3, yielded 98×10^{-6} cm^{-2}. In the 7 1/2 inch lattice, the buckling with the solid 1.66 inch slug was 73×10^{-6} cm^{-2}.

Upon completion of the 7 1/2 inch measurement, the hollow slugs were placed in the 6 3/16 inch lattice with alternate process tube holes filled with graphite, so as to simulate a 12 3/8 inch lattice. The buckling here found was $(51 \pm 3) \times 10^{-6}$ cm^{-2}. A preliminary value has been obtained for the buckling of the 6 3/16 inch lattice with the large hollow slug. This value is $(65 \pm 5) \times 10^{-6}$ cm^{-2}. The buckling in this lattice with solid large slugs was -154×10^{-6} cm^{-2}.

The bucklings with the greatest interest, however, will be those with water in the center tubes of the hollow slugs. Presently, water is being added to these tubes and values of the buckling will be determined for the 6 3/16 inch and 7 1/2 inch lattices.

Cell traverses, from which the thermal utilization and the lattice diffusion length can be determined, have been taken for the above lattices. These data have not yet been analyzed.

A number of determinations, involving slugs of various diameters, of the ratio of surface-to-center thermal neutron flux, have been made. From this ratio, a value of the thermal neutron diffusion length in uranium can be calculated. The values obtained so far are listed in the table below.

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Diameter of Slugs	μ cm^{-1}
0.925"	0.90
1.175"	0.84
1.360"	0.79
1.660"	0.69

The last value for μ, 0.69 cm was not measured, but obtained from an extrapolation and is judged to be uncertain. Measurements of this type can be made with greater accuracy if the neutron flux in the exponential piles is raised by a factor of 10.

Using the calculation scheme and constants, which have been worked out from data on standard size slugs, the buckling and other lattice constants for lattices, using the 0.925 inch diameter slug have been calculated. The results of this calculation are given in Figure 1. It will be seen that the theoretical curves predict the wet and dry buckling to be of the same value (79×10^{-6} cm^{-2}) at a lattice spacing of 5.3 inch and a graphite to uranium mass ratio of 3.69. For the 1.36 inch (standard) slug size, the wet and dry bucklings are equal at a spacing of 6.9 inch, graphite to uranium mass ratio of 2.96. The reactivity at the cross-over point for this slug size is 68×10^{-6} cm^{-2}. The lattice constants, calculated for the intersection points of wet and dry reactivity curves are given below:

	0.925" Slug Size	1.36" Slug Size
Lattice Spacing	5.3"	6.9"
p	0.865	0.858
k	1.039	1.0345
Buckling	79×10^{-6} cm^{-2}	68×10^{-6} cm^{-2}

From the above numbers, one can infer that the small slug lattice for equal wet and dry bucklings will have enough reactivity to operate without enrichment and will have a slightly lower conversion ratio than a standard slug lattice of equal wet and dry reactivities.

In the table below, are given the constants for the small-slug lattice as well as those for the 7 1/2 inch lattice, using the 1.36 inch slug.

	Standard H_2O Annulus	K H_2O Annulus	0.925" Slug
B	85×10^{-6} cm^{-2}	79×10^{-6} cm^{-2}	79×10^{-6} cm^{-2}
p	0.877	0.883	0.865
k_∞	1.044	1.040	1.039
Graphite / Uranium	3.52	3.51	3.69

It is seen from this table that the small-slug lattice has about the same reactivity and conversion efficiency as the K Pile lattice. It has, in addition however, the properties (1) of equal wet and dry reactivities, a safety feature not

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SET NO. 1
STICK NO. 3

dry lattice
wet lattice

THEORETICAL BUCKLING CURVES
uranium radius: 1.175 cm
experimental values ©

BUCKLING * (10^{-6} cm^{-2})

LATTICE (inches)

3 4 5 6 7 8

+100 0 -100

FIGURE 1

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obtained in the K lattice, and (2) a lower slug core temperature for a given power.

A transport theory calculation has been initiated to investigate the variation of the diffusion length of thermal neutrons in uranium with changes in lattice size. The values of diffusion length in uranium will be determined for the 6 1/2 inch, 7 1/2 inch and 8 1/2 inch lattices.

A new method of calculating resonance escape probabilities has been formulated, which eliminates the explicit introduction of the resonance integral concept. It consists of replacing the exact integral equation, determining the flux distribution in a lattice cell at a particular energy, (i.e., particular values of cross sections), with an equivalent one which is readily soluble.

Nuclear Physics

Completion of the irradiation of the C 12 samples in the MTR is scheduled for October 7. At this time, these samples and their monitor will have received about 9000 MWD exposure or an integrated flux of about 10^{22} neutrons/cm^2. Arrangements have been made to measure the cadmium ratio at the positions where the samples were exposed. These measurements will serve as a further check on the calibration of the monitors and will provide some idea of the neutron spectrum. The spatial variation of the flux at the positions where the samples and the monitors were exposed has been determined. Initial calculations show that the maximum thermal flux was 5×10^{14} neutrons/cm^2/second. This confirms the fact that the C^{12} samples will have received sufficient irradiation to cause a measurable change in the C^{13} to C^{12} ratio. The probable error in the final calculated cross section of C^{12} has been shown to be about ± 8%. A document describing the source of errors will be issued.

Forty-five gold and gold-cadmium foils have been irradiated in the E-Hole facility at F Pile and the data are currently being analyzed. It is expected that this analysis will yield: (1) a calibration of the epi-thermal absorption cross section of gold foils, having thicknesses ranging from 0.004 mils to 20 mils, (2) an absolute thermal and epi-thermal flux traverse over most of the length of the facility, and (3) information concerning the homogeneity of the Au-Cd alloy foils. It is hoped that the Au-Cd foils will yield the neutron temperature to within an error of about 5%. They may then be used in a production pile where other methods would not be feasible.

A set of plutonium and uranium fission foils, which utilize a heavier uranium foil than is desirable to use in an absolute measurement, have been used to obtain the ratio of fission cross sections at energies less than 0.10 ev. The results obtained are shown in Figure 2. The solid curve is a smooth curve through points obtained from the fission cross section curves of BNL-170. The experimental points are normalized to agree with the BNL-170 value at 0.10 ev. Normalization is necessary because weight assignments have not yet been given to the foils. The deviation of the curve through the experimental points from that obtained from the best values of the fission cross sections is quite large below about 0.070 ev, amounting to some 15% at 0.035 ev. The size of this discrepancy requires that the possible errors in this experiment be closely examined. The most likely source of

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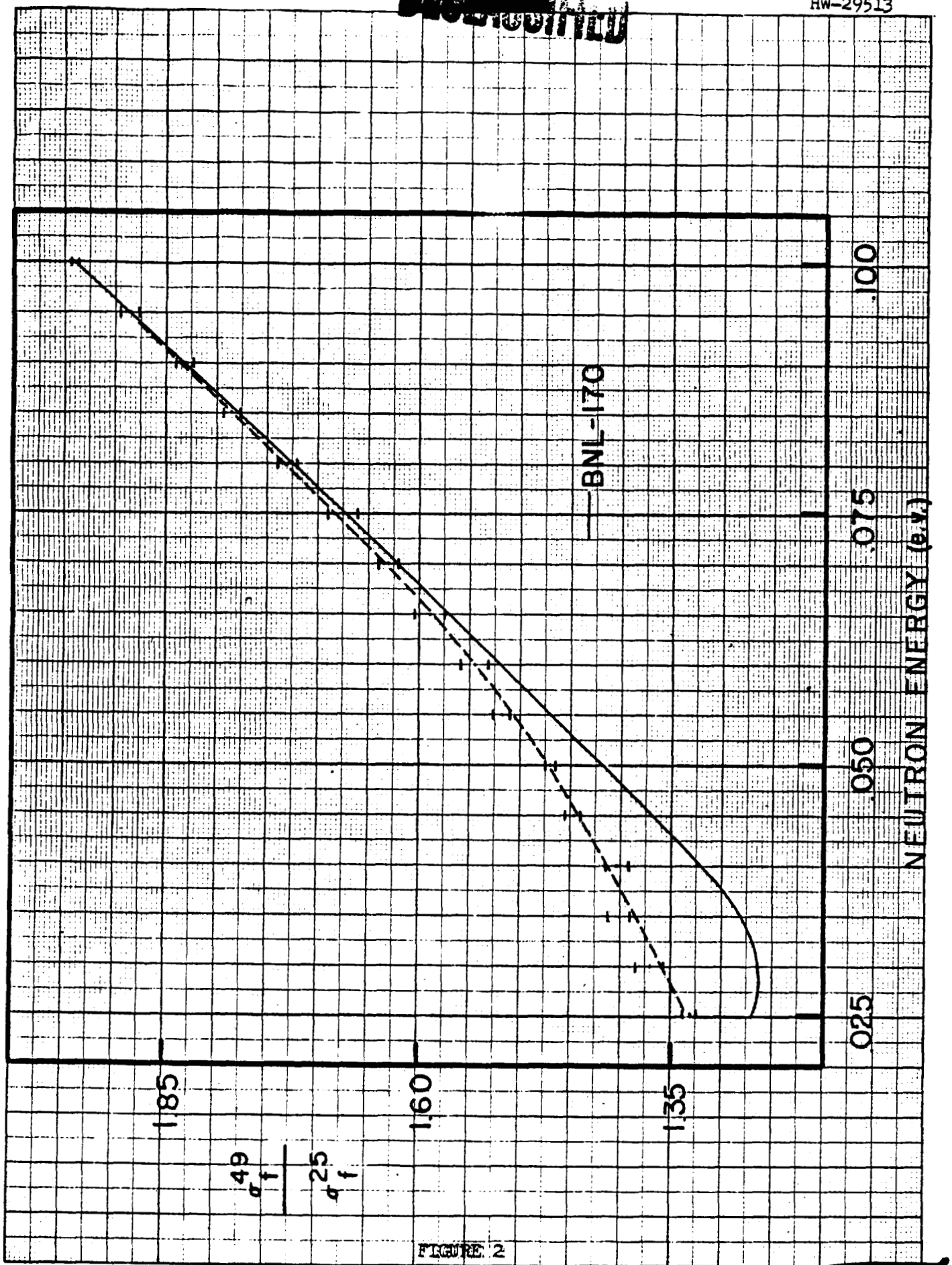


FIGURE 2

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error is in the correction for the higher order neutrons in the diffracted beam. All of the data, so far, have been checked for error from this source by using two completely different filters for the above correction. Consistent results have been obtained to date using this technique.

Irradiation Physics

In many radiation-induced reactions, it has been indicated that the relative abundances of ionic products formed on exposure to high energy ionizing radiation are the same as in the related mass spectrometric experiments. This is because the cross section for electronic excitation in molecules is a maximum when the energy of the bombarding electrons is about 1000 volts. Most of the chemical effects (ionizations and excitations) resulting from irradiation are due to electrons in the energy range of several hundred to several thousand electron volts which result in a pile from the absorption of gamma radiation and collisions with recoil nuclei. Collisions with neutrons are inefficient in producing electronic excitation.

The reaction of graphite with CO_2 may be observed mass-spectrometrically by comparing the relative abundances of the ionic species which are present when CO_2 alone is bombarded with 1000 volts electrons with the relative abundances of these species when a graphite surface in a CO_2 atmosphere is irradiated. By using suitable experimental conditions, the specific reactions of particular ionic species may be determined. For instance, the most abundant ionic species formed in CO_2 are CO_2^+, CO^+, and O^+ which have the lowest appearance potentials. With the electron accelerating potential greater than the appearance potential of CO_2^+, but less than that of CO^+ and O^+, only CO_2^+ will be formed in the gas phase. If the accelerating potential is raised above the appearance potentials for CO^+ and O^+, the three species will be formed in the gas phase. By using CO instead of CO_2 and an accelerating potential greater than the appearance potential of CO^+, this will be the only ionic species formed in the gas phase. Hence, it should be possible to distinguish between reactions due to these three species. Reactions due to ions formed in the gas phase may be distinguished from reactions due to ionization of gases absorbed on the surface of the graphite by placement of the graphite sample relative to the electron beam.

Plant Physics

A formula has been worked out to estimate the effect of interaction between two or more critical assemblies. This formula has been used to estimate the interaction in the case of two infinitely long 8-inch cylinders containing plutonium solutions. At 18 inch separation the interaction between two such cylinders is equivalent to an increase of 0.3 inches in the diameter. It is interesting to note that it takes a distance of 4 1/2 feet of separation to reduce the interaction to a 1% effect. A curve giving the interaction for all distances of separation has been calculated.

The estimate made of the K Pile flat zone and reported last month has been revised. In order to check this calculation, the same calculation was performed for DR Pile for comparison with the result obtained from present operating data. Using

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an additional gain of 150 hours to take account of the ripening of the metal in DR Pile, the calculated value was found to be 7% greater than that found from temperature data. Agreement was obtained by adjusting the exponent in the diffusion length temperature correction, which is the weakest step in the calculation. Applying this correction to K Pile and allowing for 50% increase in the water annulus, the number of flat tubes is 390. Assuming arbitrarily an uncertainty of ± 100 inhours, the result is 320 to 600 flat tubes.

EQUIPMENT DESIGN

Design scoping activities continued for the equipment for irradiation of Hanford slugs in the Materials Testing Reactor. Design or alteration of Radiometallurgy Building equipment was carried on, including the slug sampler, the cloth polisher, the electropolisher, in-cell air filters, a three ton cask, a dilatometer, and a dry storage cup.

A contamination release occurred at the Redox laboratory multicurie cell used for heavy element chemical separation. The automatic airborne alpha detector installed prior to the run gave an alarm roughly five minutes after the spill. The room was successfully decontaminated in spite of the high alpha and gamma levels.

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 September, 1953 except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

Inventor(s)	Title
L. L. Burger	Apparatus for Investigation of Emulsion Behavior of Liquids

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

FW Albaugh:ltc

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[redacted]

MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

M.F. Parr, Foxboro Company, Foxboro, Mass., visited HAPO September 14 - 17 to study design details of 105-K Power Calculator.

R.B. Clendineng, The Bristol Company, Waterbury, Conn., visited HAPO September 14 - 25 to repair faulty recorders.

A.E. Tripp, Preload Construction Corp., New York City, visited Richland September 21 - 23 to discuss design of prestressed underground concrete waste storage tanks.

L.C. Ford, General Electric Company Service Engineer, Spokane, Wash., visited HAPO September 24 - 25 to provide assistance on the canning machine electronic equipment.

E.P. Peabody and E.J. Barrett attended the AIEE convention at Vancouver, B.C., August 21 - September 4.

H.S. Davis visited the North Pacific Division Laboratory, Corps of Engineers, Troutdale, Oregon, to discuss the heavy aggregate concrete test program September 1.

I.M.A. Garcia presented a paper at the Conference of Nuclear Engineering, University of California, Berkeley, California, September 8 - 11.

J.F. Nesbitt visited the Pacific Oerlikon Company, Tacoma, Wash., to inspect initial extrusion of tube sleeves before start of production, September 9.

I.M. Jacobs visited Panascan Inc., Chicago, Illinois to discuss design details of the 105-K Temperature Monitor September 17 - 23.

E.S. Day, Jr. and C.O. Clemetson attended the National Convention of the National Instrument Society Show, Chicago, Illinois, September 21 - 26. Mr. Day also consulted with Panascan, Inc., extending his trip through September 28.

R.H. Beaton attended research and development conferences at the General Electric Research Laboratory and KAPL, Schenectady, New York, September 28 - 30.

J.C. Wood and D.L. Peterson visited the Puget Sound Naval Shipyard, Bremerton, Wash., to discuss drawings and to make cost estimates, September 29.

D.L. Peterson visited the Western Gear Works, Seattle, Wash., to review and approve vendor drawings September 30.

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ORGANIZATION AND PERSONNEL

Personnel Statistics:

	August 31			September 30		
	Exempt	Non Exempt	Total	Exempt	Non Exempt	Total
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	57	12	69	54	12	66
Design Planning Unit	16	13	29	17	12	29
Design Engineering Sub-Section	86	12	98	85	12	97
Total Section Personnel	161	39	199	158	37	195
Technical Graduates (Rotational)	-	9	9	-	7	7
TOTAL	161	48	208	158	44	202
Temporary loan from ANP			2			0

Accessions - 4
Separations - 10

GENERAL

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

	Man Months Expended	% of Total
1952 Expansion Program	89.9*	59.9
Research and Development	31.6	21.1
Other Projects and Design Orders	28.6*	19.0
	150.1*	100.0

*Equivalent man months expended reflects amount of overtime on Expansion Program and other Design Projects.

DESIGN DEVELOPMENT

Statistics:

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

	Man Months Expended	% of Total
RDS-D-10 Reactor Design Development	6.1	19.3
RDS-D-11 Water Plant Design Development	10.3	32.6
RDS-D-12 Separations Design Development	2.3	7.3
RDS-D-13 Mechanical Design Development	8.2	25.9
RDS-D-14 Utilities and Services Design Development	1.8	5.7
RDS-D-15 Engineering Standards and Materials Development	2.9	9.2
	31.6	100.0

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RDS-D-10 and D-11 - Reactor Plant Development

Work commenced during the month on the preliminary study of a plutonium producing reactor with the objective of decreasing unit costs by replacement of present reactors with a more efficient reactor. A target goal for a 3600 megawatt power level unit at one-half of 100-K operating and construction costs was established. Emphasis will be placed on making as drastic cost reductions as can be shown feasible by test programs or data now in existence. The general outline of such a plant will consist of a single low pressure water plant taking water directly from the river with screening and addition of inhibiting chemicals. The reactor will generally resemble 100-K but will take every advantage of improved technology to decrease the cost of the shielding, the process piping, the control system and the building. Preliminary cost estimates run about $60,000,000 compared to the original 100-K estimate of $94,000,000. It is believed that some further reductions will develop after further study is carried out.

RDS-D-11 - Water Plant Design Development

In connection with Reactor Plant Modification studies, a series of boiler tests was made at 100-F to evaluate the emergency steam load requirements. A permissible minimum steam load of 18,000 to 20,000 lb/hr was established and the most severe sudden change imposed on a boiler was an increase of 100,000 lb/hr. The data indicated that the response was adequate to provide the steam requirements during shutdown.

The feasibility of pumping raw water directly to the 183-B Building from the 181-B Building by-passing the 182-B reservoir was investigated. This plan proved to be economically feasible and the savings in electric power consumption alone would be in the order of $30,000 per year, in addition to the fact that new pumps and piping would not be required in the 182-B Building.

RDS-D-12 - Separations Design Development

Successful operation of the Redox Plant on a high concentration flowsheet has increased the capacity of the second and third uranium cycles and reduced the consumption of ANN (aluminum nitrate nonahydrate). As a result, parallel operation of the second and third uranium cycles (to obtain the desired capacity until larger columns can be constructed) is no longer required and co-decontamination of uranium and plutonium, known as precycle, (to reduce ANN consumption) is not economically attractive. Accordingly, the jumpers which would permit parallel operation and precycling may not be constructed.

RDS-D-13 - Mechanical Design Development

The installation in Building 314 of the prototype fuel element canning machine is nearly complete. A large number of problems developed during preliminary trial operation causing delay in progress despite the efforts of engineering personnel and craftsmen. It is planned to operate the machine cold for extended periods of time to complete the running-in of the gear boxes and bearings and to insure consistent repetitive operation. Installation and electrical connection of the furnace and furnace controls was continued.

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A prototype interface monitor instrument was installed to monitor the interface between organic and aqueous liquids in one of the 321 Building test columns. Zero and 100% calibrations were made September 18 and the instrument was placed in operation. To date it is performing satisfactorily.

A prototype meter to measure centrifuge eccentricity has been designed, constructed, and tested in the laboratory. It has an essentially linear scale for the required centrifuge shaft wobble range of zero to one-half inch. The plans for the pick-up coil and instrument will be incorporated in the Purex design.

RDS-D-14 - Utilities and Services Design Development

Methods to supply emergency cooling water for reactors in the event of river flooding have been evaluated and it has been shown that further study must be accomplished to permit a final recommendation. Items requiring further study are: a) use of water export lines for emergency coolant water supply; b) water storage for emergency at a site near the 200 Areas; c) methods by which the reactor may be sealed to prevent entrance of polluted waters and by which the shielding may be braced to withstand forces of flood waters.

A study is underway to explore the feasibility and practicability of directly recovering 105 Building effluent water heat energy which may effect annual 100 Areas steam cost savings for the existing areas on the order of $350,000 under present steam plant operations. Substantial savings appear feasible under possible reduced steam demands associated with the 100 Area expansion program. The possibility of using coolant waters directly in boiler feed makeup is being investigated.

RDS-D-15 - Engineering Standards ad Materials Development

Cost plus estimated commitments to date for development of engineering standards is $24,200.

The progress on standards for September is as follows:

a. Major revisions are being made to HW-4924-S "Standard Specifications for Welding Stainless Steels".

b. A new standard for stainless steel welding electrode and filler rod is being prepared. This specification is 85% complete.

c. Work was continued on setting up standard instrument symbols and is approximately 55% complete.

DESIGN PROJECTS:

Statistics:

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

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	Man Months Expended	% of Total
CA-512-R 100-K Reactor	47.0	39.7
CA-512-W 100-K Water Plant	3.7	3.1
CA-513 Purex Separations Facility	22.8	19.2
CA-514 300 Area Expansion	11.5	9.7
CG-551 Expansion of Building 234-5 Facilities	4.9	4.1
Major Projects - Other than Expansion Program	23.8	20.1
Minor Projects and Design Orders	4.8	4.1
TOTAL	118.5*	100.0

*Equivalent man months expended reflects amount of overtime on Design Projects.

CA-512-R - 100-K Reactor Facilities

Design progress on the 100-K Reactor Facilities was advanced to 96.5% complete, an increase of 0.6% during the month. Progress for September is based on 1960 drawings, whereas the previous monthly report reflected progress based on approximately 1920 drawings. During the month 47 drawings were approved, bringing the total to 1886 drawings which have been approved.

Expenditures to date are approximately $1,800,000 against an authorized amount of $2,781,500. A revised estimate of $2,425,000 for design, including proposed additions to the 230 KV transmission system, was submitted to the Project Section. Of the 1040 requisitions to be prepared, 998 have been issued by the Design Section for procurement of engineered items for 105-KW and 105-KE Facilities. The total value of this equipment is approximately $16,500,000.

The size of the charging machine has been established. Platforms will be added on each side of the machine for safety, and an interlock is being added to prevent movement of the carriage when coupled to a nozzle. A positive means of placing the metal in the charging position will be used to prevent the possibility of jamming.

It was decided to include the "closed line" operation feature for the 105-KW-KE crosstie pumping system (as well as the "open line") as the only safe, feasible method of providing adequate quantities of back-up water in the time required to prevent boiling in the process tubes in an emergency during water plant shutdown. This feature provides flexibility and independence of water plant operation as well as facilitating the "quick discharge system" of discharging operations.

The construction of the scale model of the 105-K Process Unit was completed.

The design of the Water Studies Semi-Works is on schedule and is approximately 25% complete, an advance of 20% during the month. Twenty-three drawings were issued for comment and two drawings were approved.

The design of the 115-K Gas Facility is essentially complete and all of the required drawings have been issued for approval. Of the six acceptance test

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procedures, two have been approved and the remaining four have been issued for comment.

The checking of reinforcing steel placing drawings and the structural steel fabrication drawings for the 105-K and 115-K Buildings continued during the month. A total of 43 structural steel fabrication drawings and 19 reinforcing steel placing drawings were received and checked.

CA-512-W - 100-K Water Plant Facilities

Detail design of the 100-K-B-C telephone exchange was advanced to approximately 90% complete. Construction specifications have been started.

The final report on the stability study for the 100-K Emergency Generators was approved and issued. The charts to be included in the short circuit study report have been completed.

Review of electrical drawings and specifications submitted by the architect-engineer continued through the month.

CA-513 - Purex Facility

Detail design of the Purex Waste Facility was advanced 18% during the month to 93% complete, based on 151 drawings required for construction exclusive of standards or study drawings. Changes in the Purex Plant have been scoped and approved which reduce the possibility of severe contamination of the canyon and cranes. These changes include (a) water proofing of all equipment and provisions of sprays in all cells to wash down loose contamination and to cool thermally hot equipment, (b) the operation of spare supply and exhaust systems to increase the flow of air into cells during the period that cell block covers have been removed, thereby reducing the backflow of potentially contaminated air, and (c) provisions for equipment to clean up contamination that escapes into the space above the canyon deck.

Over-all design of the Purex Outside Facilities was advanced to 95% complete. Eight drawings were approved for construction and two drawings were issued for comments and approval. Design engineering review and comments were made on the flocculator bids for the 283-E Filter Plant Addition.

Design work on CA-513-B, UO_3 Plant Expansion advanced to 99% complete. Four electrical drawings were revised and two instrument drawings were issued for comment.

Design of the Hot Semi-Works Conversion, CA-513-D, was advanced 18% during the month to 35% complete. A revised drawing schedule and design estimate were prepared which extended the completion date to December 15 and raised the estimated design cost to $43,700. Twenty-seven drawings of vessels, columns, etc., made by the Technical Section have been approved by the Design Section. Design work on A, B, and C cell piping is continuing and preliminary work on the writing of acceptance test procedures has been started. Purchase requisitions for instrumentation for the project are 90% complete, with all major items having been issued for bid.

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Work on the scale model of the 202-A Building plot plan was completed. Fabrication of the other model is progressing according to schedule except for the piping which is delayed because the piping drawings are not complete.

CA-514 - 300 Area Expansion

Detailed design work on the 300 Area Expansion was advanced 2% during the month to 63% complete. The small percentage increase in completion reflects the added design work of renovating buildings 3707-A, 3707-B, 3719 and 3706. This work previously had been scheduled to be performed by an architect-engineer. Vendors' bids on the component preparation machines were received and reviewed. Experimental spray cleaning equipment was received and is being evaluated by the Technical Section to determine the adequacy of spray cleaning in time to allow purchase of this type of equipment for CA-514. Final corrected drawings and specifications on the acid, caustic and methanol facilities have been submitted by the architect-engineer and are being reviewed.

CA-431-B - 100-C Area Production Facilities

Detail design was started on the replacement horizontal safety rods for 105-C and is approximately 70% complete.

CA-431-C - Metal Examination Facility Equipment

Design work on the underwater metal examination equipment at 105-C was advanced 21% during the month to 37% complete. Seventeen drawings have been forwarded to the Project Section for approval out of a total of 84 drawings required.

CG-496 - Recuplex Installation - 234-5 Building

Detail design of the Recuplex Installation was advanced 1% during the month to 98% complete. Some additional design work has been required on the load-out station ventilation system. The total number of drawings required for this job is 249, of which 245 have been completed.

CA-535 - Redox Capacity Increase, Phase II

Final design for Redox Capacity Increase, Phase II was advanced 20% during the month to 65% complete. Five jumper drawings were completed for approval and four drawings on the D-12 pot were revised. Vitro Corporation instrument drawing was reviewed and returned with comments.

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

Design work on the Activation of Task I, Building 234-5 is approximately 22% complete, an advance of 5% during the month. A revised drawing schedule was issued and the design completion date was extended to February 15, 1954 due to diversion of design efforts to TBP modifications. However, the over-all construction schedule is not expected to be changed appreciably.

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CG-550 - Reactivation of P-10 Facilities

Detailed design on Reactivation of P-10 Facilities was advanced 22% during the month to 89% complete. Of the 115 drawings required, 99 drawings have been approved. During the month 29 drawings were approved and issued for construction. Material procurement by Design Section was completed.

CG-551 - Expansion of Building 234-5 Facilities

Design work on Expansion of Building 234-5 Facilities was advanced 6% during the month to 36.3% complete. The shielding for Task III (reduction) has been scoped and approved. Six inches of lucite (for visibility) or six inches of masonite will be provided to reduce the radiation level from neutrons and gamma rays. The scope of the Final Inspection Facility is nearing completion based on its location within the 234-5 Building in the space currently occupied by the Field Maintenance Shop.

CG-558 - Reactor Plant Modification for Increased Production

Design work on Reactor Plant Modification for Increased Production was started during the month and scope design is 6% complete. Research and development activity on this project resulted in the issuance of a document setting forth the basis for the preparation of scope design.

CG-562 - Waste Metal Recovery Plant Modifications

A project proposal was prepared for design and procurement of funds for the installation of new columns in the TBP Plant and the project was authorized by the Commission on September 14, 1953. This work is being expedited so that the columns can be installed at the same time the plant is converted to series operation as well as to obtain the benefits from reduced waste losses.

D.O. 100473 - Hot Ball Detection, Ball 3-X System

A preliminary design has been completed and drawings are being made for a "hot" ball separator. The balls will be dropped past the radiation detectors at a uniform speed enabling the detectors to actuate a deflection gate to separate out the "hot" balls upon detection. Final design was started.

D.O. 100529 - Ball Third System - Ball Recovery System

Detail design of revisions to the existing Ball 3-X System as presently scoped is essentially complete. However, additional work on the ball washer is expected. Completion of the electrical design for the control system has been held up pending receipt of vendor's information.

D.O. 100539 - New Facility for Lattice Testing

Design was continued on the proposed facility for housing a lattice test reactor and a design cost estimate was prepared.

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D.O. 100549 - Redox Back-Cycle

Detail design continued on jumpers, vessels modification and sample gallery ventilation in connection with back-cycling of 2DW and 3DW to earlier cycles as scrub. Of the 70 required drawings, 32 have been completed to date.

D.O. 100577 - Gamma Monitor Chambers - 107 Basins

Design on the gamma monitor chambers was advanced 30% during the month to 50% complete. The chambers are being designed to slide along a supporting boom rather than moving the boom as was done previously.

D.O. 100596 - Soil Science Laboratory Facilities

Design of alterations and additions to hood exhaust systems, distilled water system and the building process sewer has advanced to 75% complete.

D.O. 100630 - Fuel Element Pilot Plant

This building will be constructed in two phases. The first phase includes the building structure and site work. The second phase will complete the building interior and equipment installation. The preliminary A-E drawings and specifications for the first phase have been checked and the revised drawings are being reviewed.

D.O. 100646 - TBP Plant Modifications to Maintain Capacity

Design work on TBP Plant revision for a two-cycle series operation of the process line, which was started on an emergency basis last month, was advanced 90% during the month to 95% complete. Eighteen jumper drawings were completed and approved. One additional drawing, which completes the design work as presently scoped, will be ready for approval early in October.

D.O. 100638 - Effluent Water Monitoring Improvements

Preliminary design and a project proposal were started on the installation of gamma effluent water monitoring facilities in 105-B, C, D, DR, F, and H Areas.

D.O. 100656 - 202-S Building, Cell Layout As-Builts

Work was started during the month on a program to bring drawings of the 202-S Building process equipment and piping to the as-built status.

D.O. 100663 - Alum-Activated Silica Facilities for 100-B, D, F, and H Areas

The preparation of a project proposal was initiated for the design and construction of facilities for installation of alum-activated silica water treatment in the 100-B, and 100-H Areas, and modification of existing facilities as necessary in the 100-D and 100-F Areas. A proposal draft is being circulated for review. A report on the study of hauling of activated silica from C and K Areas versus local manufacture at B, D, DR, F, and H is in preparation.

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DESIGN SECTION WORK IN THE CLOSING STAGES OR COMPLETED DURING SEPTEMBER

D.O. 100329	New 2101 Fabrication and Storage Facility
*D.O. 100396	As-Built" Drawings on Modified RA Columns and New Associated Jumpers
*D.O. 100471	Linear Differential Transformer
D.O. 100476	Positive Ion Acceleration Laboratory
*D.O. 100608	Jumper Drawing - 221-U
*D.O. 100609	New Connector Assemblies 221-T
*D.O. 100650	Jumper Design, 152-UR Diversion Box
*D.O. 100651	In Line Sampler, 221-U
*D.O. 100660	Jumper Design, 241-TX
*D.O. 100667	Jumper for 152-BR Diversion Box

*Design work completed during September

INVENTIONS

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

INVENTOR	SUBJECT
N.T. Hildreth M.T. Slind	Densometer - a device for use in measuring water and grout levels in "Prepakt" concrete operations.

P.K. Beaton

Manager - Design
ENGINEERING DEPARTMENT

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DESIGN SECTIO WORK STATUS

PROCESS ENGINEERING SUB-SECTION
ENGINEERING MAN MONTHS *

Description	Backlog Start Of Month	Orders Received During Month	Time Spent During Month	% of Total Effort	Backlog End of Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Balance
CA-512-R	314.8		17.1	34.5	297.7	15	12	10	10	10	10	230.7
CA-512-W	30.6		.2	.4	30.4	.5	.5	.5	.5	.5	.5	27.4
CA-513	40.3**		3.1	6.3	37.2	4	4	4	4	4	4	13.2
CA-514	8.0**		1.7	3.4	6.3	2	1	1	0	0	0	2.3
CG-551	33.3		2.9	5.8	30.4	3	3	3	3	3	3	12.4
Pile Modifications	113.0		2.0	4.0	111.0	9	10	10	10	10	10	52.0
RDS Program	382.8		20.7	41.8	362.1	16.5	24.5	26.5	30.5	30.5	30.5	203.1
Minor Design Orders	30.6	3.0	1.9	3.8	31.7	3	3	3	1	1	1	19.7
TOTALS	953.4	3.0	49.6	100.0	906.8	53	58	58	59	59	59	560.8

DESIGN ENGINEERING SUB-SECTION
ENGINEERING MAN MONTHS *

CA-512-R	105.6		22.3	30.4	83.3	16	14	8	7	6	5	27.3
CA-512-W	28.7		3.1	4.2	25.6	3	2	1	1	1	1	16.6
CA-513	67.8**		15.5	21.1	52.3	12	9	7	6	4	3	11.3
CA-514	55.5**		8.4	11.4	47.1	10	9	7	6	4	3	8.1
CG-551	8.0		1.3	1.8	6.7	1	1	1	0	0	0	3.7
Pile Modifications	117.0		.7		116.3	3	7	9	11	11	11	64.3
RDS Program	212.4		3.6	4.9	208.8	8	11	14	17	22	25	111.8
Major Projects - Other	64.8	9.5	15.3	20.8	59.0	15	10	7	5	5	5	12.0
Minor Projects & Design Orders	64.9	2.7	3.2	4.4	64.4	7	7	7	7	7	7	22.4
Available for Anticipated Future Work						1	5	14	15	15	15	
TOTALS	724.7	12.2	73.4	100.0	663.5	76	75	75	75	75	75	277.5

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

	Authorized Projects	Anticipated Future Work	Totals
Architectural & Civil	92.9	21.4	114.3
Mechanical	219.2	41.4	260.6
Electrical	165.7	33.3	199.0
Instrument	146.0	26.7	172.7
Standards	39.7	10.7	50.4
TOTALS	663.5	133.5	797.0

*Exclusive of Technical Graduates
**Adjusted backlog

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Design Section
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MONTHLY NARRATIVE REPORT - SEPTEMBER 1953

PROJECT SECTION

I. SUMMARY

A. ORGANIZATION AND PERSONNEL

There were 573 employees on Project Section payroll at the end of the month. Ratings of non-exempt personnel were essentially completed. Personnel employed by the drafting assistance contractor completed their work and were released on September 18, 1953.

B. SCOPE OF ACTIVITIES

At the end of the month, completion status of major project was as follows: CA-187-D-II, Redox, 6%; CA-431-A, 100-C Waterworks, 99.9%; CA-431-B, 100-C Reactor, 99.9%; CG-438, Ball Third Safety System, 97%; CG-496, Recuplex, 22%; CA-512, 100-K Area Facilities - Water Plants, KW, 32%, KE, 26% - Reactor Buildings, 105-KW, 28.8%, 105-KE, 14%; CA-513, Purex Facility, Part "A", overall 10.4%, Part "B", 50%, Part "C", 100%; CA-514, 300 Area Expansion, overall, 13.5%.

C. MATERIAL PROCUREMENT

The warehousing program at G. O. Carlson for Purex materials has become involved in many difficulties. To date neither a formal contract nor purchase order has been accomplished for the warehousing of stainless steel. Material is not arriving at the warehouse as was planned, and the G. O. Carlson Company is holding material with their own stock until fabricators make requests.

The workload of field inspection has continued to increase, particularly for 100-K Reactor Area materials. Vendors of thermal shielding blocks, both base and top, have not reached adequate production. Side blocks are being produced at a satisfactory rate. Production of biological shielding crates is about two months ahead of schedule. Gun barrels of good quality are being produced, but the vendor has not been assured of tubing for the second half of the order. There has been practically no progress on horizontal and vertical safety rods, or on nozzles.

The limonite contract, previously reported as cancelled, was modified. Later shipments of limonite have not been of satisfactory quality for aggregate. An inspection at the mine revealed that the limonite is useful only as sand; however, additional laboratory tests are being made, and other sites are being investigated.

Production of P-10 pots has been increased to an acceptable rate.

Vendors of stainless steel vessels for Recuplex have begun fabrication.

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D. CRAFT LABOR

A court injunction brought to a close, on September 25, the work stoppage by machinists in the 2101-M Building. Asbestos Workers' Union has continued to withhold men because of no contract at Hanford. Plumbers and pipefitters have apparently made little progress in their agitation for special hazard pay. An unfair labor practice charge was filed by machinists against Kaiser Engineers. The hearing has been scheduled for October 12.

E. SAFETY AND SECURITY

Nine regular meetings for discussion of safety and security, and health topics were attended by about 410 personnel. The special hazard meetings and security orientation for field personnel were continued.

An employee of Kaiser Engineers was fatally injured by a fall from a scaffold at 105-KE on September 19. A fire started at 3:10 p.m. September 23, over the inner rod room at 105-KW and caused $15,000 damage.

F. HIGHLIGHTS

Inspection, Drafting, and Estimating Sub-Section

Inspection was completed on twenty orders, and 151 new orders which will require inspection were received. At the close of the month, there were 223 requisitions for items which will require inspection. Drafting production was 212 new drawings, 23 charts and graphs, and 357 revisions. Since drafting work on major projects is being completed, some design development work is being scheduled. Field Surveys group completed formal transfer of landlord responsibilities for the Hanford Area from General Electric Engineering Department to A.E.C.

Minor Projects Sub-Section worked on fifty project items and six informal requests, representing an estimated total of $20,184,900. The Sub-Section completed work on three project items, Purex Prototype, 3904 Process Sewers, and Fire Protection, Spare Parts Warehouse, 200-W. Important projects now in progress include Recuplex, 300 Area Expansion Program, Fuel Element Pilot Plant, Reactivation of P-10 Facilities, and Hot Semiworks Conversion. The Industrial Electric Company has been selected as the electrical sub-contractor at Hanford for the service contractor, effective October 19, 1953. The old contract with Pacific Electric Company will be terminated the same date.

Reactor Projects Sub-Section

The overall construction completion for 100-K Area, including General Facilities and the 2101-M Building, was 26.9% as compared to scheduled completion of 34.8%. The 105-KW Building was 27.9% complete, or about 17% behind schedule.

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Construction of 100-K Waterworks was hampered by labor disputes; however, satisfactory progress was made on structural work of Filter Plants and the 165 and 190 Buildings. Earthwork on the jetty for outfall lines was nearly completed, and laying of pipe was begun. Factory acceptance tests of the first primary pump for the 190 Building were conducted September 15, and results are being reviewed.

Subcontract for installation of siding on both 105 Buildings was cancelled, and the construction contractor will complete the work. The first and second tiers of crates in 105-KW have been packed with the shielding material. The limonite contract, previously reported as cancelled, was modified; but the shipments have not been of satisfactory quality.

Deliveries of graphite have continued ahead of schedule, and far above present output at the fabrication shop. About 25% of blocks have been cracked; however, the majority are being utilized as short sections. Mock-up of the first 30 layers has progressed through four layers.

An entire sample lot of 60 aluminum process tubes was rejected.

Separations Projects Sub-Section

Construction of Part "C", Purex Prototype, was completed. With construction of Part "B", UO_3 Conversion, about 50% complete, it was decided to suspend work until all critical equipment has been delivered. Architect-engineer design of Part "A", Purex Facilities, was 74% complete, or 6% behind schedule. Development of the 40-inch centrifuge was successfully completed; and scale-up for the 48-inch prototype was begun immediately. Construction of 202-A Building was 5.8% complete, as compared to 9.2% scheduled completion. Only about half of the scheduled concrete placement has been accomplished.

The project proposal for Redox Capacity Increase, Phase II, is being revised to show changes in scope and schedule. Percentage of construction complete was revised downward to 1.5%. Progress of construction on 241-SX Tank Farm was delayed by late delivery of steel for tank liners and by cancellation of subcontract with the roofing subcontractor who was to install the bottom membrane. A new contractor has been obtained. Overall construction was 17% complete.

G. MONTHLY REPORT OF INVENTIONS AND DISCOVERIES

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

Inventor	Subject	Report of Invention (Date)
O. H. Kunze	Cartridge Hook Arrangement and Details (Automatic-Latching Devise)	September 18, 1953

1253120

September 30, 1953

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J. S. McMahon, Manager - Projects

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II. STATISTICAL AND GENERAL

A. SIGNIFICANT ASSIGNMENTS

1. Initial Reporting

CG-558 - Reactor Plant Modification for Increased Production

A Work Authority for $5,000 for design liaison has been received, and initial scoping has begun.

CG-562 - Waste Metal Recovery Plant Modifications

Design was 75% complete. An advance authorization of $50,000 for design and procurement has been obtained, and a project proposal requesting construction funds has been submitted to the A.E.C. This project includes the fabrication of a new RA and a new RD Column for the TBP Plant plus the provision of other minor items such as jumpers and control valves. Fabrication work is scheduled to be started by Minor Construction forces during the first week of October.

All material for the columns has been located at various sites throughout the country. Completion of the fabrication of the columns is scheduled for December 1, 1953, and they are to be installed by plant forces.

ER A-1208 - Activated Silica Facilities - 100 Areas

A project proposal is being prepared for Design Planning to provide activated silica water treatment in 100-H, 100-B Areas. The proposed completion date for facilities at 183-H is December 31, 1953, and the proposed completion date for 100-B is April 1, 1954.

ER-1209 (Job 039) - Installation of Additional Ball 3-X Equipment, 105-C Building

Design was 25% complete. Work Authority, PM 2752 dated September 14, 1953, authorized $2,000 for preparation of a project proposal. It is proposed to activate the six unoccupied pile hoppers in the 105-C Reactor, thus bringing that Ball 3-X system up to full strength. The project proposal requesting $62,500, for either plant forces or Minor Construction forces to do the work, has been approved by the A&B Committee.

ER A-3101 - Electroplating Facility for Fuel Development

Scoping was 30% complete. The Technical Section has issued a work order authorizing $1,500 for preparation of a project proposal. The proposed facility is to include sufficient electroplating tanks and accessory equipment to permit a thorough investigation of the feasibility of electroplating pile fuel elements on a production basis.

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2. Final Reporting

CA-513-C - Purex Prototype 321 Building

All work was completed and accepted without any exceptions on September 28, 1953.

CA-514-H - Process Sewer

This portion of the 300 Area Expansion Program was complete as of September 25, 1953.

CG-520 (ER A-1182) - P-13 Pressure Assembly Removal

The project has been physically completed with exceptions. The Physical Completion Notice, PM 2756, was issued September 28, 1953.

CA-527 (ER 2718) - Fire Protection - 200 East and West Spare Parts Warehouse

All work on the G.E. portion of this project has been completed, and a letter of information was written to A.E.C. during the month.

ER A-741 - Renovation of 3722-A, 3702, and 3703 Buildings

With design at 50% complete, the project proposal was stopped. A recent study of future building utilization in 300 Area showed that the 3722-A Building would no longer be required. The 3702 and 3703 Buildings have been painted by area personnel.

ER A-1207 - 100 Area Expansion Program

The requested construction schedules were prepared for presentation with recommendations for improvements to the Reactor Water Plants. The schedule indicated a total construction period of 91 weeks, with one year required for delivery of critical materials, and with pile shut downs of about six weeks duration. All remaining work on this request will be performed under Project CG-558.

ER-2741 - Conversion of 200-W Laundry to Offices

With design at 5%, the Manufacturing Department has requested that the work order be closed out.

ER E-485 - Additional Generator Capacity for Heat Studies - 189-D Building

With design at 15% complete, the work order is being closed at the request of the Technical Section. The equipment is to be installed by plant forces.

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3. Current Projects

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

Overall completion status remained at design 100%, construction 94%. Construction of Parts III and IV progressed 13% to a total of 46%. The additional ventilation work, including three new fume hoods, exhaust fans, and duct work, was accepted September 18, 1953.

The lack of asbestos workers has prevented any progress on lump sum work. The contractor has completed as much work as is possible without insulation of the steam and hot water lines. The X-Ray equipment has not been delivered because the General Electric X-Ray plant is still on strike.

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

Completion status remained at design 100%, construction 99.9%. Minor Construction forces are working on incomplete items.

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

Completion status remained at design 100%, construction 99.9%. Minor Construction is completing various clean-up items and acceptance test procedures.

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

Design progressed 14% to a total of 70%. Design work at the General Engineering Laboratory is estimated for completion in October. Shop work at the Laboratory has begun. The project scope is being revised to include the addition of a chemical stripper, monorail, and ultrasonic testing equipment.

CG-438 - Ball Third Safety System

Design completion status remained at 100%; construction progressed .5% to a total of 97%. Specifications for the purchase of spare balls and the ball washers are being prepared for release. The authorization of $250,000, Directive HW-230, Modification No. 7, is expected during October 1953.

During the scheduled outages, the exceptions and revisions to circuits are being finished.

CG-496 - Recuplex Installation, 234-5 Building

Design progressed 1.5% to a total of 99.5%; construction progressed 2% to a total of 22%. Construction is proceeding on service piping, architectural work, waste lines, and other phases which are not dependent upon delivery of critical materials and equipment. Following a settlement of the strike at his plant, the vendor of stainless steel vessels has begun fabrication.

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Because of difficulities in procuring material, the deliveries of vessels may be delayed until early 1954. An estimate for revised project proposal indicates the need for an additional $50,000, bringing the total to $1,450,000.

CA-512 - 100-K Area Facilities

100-KW and 100-KE Water Plants

Overall design of water plants progressed 3% to a total of 98%. Construction progress was as follows: KW progressed 4.8% to a total of 32%; KE progressed 4.8% to a total of 26%; General Facilities are 39% complete.

Continued labor disputes virtually stopped work except for some subcontractors. Satisfactory progress was made on structural work of Filter Plants and the 165 and 190 Buildings. Installation of mechanical items was started in the 181-KW River Pump House. Earthwork on the launching jetty for the outfall lines was completed sufficiently for pipe laying to begin. Total concrete placed to date was: KW water area, 70,400 yards; KE water area 50,900 yards.

Factory acceptance tests of the first primary pump for 190 Building were conducted September 15, and results are being reviewed by General Electric engineers.

105-KW and 105-KE Buildings

Overall design progressed 1.5% to a total of 98.5%. Construction progressed as follows: KW gained 4.2% to a total of 28.8%; KE gained 1.1% to a total of 14%. Cumulative total of concrete placed for 105-KW was 21,500 cubic yards, and for KE 19,300 cubic yards. The cumulative total of structural and miscellaneous steel was 2,400 tons for 105-KW and 1,800 tons for 105-KE. The main progress at 105-KE was structural work on the main building, and on the ventilation stack. The latter operation is now being inspected continuously to insure quality control.

The subcontract for installation of siding on both 105 Buildings was cancelled, and the construction contractor will complete the work. Progress on both Reactor Buildings was further delayed when construction forces were obliged to make "block-outs" and to leave concrete open for further placement of embedded items.

The first and second tiers of crates in 105-KW have been packed with the shielding material. The limonite being received is still unsatisfactory; so the limonite contract was modified instead of being cancelled as previously reported. A later study of recent samples was being made, and other sources are being investigated.

Samples of 60 aluminum process tubes were checked and inspected. The entire lot was rejected.

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2101 Building - 200 E Area (A.E.C. Administered)

Deliveries of graphite by National Carbon Company have continued ahead of schedule and far above the present output of the fabrication shop. About 25% of this graphite has been cracked; however, a majority of the blocks are being utilized as short sections. Mock-up of the first 30 layers has progressed through four layers, but greater progress was prevented by lack of fabricated pieces.

The building structure of 2101 is being studied for the installation of additional facilities, including new pneumatic damper controls and dust protector for the exhauster motors. Continued labor difficulities have prevented completion of many mechancial details as well as insulation for the steam lines and hot water system.

CA-513-A - Purex Facility

Overall design for Purex progressed 5.7% to a total of 78.7%; overall construction progressed 2.8% to a total of 11.6%.

Design of the 202-A Building has been changed in accordance with operating experience in the Redox Plant so that design is now 74% complete. Construction progressed 1.4% to a total of 5.8%, which is still 3.4% behind schedule. About half (21,400 cubic yards) of the scheduled concrete for 202-A Building has been placed. Form work and placing of concrete has progressed on all walls, and the base slabs for stairwells and elevator structures. About 14.5% of required concrete has been placed in the walls.

Both design and construction have been completed on the 2101-E Sanitary and Raw Water Line, 2802-E Steam Distribution Line, 2601-E Railroad, and outside electrical facilities which are being constructed by CPFF constructors. Design was completed and construction has started on the 2607-E Sanitary Sewers, 2900 Export Water Line, 282-E Reservoir and Pump House Addition, and the portion of 2601-E Railroad are being constructed by CPFF contract. Design was completed on storage tanks, outside electrical facilities, roads, parking areas, and the 283-E Filter Plant Expansion. Primary design of the 284-E Power House Addition has been completed. The contract for construction was awarded in late August, and the notice to proceed was issued during September.

Tests of 40" development centrifuge for Purex were conducted during September. The results were satisfactory, and the Bird Machine Company began immediate preparation for scale-up to the 48" prototype centrifuge. The Atomic Energy Commission has completed negotiations for a contract to purchase the Purex centrifuge from this source.

CA-513-B, Uranium Oxide Conversion Facility

Design was essentially complete, and construction progressed 3% to a total of 50%.

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At a meeting in early September, it was decided to suspend work until all items of critical equipment were on the job site. Work is to be resumed during early October 1953.

CA-513-D (ER A 747) - Hot Semiworks Conversion

Design progressed 27% to a total of 50%; construction has not begun because the Separations Technical Sub-Section has advised that dismantling in the cells can not be started until January 4, 1954. This two-month delay may prevent completion by April 1, 1954; so the construction schedule is being reviewed.

Procurement progress seems to be satisfactory.

CA-514- 300 Area Expansion Program - Production Facilities

Detail design progressed .5% to a total of 62.5%; overall construction progressed 2.5% to a total of 13.5%. There was an increased authorization to Hanford Operations Office of $1,100,000 for this project.

A. Process Facilities

Detail design progressed 8% to a total of 63%; construction completion was revised downward to 13.2%. An engineering review is being conducted on bids for the slug pickle machine, can and cap preparation machine, sleeve cleaning machine, penetrating etch machine, the furnace area cleaning system, monorail for the metal drying room. Specifications and requisitions for the induction furnaces, automatic spray booth equipment, methanol still, and other equipment have been issued for bids. Purchase specification for other machines and equipment are being circulated for approvals.

The erection of steel for the building was complete with minor exceptions, and work is progressing on the steel deck. The construction of 313 Building was delayed because of improper alignment of footings and other discrepancies. It was necessary to re-fabricate some structural steel in order to maintain dimensions.

Drawings and specification are essentially complete for the second phase, including No. 303-F and 303-K, the addition to 3701-L Badge House, addition to 313 Building, and road facilities.

B. Acid, Caustic and Methanol Facilities

Detail design progressed 2% to a total of 97%. The drawings have been revised and are ready for signature.

E. Decontamination Station

Detail design progressed 25% to a total of 97%. The drawings have been revised and are ready for signature.

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G. Railroad

Completion status remained at design 100%, construction 97%.

K. Manufacturing Office Building, Gate House, and Parking Lot

Detail design progressed 4% to a total of 35%. The Technical Section has made available for Manufacturing Department office space the 3702 and 3703 Buildings. A study is being made of the most desirable use of these buildings and the 3706 Building. Specifications and drawings for the gate house and parking lot have been delivered to the A.E.C. for signature.

L. Change House Renovations 3707-A and B

With scoping complete, no further work was done.

M. Oil and Paint Storage

With scoping complete, no further work was done.

N. Steam and Water Facilities

Detail design progressed 18% to a total of 30%, with bid emphasis on the steam line.

P. Hutment Removal

With scoping complete, no further work was done.

Q. Fire Alarm System

Completion status remained at scoping 100%, detail design 27%.

R. 3706 Telephone and Security Alarm

With scoping completed, and detail design 40% complete, the critical items have been advertised for bid.

CG-550 - (ER A 746) - Reactivation of P-10 Facilities

Design progressed 20% to a total of 90%; construction progressed 20% to a total of 63%. Revision No. 2 of the project proposal is awaiting review by the A&B Committee.

Because of changes in operating procedure, portions of the vacuum tank outgassing facility, and some of the hood plastic bag port work was deleted from the project.

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B. OTHER ASSIGNMENTS

CG-187-D-II - Redox Production Plant

Design progressed 17% to a total of 42%; construction progressed 3% to a total of 6%. Design for sample gallery ventilation was completed. Plant forces are performing construction work on modification for this ventilating system. Both design and construction are behind schedule because this work is being accomplished in conjunction with Phase II of Redox Capacity Increase. Revised construction schedule is being prepared.

CA-187-D-III - Redox Cooling Water Disposal Basin (ER 2739)

Design progressed 30% to a total of 80%; construction began and progressed to 3% complete. Drawings and specifications have been issued for comment and have been submitted for bid purposes. The percolation test has been completed, and site preparation commenced on September 22, 1953.

CA-406 - Phase II, Mechanical Development Building

Design had been completed previously; construction progressed 6% to a total of 98%. The major portions of the job equipment have been placed. The work of the general contractor is being completed on work orders issued to plant forces. The building is now partially occupied by personnel of the using department.

CA-434 - New Bio-Assay Laboratory

Design progressed 2% to completion; construction of Phase I progressed 22% to a total of 30%. The bid assembly for final design and specification for Phase II (electrical and mechanical) has been prepared by the A.E.C. The bid opening is scheduled for October 13, 1953.

CA-441 - Solvent Building

Design completion status remained at 25%. The revised work authority has not been issued.

CG-447 - Portable Meteorological Mast

Completion status remained at design 100%, construction 99%. All necessary work orders for completion of exceptions have been issued, and as-built drawings are being prepared.

CA-455 - Replace Two Elevated Water Tanks in 200-E Area

Design had been completed previously; construction progressed about 33% to a total of 58%. The water tank by the 200-East power house was almost complete. Work on the tower at 221-D Building has been started. Because of slow progress by the contractor, the A.E.C. is extending the physical completion date; however, the exact time has not been established.

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

Design had been completed previously; construction progressed .5% to completion. The project is being closed out with exceptions, and these are covered by about $2,000 in work orders.

CA-489 - Neutron Monitoring Calibration Facilities

Design had been completed previously; construction progressed 4.5% to a total of 5%. The shipment of the accelerators is still scheduled for December 31, 1953; however, the purchase order is being altered to include certain auxiliary equipment. This alteration has been submitted to the A.E.C.

CG-511 - Completion of Minor Construction Fabricating Shops

Design completion status remained at 95%; construction progressed 7% to a total of 82%. The revised project proposal which extends the scope of work is scheduled for submittal to the A&B Committee during October. It is believed that the additional work can be done without an increase of authorized funds.

CA-516 - Gable Butte Railroad

Design progressed 10% to a total of 60%. The project authorization was issued September 1, 1953. Detail design and specifications are being prepared.

CA-517 - Fire Protection Buildings, 272-E and W

Design completion status remained at 30%. The approved request is awaiting authorization by A.E.C.

CG-519 - Replacement of 100-D Reactor Effluent Line

Design had been completed previously; construction progressed 10% to a total of 90%. The installation of pipe, valves, control, and instrumentation was essentially complete. The remaining work consisted of closing off the concrete line, diverting flow into the new steel line, and conducting acceptance tests.

CA-525 - Permanent Auxiliary Combined Civil Defense and Plant Disaster Control Center

Design had been completed previously; construction progressed 25% to a total of 80%. All tie-ins have been completed by plant forces. The principal remaining work is installation of heating and cooling units which are scheduled for delivery on or after December 1, 1953.

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CA-529 - Personnel Meter Gatehouse Facility Improvements

Completion status remained at design 100%, construction 0%. The low bid received exceeded the money allotted for a lump sum contract; so the project proposal was revised to increase funds from $30,000 to $33,000. The revised project proposal has been submitted to the A.E.C., and construction is to begin in October 1953.

CA-532 (EP 2737) - Fiscal Year 1954 Water Tank Replacements

Completion status remained at design 20%, construction 0%. The Directive was issued September 1, 1953, and a Work Authority, PM 2755, has been issued. A design request has been issued to the Design Section. Drawings and specifications are scheduled for delivery to the A.E.C. during December 1953.

CA-533 - (ER E 479) - Hanford Works Official Telephone Exchange

Completion status remained at scope 82%, design 12%. The Legal Department of A.E.C. is reviewing bids for the telephone exchange equipment. Relocation of the new exchange has not been decided.

CA-535 - Redox Capacity Increase, Phase II

Overall design was revised downward to 34% complete as compared to 92% scheduled completion; construction was 1.5% complete. The small part of total construction which has been released is being performed on work orders. The project proposal is being revised to include changes in scope and to reflect changes in completion status. Material procurement was 33% complete, and is behind schedule for lack of approved design drawings.

CG-538 - (ER 2734) - Install Underground Waste Line Between "S" Area and "U" Area 200-W

Design had been completed previously; construction progressed 10% to a total of 87%. The main waste line has been accepted by the Manufacturing Department. The principal remaining work is in the 241-U tank farm, and it includes installation of condensers which were delivered late in September. A revision to the project proposal is being prepared requesting permission to install facilities to crib the condensate at 241-U tank farm.

CA-539 - Additional Waste Storage for Redox

Design completion was 94% complete; General Electric construction progressed 7% to a total of 45%. Overall construction progressed 9% to a total of 17%. The work consisted of excavation for the encasement and placing concrete. The stub line encasement at 241-S-151 Diversion Box was completed. The transformer bank was installed. Ten concrete tank bases were placed during the month, and three of them were water-proofed.

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CG-543 (ER 2733) - Replace Sanitary Tile Field 200 West Administration Area

Design completion status remained at 40%. The project proposal was returned by the A&B Committee with the suggestion that only the 200-W Administration Area tile field be constructed, or that further justification be furnished for the 200-U tile field. The Manufacturing Department later requested that 200-U Area tile field be included.

CG-544 (ER A-661) - Central Distribution Headquarters

Design completion status remained at 27% complete. Submittal of the project proposal is awaiting justification study for using Building 2713-E as a transportation garage.

CG-545 (ER A-724) - Soil Science Laboratory Facilities

Design progressed 5% to a total of 90%, construction completion remained at 30%. Design work is scheduled for completion during October 1953.

CA-546 (ER 3099) - Fuel Element Pilot Plant

Detail design progressed 6% to a total of 37%. Final drawings and specifications for the first phase contract have been received and reviewed. The Bureau of Budget has not released funds for this project.

CG-549 (ER 2731) - Activate Task I, RMA Line - Building 234-5

Design progressed 7% to a total of 35%; construction completion remained at 6%. Progress was delayed by higher priority work.

CG-551 - Expansion of Building 234-5 Facilities

Design progressed 8% to a total of 36%. Most of the material necessary for fabricating the hoods has been delivered, and a work order has been issued to plant forces. Design Section is preparing a revised project proposal to include new location within Building 234-5 for Final Inspection Facilities, a revised estimate, and additional justification.

CA-555 (ER A-735) - Graphite Hot Shop and Storage Building

Design progressed 35% to a total of 50%. This project was approved by the A.E.C. as being one in the category of miscellaneous projects under $100,000.

CG-556 (ER A-1201) - X Level Controlling and Recording Equipment

Design began on September 21, and progressed to 4% complete. Work Authority, PM 2745, authorizing $54,000, has been received.

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CG-559 (ER A-1200) - Heat Transfer Laboratory

Neither design nor construction has begun. Work Authority, PM 2758, was issued September 28, 1953. The A.E.C. has issued a Directive providing $11,000 to proceed with the design.

CG-560 (ER 2743) - First Cycle Waste Supernatant Cribbing Facilities

Design progressed 30% to a total of 90%; construction began and progressed to 1% complete. The drilling of wells (USGS) has begun, and a work release has been issued to Minor Construction for excavation work.

IR-116 (AEC-P-138) - Combined Civil Defense and Plant Disaster Control Center

Design had been completed previously; construction progressed 9% to a total of 10%. Progress has been satisfactory. Some special material and engineered items have been received, and orders for all other material have been placed.

IR-159 (ER 2742) - Improved Ventilation Facilities, 201-C

Design had been completed previously; construction progressed 30% to a total of 60%. The duct work and filter box have been fabricated; the concrete pad and equipment supports have been placed; and the fan and motor have been reconditioned. A shortage of funds may delay completion.

IR-160 (ER A-753) - Asbestos Shakes, 100-B, D, and F Buildings

Design progressed 10% to a total of 45%. Informal information indicates that the A.E.C. Budget Review Board has approved this request for $16,700.

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The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month:

ER A-725 - Particle Problem Animal Exposure Equipment

Design completion status remained at 10%. High spot estimate was made, and a project proposal is being written.

ER A-727 - 313 Building Roof Repair or Replacement

Design completion status remained at 50%. Further work awaits completion of 313 Building.

ER A-736 - Transportation Garage and Facilities - 2713-E

Design completion status remained at 10%. The Transportation Section has submitted data to aid justification, and this study is to be completed in early October 1953.

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ER A-742 - Remodeling First Aid Buildings 100-B, D, and F

Design progressed 2% to a total of 5%. Work has continued on justification, and a high spot estimate indicated a total cost of $37,500 for remodeling 100-B Area.

ER A-748 - Laboratory Supply Space, 3706 Building

Design completion status remained at 25%. No work was done because location of the facility had not been decided.

ER A-750 - Metal Stock Storage, Building 3717

Design completion status remained at 30%. This request was returned by the A&B Committee with the suggestion that the work be done on a work order basis. The Manufacturing Department is reviewing this suggestion.

ER A-751 - Facilities for Special Pile Measurement

Design completion status remained at 2%.

ER A-1204 - Panellit Gauge Testing Facilities

Neither design nor construction had begun. Further work awaits decisions by the Manufacturing Department.

ER A-1205 - Physical Constants Test Reactor (New Facility for Lattice Testing)

Neither design nor construction has begun. A project proposal for about $90,000 is being prepared to construct a concrete building below grade in the 303 Exclusion Area.

ER A-3098 - Cobalt 60 Source for Radiation Studies

Design completion status remained at 50%.

ER A-3100 - Modifications to 314 Building and Installation of Electroplating Pilot Plant

Design completion status remained at 10%. A project proposal requesting $75,000 has been submitted to the A&B Committee. A suspense authorization for installation of two Gisholt lathes in the 314 Building has been obtained by the Fuel Technology Sub-Section.

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

Design was 2% complete. Further work awaits decision by Separations Section on alternate methods of handling contaminated waste materials from the 222-S Building.

Work Orders: The progress of work orders has been noted in individual project write ups.

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C. RELATED FUNCTIONS

Minor Construction Contract

The Industrial Electric Company has been selected as the electrical subcontractor for J. A. Jones Construction Company, service contractor. The new contract is to be effective October 19, 1953, and the contract with Pacific Electric Company will be terminated the same date.

Inspection, Drafting and Estimating

The work load of field inspection has continued to increase particularly for 100-K Area materials. There is unusually heavy inspection work in the areas of Seattle, Los Angeles, and Pittsburgh.

The following is a resume' of inspection activities during the month:

ITEM	NUMBER
Open requisitions requiring inspection	223
Orders assigned to inspectors	131
New orders received	151
Orders completed	20
Sub-vendors orders assigned to inspectors	12
Total requisitions for Program "X" transmitted	106
Total orders for Program "X" placed - Engineered Equipment	179

At the end of September there has been grand totals of 1,735 program "X" requisitions transmitted, and 1,565 program "X" orders placed for engineered equipment.

Drafting production for the month was 212 new drawings, 23 charts and graphs, and 357 revisions. The drafting room average was 7.3 man-days per drawing.

Since drafting work on minor projects is being completed, some design development work has been scheduled. The personnel employeed by the drafting assistance contractor were released on September 18, 1953. The work was satisfactory and was completed on schedule.

The 105-K Model which was being prepared by drafting personnel under the direction of Graphics Unit was completed, as was the plot plan model for Purex.

The Reproduction group output was 840,809 square feet during the 24 regular working days. The VOID print file is being microfilmed in order to save space. After microfilming of the film, it will be destroyed by the A.E.C.

The Estimating group completed 25 estimates during the month. The completed estimates comprised the following: project proposals - 10, comparative - 3, fair cost - 3, high spot - 2, scope - 4, miscellaneous - 3.

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Field Surveys group continued work on the survey of Richland, rendered assistance to Project Section engineers in the 300 Area, and performed other routine functions. This group completed formal transfer of land-lord responsibility for the Hanford Area from the Engineering Department to A.E.C.

Project Control Unit continued its routine functions. The History group published one history.

D. CRAFT LABOR

Voluntary terminations of construction contractor personnel increased generally during the month. Percentages of terminations from the employers were: Kaiser Engineers and associates 7.8%; Blaw-Knox and associates, 13.3%; J. A. Jones, service contractor, 2.5%.

The jurisdictional dispute between machinists and millwrights in the 2101 Building caused a work stoppage by machinists on September 11. Following considerable agitation and picketing by machinists, the contractor sought an injunction from the Federal District Court. The injunction was issued on September 24, and craftsmen returned to work on September 25. However, the expected peak production in the graphite program has not been obtained.

The Executive Council of the AFL has submitted a plan for settling jurisdictional disputes to the convention in St. Louis which began on September 21. The proposal is expected to provide for written lists of all union jurisdiction. The actual settlement is to be accomplished by arbitration based upon the complete and authoritative list of jurisdiction for each craft. This proposal, if adopted, could result in a simpler and easier settlement of jurisdictional disputes.

The Asbestos Workers' Union has continued to withhold men from Hanford because of no contract. This deprivation is beginning to have serious effects on several projects which require extensive installation work.

Agitation by plumbers and pipefitters for special hazard pay has apparently accomplished very little. A wage increase, to be effective January 1, 1954, was agreed upon, with increases to be added as an "improvement factor" on the first of July 1954, 1955, and 1956.

In arbitration of the wage dispute between Kaiser and the Technical Engineers, Father Carmody of Seattle University recommended rates of $80 to $115 per week. This wage structure is believed by the A.E.C. to be excessive and completely out of line with prevailing rates in the area. Therefore, the A.E.C. has refused to reimburse on this pay scale, and this additional information is being compiled to be sent to the arbitrator. Meanwhile the Technical Engineers have agreed to a twelve-day relief period, before carrying out their threat of strike.

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Negotiations have been completed and a new contract executed between the Hanford Contractors Negotiation Committee and the Brotherhood of Sign and Pictorial Painters of America, Local 1777. The rate of pay established was $2.90 per week, with working foremen in the craft to receive $3.15 per week.

In an election on September 14, officer workers of Blaw-Knox voted 143 to 28 in favor of representation by Local 100 of the Office Employees' Union. Similar employees of Kaiser Engineers are represented by this Local.

On September 8, the Carpenters' Union rejoined the AFL. Since local carpenters had made no changes during the separation, this reunion has had no local effect.

A charge of unfair labor practices was filed by machinists against Kaiser Engineers. The hearing was scheduled for October 12, 1953.

ORGANIZATION AND PERSONNEL

Following is a summary of personnel data for the Project Section covering September, 1953.

	Sept. 1, 1953	Sept. 30, 1953	Net Change
Employees on Payroll	578*	573	-5
Technical Graduates - Rotational	12	13	+1

The end-of-month status involved these changes:

	Project Section Personnel	Tech. Grad. - Rotational
Payroll Additions	8	
Payroll Removals	12	
Transfers into Section	6	1
Transfers from Section	2	
Transfers within Section	8	

*Increased by two over the total for August 31, 1953, because of transfers effective September 1, 1953.

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HW-29513

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

October 8, 1953

MONTHLY REPORT

FUEL TECHNOLOGY SUB-SECTION

SEPTEMBER, 1953

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VISITORS AND BUSINESS TRIPS

Visitor	Date	Address	Purpose
H. A. Saller	9-15,16-53	Battelle Memorial Institute	Discussion of uranium alloys and coatings
N. F. Ritchey	9-24,29-53	Reynolds Metal Co.	Aluminum corrosion problems
C. Bruno	9-24,29-53	Reynolds Metal Co.	Aluminum corrosion problems
J. P. Scheuer	9-14,18-53	National Lead Co.	Testing techniques

Name	Date	Place Visited	Purpose
J. A. Ayres	9-5,15-53	ACS Society	Presentation of chemistry papers
J. M. Fouts	9-7,11-53	General Engineering Laboratory	Design of underwater weighing equipment
A. C. Callen	9-10,13-53	Hunter Douglas Corp.	Discussion of canning quality
G. E. McCullough	9-10,23-53	Hunter Douglas Corp.	Canning techniques
		Argonne Nat'l. Lab.	Fuel element development program
		Battelle Memorial Institute	Same as above
		Knolls Atomic Power Laboratory	Same as above
		N.Y.-AEC	Same as above
		General Engineering Laboratory	Same as above
		Sylvania Electric Products Corp.	Same as above
R. L. Dillon	9-12,19-53	Sea Horse Institute & Electrochemical Society	Discussions of corrosion problems
J. D. Sprowl	9-13,18-53	International Nickel Company	Conferences on fuel fabrication and equipment
		Sylvania Electric Products Corp.	Same as above
		Knolls Atomic Power Laboratory	Same as above
W. J. Bailey	9-13,21-53	Same as above	Same as above

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VISITORS AND BUSINESS TRIPS

Name	Date	Place Visited	Purpose
E. A. Eschbach	9-13,28-53	Argonne National Laboratory	Discussions of fuel element development program
		Battelle Memorial Institute	Same as above
		Knolls Atomic Power Laboratory	Same as above
		N.Y.-AEC	Same as above
		General Engineering Laboratory	Same as above
		Sylvania Electric Products Corp.	Same as above
J. W. Lingafelter	9-14,17-53	General Electric Co.	Welding discussions
E. A. Evans	9-17,27-53	Nela Park Co.	Fuel element development program
		Central Scientific Co.	Same as above
		Kinney Mfg. Co.	Same as above
		General Engineering Laboratory	Same as above
		Consolidated Vacuum Corp.	Same as above
		Nat'l. Research Corp.	Same as above

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URANIUM QUALITY

Uranium Specifications

Specifications for chemical composition, reactivity, rolling, and beta heat treatment of uranium have been drawn up. These will be included as part of the lead dip canning process specification which is to be issued shortly.

Split Core Fractures

A mechanism has been proposed which suggests how split slug cores - so-called cleavage failures - may develop. This theory postulates that the surface of most uranium cores is in compression, but that a few slugs may have the surface in an unstressed condition as a consequence of annealing which has occurred in the pile. It is reasoned that while the slugs are irradiated, the slugs whose surfaces are not in compression may exceed the ultimate tensile strength as the temperature of the core increases and the core expands and puts the surface in tension. Later the initial surface tensile failure becomes extensive as a consequence of the stresses present. Experimental equipment to test this hypothesis is being constructed and should be ready for use the latter part of October. In this equipment the slug will be simultaneously heated by induction and water cooled.

Uranium Rolling

Forty samples from the June and July production rollings at the Feed Materials Production Center showed completely recrystallized grains of diameters in the satisfactory range of .020 to .049 mm. Two large grains or bands of large grains, similar to those previously reported, were present in two of the 40 samples. Annealing for one hour between 520 and 620 C does not alter this structure. The structure is, however, erased by beta transformation. This indicated the production materials was satisfactory for triple dip canning.

Heat Treatment of Uranium

All the production samples from the triple dip process, routinely examined during September, were completely transformed. Several types of macrostructures have been observed in triple dip canned slugs. X-ray diffraction studies have demonstrated, however, that Fernald and Simonds rolled uranium slugs are similar in orientation texture after triple dip canning. The variation of macrostructures of triple dip canned material are being classified to further study of the causes both of warping in canning and during irradiation and of bumping during irradiation.

Plans are being made to convert from triple dip canning of slugs to salt bath heat treatment of rods and lead dip canning of the slugs machined therefrom. A series of grain size (transformation) standards are being prepared for use at Hanford and at the Feed Materials Production Center. Use of equivalent standards will reduce variation between the ultrasonic tests at the two sites.

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Five uranium rods were consecutively beta heat treated in the experimental Tocco induction equipment. The structures obtained were fine grained along the rod length and across the diameter and are comparable to structures produced by salt bath heat treatment. Further work relating to the possible use of induction heat treating for production use is not contemplated, in view of the plan to install at Fernald a production unit for salt bath heat treatment of uranium rods.

Metal Quality

The gas analyses of uranium samples are being continued. The data indicate that the salt bath heat treatment increases the gas content of the slugs. The gas is essentially all ($> 98\%$) hydrogen.

Cold Drawing of Uranium

Five four-inch triple dip canned uranium slugs fabricated from cold drawn rods have been irradiated to 600 MWD/T satisfactorily. Based on the present rates of production, annual savings on the order of $1,000,000 a year can be made if it is possible to substitute cold drawing of uranium rod to the desired slug diameter for machining to the desired diameter. These savings will accrue largely in avoiding the costs of recovery of the machine turnings. The National Lead Company of Ohio has placed a contract with the Battelle Memorial Institute for work on the development of improved processes for casting and rolling uranium. One specific objective of the effort will be to develop means of rolling rods with better surfaces than are obtained in present rolling practice. Improved surfaces will be necessary to obtain a low reject rate of cold drawn slugs. When these techniques are developed, it may be possible to substitute cold drawing to the desired slug diameter as a finishing process after rolling to only approximate diameter.

URANIUM DEVELOPMENT

Fabrication of Uranium

The initial 500 uranium powder metal compact slugs from Sylvania Electric Products Company exhibit a uniformly fine grain size, approximately one-tenth that of triple-dip canned uranium and an essentially random orientation. Upon receipt of an additional one-thousand pieces, these slugs will be lead-dip canned and irradiated. About 140 of the powder metal compact slugs produced from powder derived directly from derby metal rather than ingot metal that exhibit high density and low impurity content will be irradiated.

Small billets were produced wherein the uranium was cast directly into zirconium containers, achieving a metallurgical bond between the uranium and zirconium. Two of the castings were shipped to MIT for extrusion trials and three were rolled at Hanford. After initial tests to establish the proper roll pass schedule, two billets were reduced 86 per cent in area. Visual examination of the rods show the cladding thickness to be fairly uniform.

Fabrication of uranium standards having varying grain sizes to be used in conjunction with ultrasonic testing equipment was continued. Uranium-chromium alloys and specially prepared rolled rod were heat treated to obtain grain sizes intermediate between powder metal compact slugs and beta heat treated uranium.

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Uranium Alloys

Investigation of the surface cracking of the Hanford cast, Fernald rolled uranium-chromium alloy rods indicates that the cracks may have been caused by a low rolling temperature. A 500 pound billet of uranium plus 1.5 atomic per cent silicon alloy has been successfully cast using the Melt Plant facilities in the 314 Building. If found homogeneous, this billet will be sent to Fernald for rolling, salt bath beta heat treating and machining to eight inch slugs.

CANNING TECHNIQUES

Mechanized Canning

Highlights of the data available to date in evaluation of uniformity and quality of about 300 machine canned slugs in comparison for control to about 300 manually canned slugs are:

	Manual		Prototype Machine	
	Fernald Heat Treated Slugs	Z Slugs	Fernald Heat Treated Slugs	Z Slugs
Braze line width, inches, average	.018	.022	.009	.011
Standard Deviation	.0047	.0047	.0022	.0026
Residual can wall, inches, average	.020	.0198	.028	.0267
Standard Deviation	.0047	.0029	.0014	.0013
Undercutting quality, % of arbitrary factor	*	91%	*	86%

* Values replaced by asterisk are not comparable due to differences in the history of the uranium.

"C" and "J" Type Slug Canning

The brazed closure technique for canning "J" alloy slugs has not been entirely satisfactory on a production basis due to a low yield (about 30%). Several types of defects attributable to air not eliminated during the submerge cycle account for the low yield. Canning of alloy slugs by the "C" process - cold sized and welded cap only - has been resumed. The "J" alloy slugs for DR enrichment or replacement loading will be made up of three types: brazed closure (thick-walled cans) now on hand, and "J" slugs canned by the "C" process in thin and in thick-walled cans.

Lead-Dip Canning

In checking the effect of metal origin, on the porosity found in some lead-dip slugs, by comparison of slug reject rates (for defects assumed to be associated with the porosity), Hanford uranium (secondary metal from solid scrap) appears to be less susceptible to porosity than Mallinckrodt cast uranium. Outgassing tests to compare measurable gas content of slugs from salt-bath heat-treated rod to that of slugs from as-rolled sections of the same rod indicate ten per cent higher gas content from the

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heat treated material. Canning experiments are in process to evaluate the significance of this difference.

Although by the standards proposed for radiograph inspection of the cap end of slugs, none of the approximately 2500 lead-dip slugs recently examined would have been rejected, the porous condition is considered not desirable.

Hunter Douglas Slug Caps

Examination of test lots of aluminum caps from the Hunter Douglas Corporation confirmed their poor microstructure and a microstructure dependent susceptibility to corrosion. Changes in fabrication under consideration by the vendor may result in acceptable quality.

Tru-Line Slugs

Approximately 2000 additional slugs were canned with a 74 per cent yield in tru-line cans and caps, raising the total canned to date to 5000. Eccentricity measurements to evaluate possible omission of a machining operation to center the cap button (interlocking feature) indicate a possible seven per cent reject rate without machining.

Fillerwelding

Under production test, 1250 eight-inch triple-dip slugs were fillerwelded in pursuit of improvement of corrosion resistance of the slug weld. In regard to the suitability of this method to test slug quality, it is believed that its requirement of a stable molten weld puddle may provide a more sensitive indication of bond integrity than the heli-arc weld now in use.

Vacuum Canning

Al-Si canning of a nickel-plated uranium wafer was accomplished by the Sevac (vacuum) process with excellent results. The bond between the Ni and the Al-Si was in some regions more adherent than that between the Ni and the uranium. The Al-Si should fill in and compensate for any imperfections in the Ni coat.

FABRICATION TECHNIQUES

Hot Press Canning Program

A one-eighth inch extrusion of the cap and can wall continued to give good uniformity of pressure welded closures. Corrosion and strength tests are being designed to give a quantitative measure of the weld integrity.

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The inverse ratio of bond strength and zinc diffusion with Al/Zn/Al-Si bond was borne out by additional investigation. As expected, bond strengths of 1000 to 2000 psi were noted for zinc penetrations greater than 0.002 inch.

Cold Press Canning Program

Five mechanically bonded slugs which were baked at 250 C for 41 days without visible pimple formation were frost tested. All five were complete burnouts. Metallographic examination of the uranium-aluminum interface showed some diffusion, apparently causing the jacket to pull away from the uranium.

Fabrication of Components

Several 3/16 inch thick Al-Si clad blanks have been successfully drawn to cup dimensions required by Uniscan operation. These cups with a 0.100 inch wall thickness were uniscanned into four inch cans with a 0.020 inch wall thickness. The excess flow of metal ahead of the rolls noted in earlier operation was substantially eliminated where can wall reduction approached 90 per cent.

Fuel Feasibility Studies

Experiments in bonding zirconium to uranium utilizing a nickel to nickel interface are proceeding.

Three internally cooled slugs, Al-Si bonded to an aluminum liner, were tested up to "specific powers" of 16 KW per foot. The tests, designed to investigate bond characteristic in this type configuration, gave no evidence of bond fracture. Higher power level tests are being planned.

TESTING

Al-Si Penetration

After minor revisions to the circuitry the MIZ-1 electronic gear and associated mechanical equipment were moved into 314 Building to be near a large source of slug supply. Test use of the instrument on several hundred reject slugs is now in progress. Separation of the slugs into groups through use of several reject settings and subsequent stripping of these slugs should produce a calibration of the instrument. Major operating problems are still stability and wear on the slipper bearing probe support.

Unbond Test

Work is progressing on three different versions of an unbond test. One, using very high frequency ultrasonic pulse-echo techniques appears promising and is much simpler in principle than the two crystal reflection technique. However, the associated electronic gear is complex. A method using an infra-red detector to measure surface temperature after heating was worked out by GEL. Efforts are being made to make the detector assembly sensitive to changes of about 100 C instead of 250 C as it is at present. This would permit use of the detector in lieu of acenaphthene and allow flame or hot air heating. Use of an eddy current temperature measurement is also being explored.

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Cracked and "Dirty" Slugs

Data from over 2,200 slugs tested with MIZ-2, the eddy current crack test equipment, indicates that the test would be useful for rejecting cracked slugs and slugs with heavy inclusions. However, the equipment does not distinguish between cracks and inclusions. A stringent setting to eliminate cracked slugs could well cause rejection of slugs containing amounts of inclusions which would not necessarily be harmful.

COATINGS AND CORROSION

Corrosion

Weight loss and solution potential measurements are being made in the Flow Cup Laboratory. A large day-to-day variation in the solution potential measurements has been observed; it is thought that these variations are caused by the slight differences in concentration of dichromate. Some improvement was noted after a proportioning pump was installed.

Polarization studies have shown in a preliminary manner the effect of various ions on acceleration or inhibition of corrosion. Attempts to correlate the data with the results from the Flow Cup Laboratory were not very successful.

Autoclave and Anodic Films

The film formed in the water autoclave has been found more resistant to abrasion than that formed in the steam autoclave. Film formation is rapid initially with a gradual decrease in rate after about eight hours. The film breakdown potentials for both types of film range from 250 to 900 volts. This may be compared with the 800 volts required for breakdown of anodic films.

Different types of anodic films have been tested for resistance to abrasion. An attempt will be made to correlate these laboratory measurements with effects observed in the charging machines.

Cleaning of Slugs

Tests have shown that a mixture of chromic and sulfuric acids is very satisfactory for removing graphite from slugs. With the exception of deep inclusions, all the graphite is removed after heating in this mixture at 160 F for one hour. This is the standard solution used by the Aluminum Company of America for removing graphite from process tubes.

Plating

Several slugs have been nickel plated by a new procedure utilizing an anodic etch and a bath with excellent micro-throwing power. This procedure gives an excellent slug for canning by the hot-press method. The aluminum-nickel and nickel-uranium bonds are very adherent. Although the nickel plate is not entirely free from pinholes, the aluminum flows into all irregularities and produces a slug resistant to corrosion. Equipment for plating up to ten slugs a day by this method has been assembled. The slugs, after being plated, will be canned and subjected to various tests. A pilot plant capable of plating a larger number of slugs is being planned.

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FUEL EXAMINATION

Production Test Material Examination

A rupture of material in the low pH alum-treated water production test occurred in tube 2070-D on August 25 after an exposure of 411 MWD/T. The cap of the slug failed and a circumferential crack was observed almost completely around the can end.

On August 30, a 63S aluminum-jacketed slug in a 72S-clad 2S aluminum tube ruptured in tube 2483-H after an exposure of 215 MWD/T. On September 25, a 63S aluminum-jacketed slug in a 63S aluminum tube ruptured in tube 2881-H after an exposure of 305 MWD/T. Both of these ruptures were side failures; the first one ruptured the tube. Slugs from these tubes and two additional tubes that were weighed and measured prior to charging will be weighed and measured after discharged to obtain comparative corrosion data between 63S aluminum and 2S aluminum.

Three enriched uranium ("Ike") slugs ruptured in tubes 1463-C and 3766-C on September 5. These slugs were at an exposure level approximately 15 per cent higher than the highest level reached in a normal charge. These ruptures were "splits" - complete cleavage of the end cap occurred on one and another was found to be in four pieces after discharge. Due to this rupturing, all remaining "Ike" slugs, except three recently charged, contained in C Pile were discharged. Several of the slugs will be stripped and then inspected and measured.

After an exposure of 601 MWD/T, smooth-machined slugs appeared to be equal in quality to the centerless ground contoured slugs ("simulated Hanford") slugs contained in the same tube.

Examination Basins and Equipment

Acceptance of the 100-C Slug Examination basin is awaiting the completion of a satisfactory door seal, the painting of the basin and the correction of minor discrepancies.

The prototype slug handling dolly has been installed in the 189-D test tank for performance trials. A portion of the prototype dimensioner was received during the month.

Routine examination of slugs in the 105-B facility was begun. All installed equipment performed satisfactorily.

LABORATORY ENGINEERING

Buildings and Grounds

Construction progress on the remaining Laboratory Area buildings has been very gratifying during the month, and occupancy of the Pile Research & Development, and Radiochemistry Buildings during December, now appear [illegible]

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Laboratories and offices in each of the new buildings have been assigned. Plans were made for occupying the office section of the Mechanical Development Building on October 3. This move will release a major portion of Building 3703 to the Metal Preparation Section, and will allow evacuation of several hutments before the winter months.

Final plans and specifications on Phase I, (the building shell), of the Fuel Element Pilot Plant have been completed by the architect engineers. Design work on Phase II is continuing.

Glass and Photography Shops

Arrangements were made to move the glass shop to its new location in the Mechanical Development Building the week of September 28.

Effective September 28, the two photographic personnel assigned to the Technical Section were transferred to the Public Relations Section. These men will continue on assignment to Technical in the 300 Area, but will be under the technical direction of the Photo House. This change will consolidate plant accounting of photographic equipment and assigns all persons in photographic classifications in the one organization.

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.

GE McCullough

Manager - Fuel Technology
ENGINEERING DEPARTMENT

GE McCullough:acj

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MEDICAL DEPARTMENT

SEPTEMBER 1953

General

Personnel Changes

The roll increased from 243 to 249. The roll is still low and this is causing excessive overtime costs.

Visits

Mr. Bakko, hospital administrator, and three of his assistants in hospital administration and nursing, attended the annual meeting of the Washington State Hospital Association and two of these attended the one-day institute on Hospital Organization in Seattle.

Messrs. W. J. Fitch and C. Lawrence, hearing and speech consultants from the State Department of Health, visited the department relative to the staff conferences regarding children with acoustical defects.

Employee Relations

Employee attendance at 12 employee relations meetings was 104. A two-hour program on Customer relations was given to about 50 employees by the Training and Program

[redacted]

Medical examinations dropped slightly from 1295 to 1232. Dispensary treatments rose a little from 4437 to 4485.

No major and 2 sub-major injuries of General Electric employees were treated. Contractor employees were free of major or sub-major injuries.

Interviewing of accident prone as well as absentee prone employees was started as part of a program aimed at detecting and diminishing these problems through improved selection, training and counseling of employees and supervisors.

The health topic of the month was "At Ease."

Sickness absenteeism was 1.24% as compared with 1.32% in August, while total absenteeism was 1.91% as compared with 2.02% in August. Absenteeism, all causes, year to date was 2.35% as compared with 2.42% for the same period in 1952.

General (Continued)

Costs - August

Medical Department Costs before assessments to other departments were as follows:

	July	August	Aug. Budget
Industrial Medicine (Oper.)	$46,311	$43,682	$42,033
Public Health (Oper.)	12,664	12,455	11,768
Kadlec Hospital (Net)	28,454	17,165	23,333
Hospital Expense Credits	4,521	4,795	3,333
Sub-total-Medical Department (Oper.)	91,950	78,097	80,467
Construction Medical (Industrial and Public Health)	1,706	1,778	943
Total-Operations and Construction	$93,656	$79,875	$81,410

The net cost of operating the Medical Department before charges were assessed to other departments was $79,875, a decrease of $13,781 and $1,535 below the budget figure.

There was an increase in hospital revenue of $7,000, the increase coming largely from room and board with some increase in pharmacy. Expenses were decreased due to employee shortages and some decrease in maintenance.

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Industrial Medical Section

Medical examinations changed little from 1295 to 1232. Dispensary treatments deviated only slightly from 4437 to 4485. General Electric employees sustained no major and 2 sub-major injuries. Contractor employees sustained no major or sub-major injuries.

Interviewing of accident prone as well as absentee prone employees was started as part of a program aimed at detecting and diminishing these problems through improved selection, training and counseling of employees and supervisors.

One information meeting was held during the month for industrial physicians.

A scientific meeting was also held for industrial physicians and Dr. Weitz reviewed the papers on industrial medicine heard at the Los Angeles meeting of Industrial Medical Association.

The Health Activities Committee met on September 17th and the health topic "At Ease" was discussed. This topic deals with the benefits of relaxation.

Sickness absenteeism was 1.24% as compared with 1.32% in August while total absenteeism was 1.91% as compared with 2.02% in August. Absenteeism, all causes, year to date was 2.35% as compared to 2.42% for the same period in 1952.

Net costs for August amounted to $35,846 as compared with July net costs of $37,793. This was a decrease of $1,947 or 5% and was attributable in part to the inclusion in July of an accrual for miscellaneous charges ($2,500). No accrual was made during August. Salaries were slightly higher in August than July ($360), but the increase was minor in relation to the total salary expense.

Costs-Operations	August	July	Increase (Decrease)
Salaries	$33,108	$32,748	$ 360
Continuity of Service	3,310	3,275	35
Laundry	275	291	(16)
Utilities, Transportation, Maintenance	4,006	4,823	(817)
Supplies and Other	3,909	6,545	(2,636)
Total Gross Costs	44,608	47,682	(3,074)
Less: Revenue	926	1,371	(445)
Expense Credits	7,836	8,518	(682)
Net Cost of Operation	$35,846	$37,793	$(1,947)

Actual costs for August were approximately $1,800 less than budgeted expectations. On a year to date basis actual costs amount to $73,639 as compared with a budget of $75,250.

Costs-Construction

Gross costs for August amounted to $669 and approximated very closely the cost incurred during July. Expense incurred in connection with storage of records accounted for the entire amount.

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Industrial Medical Section (Continued)
Costs-Construction (Continued)

	August	July	Increase (Decrease)
Salaries	$562	$577	$(15)
Continuity of Service	56	56	0
Supplies and Other	51	63	(12)
Total Gross Costs	$669	$696	$(27)

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Industrial Medical Section (Continued)	August	September	Year to Date
Physical Examinations			
Operations			
Pre-employment	99	52	757
Rehire	8	16	160
Annual	452	322	3192
Interim	278	336	1988
A.E.C.	53	19	300
Re-examination and rechecks	179	209	1389
Termination	153	172	1110
Sub-total	1222	1126	8896
Contractors			
Annual	10	42	88
Pre-employment	1	5	703
Rehire	0	0	121
Recheck	12	13	231
Termination and Transfer	50	46	907
Interim	0	0	87
Sub-total	73	106	2137
Total Physical Examinations	1295	1232	11033
Laboratory Examinations			
Clinical Laboratory			
Government	155	79	1269
Pre-employment, Termination, Transfer	2108	2060	24406
Annual	2987	1841	20188
Recheck (Area)	1349	1522	10687
First Aid	8	0	63
Clinic	271	321	3494
Hospital	4500	4650	44541
Public Health	6	0	77
Total	11384	10473	104725
X-Ray			
Government	48	13	238
Pre-employment, Termination, Transfer	124	124	1936
Annual	746	697	4575
First Aid	102	89	923
Clinic	188	318	2042
Hospital	265	282	3112
Public Health	5	12	59
Total	1478	1535	12885
Electrocardiographs			
Industrial	55	52	469
Clinic	3	2	22
Hospital	34	35	434
Total	92	89	925

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Industrial Medical Section (Continued)	August	September	Year to Date
First Aid Treatments			
Operations			
New Occupational Cases	412	369	3351
Occupational Case Retreatments	1241	1310	11356
Non-occupational Treatments	2462	2534	23695
Sub-total	4115	4213	38402
Construction			
New Occupational Cases	82	68	1143
Occupational Case Retreatments	175	165	3380
Non-occupational Treatments	27	21	992
Sub-total	284	254	5515
Facility Operators	38	18	348
Total First Aid Treatments	4437	4485	44265
Major Injuries			
General Electric	2	0	8
Contractors	0	0	2
Total	2	0	10
Sub-Major Injuries			
General Electric	1	2	12
Contractors	0	0	11
Total	1	2	23
Absenteeism Investigation			
Calls Made	9	11	68
Employee Personal Illness	8	5	53
No. absent due to illness in family	0	0	1
No. not at home when call was made	1	6	13

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Hospital Section

The average daily adult census remained the same as it was the previous month, namely 78.8, as compared to 78.2 a year ago. This represents an occupancy percentage of 72.3, broken down as follows: Mixed Service (Medical, Surgical, Pediatrics) 74.3; Obstetrical Service 63.8. The minimum and maximum daily census ranged as follows:

	Minimum	Maximum
Mixed Service	42	85
Obstetrical Service	7	22
Total Adult	53	102

The average daily newborn census increased from 11.6 to 12.3, as compared to 12.7 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.59
Obstetrical	3.65
Newborn	2.92

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of August was 2.01. When newborn infants are included, the ratio is 1.75.

The net expense for the operation of Kadlec Hospital for August was $17,165, as compared to $28,454 for July. Summary is as follows:

Kadlec Hospital net expense $17,165
This is a reduction of approximately $11,000 and is due primarily to increased revenue of over $7,000 as a result of a higher patient census. Costs were, however, reduced over $3,500, partially as a result of being short a number of people on the staff. Expense credits increased almost $300.

Mr. O. E. Bakko and Mrs. Helen Turner attended a one-day Institute on Hospital Organization in Seattle and also the annual meeting of the Washington State Hospital Association. Mr. E. J. Quigley and Mr. J. R. Woodhead also attended the latter meeting.

A two-hour program on "Customer Relations" was given to approximately fifty of our employees as a part of a program to further improve relations between the hospital and its patients, doctors and the public. The meetings were ably conducted by representatives of the Training and Program Development Unit.

Work is underway on a series of slides to depict the hospital's activities and the services it renders to the community. These slides will be available for use in plant and community discussion groups.

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Hospital Section (Continued)

Analysis and summarization of the comparative data obtained by Mr. O. E. Bakko and Mr. C. A. Kremer on a recent survey of Washington hospitals has been completed.

There were twelve employee relations meetings held during September with an attendance of one hundred and four. These meetings are summarized as follows:

	Meetings	Attendance
Hospital	4	45
Industrial Medicine	1	8
Public Health	3	31
General	4	20
	12	104

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Hospital Section (Continued)	August	September	Year to Date
Kadlec Hospital			
Average Daily Adult Census	78.8	78.8	86.1
Medical	24.7	21.9	25.9
Surgical	32.2	30.0	33.5
Pediatrics	8.6	13.5	13.6
Mixed	65.5	65.4	73.0
Obstetrical	13.3	13.4	13.1
Average Daily Newborn Census	11.6	12.3	12.3
Maximum Daily Census:			
Mixed Services	89	85	108
Obstetrical	20	22	23
Total Adult Census	104	102	120
Minimum Daily Census:			
Mixed Services	48	42	35
Obstetrical Service	7	7	6
Total Adult Census	55	53	43
Admissions: Adults	499	544	5235
Discharges: Adults	518	515	5212
Newborn	84	76	712
Patient Days: Adult	2443	2364	23516
Newborn	359	369	3375
Total	2802	2733	26891
Average Length of Stay: Adults	4.7	4.6	4.5
Medical	5.2	4.7	4.5
Surgical	4.1	4.6	4.7
Pediatrics	3.8	4.4	4.2
Mixed	4.8	4.6	4.5
Obstetrical	4.2	4.8	4.4
Newborn	4.3	4.8	4.7
Occupancy Percentage: Adults	72.3	72.3	79.0
Medical	66.8	59.5	70.0
Surgical	100.6	93.8	104.7
Pediatrics	40.5	71.0	71.6
Mixed	74.4	74.3	83.0
Obstetrical	63.3	63.8	62.4
Newborn	44.6	47.3	47.3
(Occupancy Percentage based on 109 adult beds and 26 bassinets.)			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.59		
Obstetrics	3.65		
Newborn	2.92		
Avg. No. Employees per Patient (excluding newborn)	2.01		
Operations: Major	89	78	853
Minor	93	106	881
E.E.N.T.	34	59	539
Dental	3	0	7

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Hospital Section (Continued)	August	September	Year to Date
Kadlec Hospital (Continued)			
Births: Live	80	88	719
Still	2	0	11
Deaths	4	6	42
Hospital Net Death Rate	.17%	.34%	.18%
Net Autopsy Rate	0	33.3	26.2
Discharged against advice	1	0	5
One Day Cases	89	130	1261
Admission Sources:			
Richland	74.1	74.6	76.4
North Richland	12.2	12.0	10.8
Other	13.7	13.4	12.8
Admissions by Employment:			
General Electric	73.6	68.4	72.9
Government	3.6	2.8	2.8
Facility	3.2	4.8	4.0
Contractors	12.6	16.9	12.7
Schools	1.8	1.8	1.9
Military	.2	.0	.4
Others	5.0	5.3	5.3
Hospital Outpatients Treated	516	594	4418
Physical Therapy Treatments			
Clinic	95	180	2224
Hospital	64	108	1345
Industrial: Plant	171	303	2421
Personal	0	0	60
Total	330	591	6050
Pharmacy			
No. of Prescriptions Filled	2492	2400	24976
No. of Store Orders Filled	511	449	4707
Patient Meals			
Regulars	3714	3776	35344
Children under 8	285	550	4410
Specials	1296	884	12677
Lights	3	0	8
Softs	1247	1076	9759
Tonsils	41	102	985
Liquids	192	196	1972
Surgical Liquids	79	96	965
Total	6857	6680	66120
Cafeteria Meals			
Noon	1737	1699	16993
Night	338	322	2732
Total	2075	2021	19723

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Public Health Section

There was a slight rise in the number of communicable diseases reported. This was due to a delayed report on an infectious eye condition called kerato-conjunctivitis which is sometimes found to be prevalent among construction workers. Investigation through our local ophthalmologist reveals that undoubtedly this disease was introduced by construction workers who came to this area from coastal regions. The cases occurred between August 14th and the present time. Although treatment is long, the cure rate is high. Precautions are being instigated to prevent further spread, such as sterilization of masks and other protective head covering used in common by employees.

The other disease of increased incidence is gonorrhea which is due primarily to the number of cases being reported by army personnel among soldiers stationed at North Richland.

Of the polio cases reported two were mild and full recovery is expected. The third one was a delayed report and unusual to the extent that paralysis of a limb occurred after the child attended the pre-school roundup clinic and received a first shot of diphtheria-pertussis-tetanus toxoid.

Mr. Waring J. Fitch and Mr. Clifford Lawrence, hearing and speech consultants from the Maternal and Child Hygiene Division of the State Department of Health, visited the department relative to staff conferences regarding children with acoustical handicaps. A meeting was held with an administrative group from the Richland School District and our personnel in regard to further recommendations for these handicapped children in terms of medical care and educational facilities.

A medical advisory clinic for children who are handicapped and attending the Richland School District was held with Dr. C. Don Platner in attendance.

Open house was held for the new teachers in the Richland school system at which time the medical facilities available were presented. It is hoped that by such techniques better use will be made of the facilities.

Restaurant and school cafeterias were found to be in satisfactory condition. The item stressed was the improper maintenance of dishwashing machines, correction of which is felt to be important in terms of sanitary maintenance of food handling establishments.

A rodent problem was discovered in one of the bakeries which was put under control by the operator through the enforcement of pest control measures.

An insanitary condition was reported on the river bank at the north end of the trailer camp in North Richland. This was due to the improper disposition of trash and garbage. Upon notification to the camp authorities, steps were taken to have the area cleaned up and posted.

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Public Health Section (Continued)

Twenty-seven Grade A dairy farms were inspected and found to be in acceptable condition. Bacteriological results of pasteurized milk samples were within legal limits. One dairy operator discontinued selling milk in Richland reducing the number of milk suppliers to four.

Bacteriological results of water and sewage samples were satisfactory.

A total of 500 gallons of larvicide mixture was sprayed previous to the termination of the program on September 25th.

During September the Social Service Counselors worked with school personnel in setting up a project whereby counselors will act as consultants to teachers and principals regarding behavior problems of children. This is a further step in the attempt to focus on the prevention rather than on the correction of emotional illness. Work on four cases involving difficulties between parents and children was completed, also two cases of marital difficulty. The successful working out of these problems offered more stable family atmosphere to twenty-six children.

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Public Health Section (Continued)	August	September	Year to Date
Education			
Pamphlets distributed	12,995	11,988	100,927
News Releases	6	12	94
Staff Meetings	0	1	11
Classes	13	10	94
Attendance	56	47	650
Lectures & Talks	7	12	103
Attendance	380	348	4,077
Films Shown	6	11	165
Attendance	128	286	4,793
Community Conferences & Meetings	44	75	399
Radio Broadcasts	0	0	9
Immunizations			
Diphtheria	8	1	95
Diphtheria Booster	170	58	564
Tetanus	7	1	150
Tetanus Booster	139	59	636
Pertussis	7	1	26
Pertussis Booster	128	56	323
Smallpox	88	61	237
Smallpox Revaccination	211	31	1,016
Tuberculin Test	12	6	117
Typhoid	3	0	3
Typhoid Booster	0	0	1
Immune Globulin	6	3	48
Other	3	0	53
Social Service			
Cases carried over	89	93	772
Cases admitted	15	11	131
Cases closed	11	24	129
Remaining case load	93	80	774
Activities:			
Home Visits	14	6	107
Office Interviews	237	300	2,654
Conferences	40	53	460
Meetings	0	7	57
Sanitation			
Inspections made	255	155	1,522
Conferences held	38	35	218
Bacteriological Laboratory			
Treated Water Samples	276	294	2,050
Milk Samples (Inc. cream & ice cream)	34	30	342
Other bacteriological tests	344	365	4,195
Total	654	689	6,587

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MEDICAL DEPARTMENT

SEPTEMBER 1953

Public Health Section (Continued)	August	September	Year to Date
Communicable Diseases			
Chickenpox	3	5	241
Kerato-conjunctivitis	0	6	6
Diphtheria	0	0	2
Erysipelas	0	0	1
Food Poisoning	0	0	29
German Measles	8	14	79
Gonorrhea	10	15	93
Impetigo	0	0	7
Influenza (U.R.I.)	0	0	4
Measles	5	0	74
Mumps	9	6	299
Pinkeye	0	0	9
Poliomyelitis	0	3	5
Ringworm	2	0	8
Roseola	0	0	1
Salmonellosis	0	0	4
Scabies	0	0	1
Scarlet Fever	0	3	57
Syphilis	0	3	16
Tuberculosis	0	1	6
Whooping Cough	8	0	18
Total	45	56	960
Total No. Nursing Field Visits	712	581	6606
Total No. Nursing Office Visits	39	38	653

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Radiological Sciences Department

RADIOLOGICAL SCIENCES DEPARTMENT

SEPTEMBER 1953

Summary

Twenty four informal, 6 Class I, and 2 Class II radiation incidents were reported. This is higher by 8 than the total reported in August. The magnitude of the exposure in both Class II events was insufficient to be of any harm to the employees involved.

Concentration of radioactive particles in the air continued higher than normal at all sampling locations. Significant increases noted in the immediate environs were coincident with high ruthenium emission at Redox. Average daily I^{131} emission from separations stacks increased by a factor of 3.

Research and development items of interest included a method for determining high level radiation dose registered on film badges, information on the mechanism of plutonium entry through the skin, and the encountering of a flow of hot artesian ground water in a test well drilled to a depth of 773 feet in the 100-B Area. Studies were initiated on the tumorigenicity of plutonium oxide particles in the lung and the toxicology of I^{131} in pigs.

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Radiological Sciences Department

RADIOLOGICAL SCIENCES DEPARTMENT

SEPTEMBER 1953

Organization

The month end force of 361 included 28 supervisors, 104 engineers and scintists, 18 clerical, and 211 other personnel.

Number of Employees on Payroll		
Beginning of month	-	364
End of month	-	361
Net decrease	-	3

The decrease of 3 was the net result of 10 deletions from the roll and 7 additions. Twenty-two people are presently on leave-of-absence status from the department.

General

There were 2 Class II, and 6 Class I radiation incidents recorded. Of the Class I incidents, the more potentially hazardous situations included: exposure to and possible inhalation of plutonium following an explosion in a 234-5 building hood; inadvertent release of special process material in the 1-F cubicle at the Redox laboratory; and discharge of irradiated dummy pieces from the front face of the 105-B reactor. The magnitude of the exposure in both Class II incidents was insufficient to be of concern with respect to the health of the employees involved.

Twenty-four other radiation incidents that occurred were not of sufficient general interest or importance to be reported other than informally.

During the period covered by this report, all persons in the Radiological Sciences Department engaged in work which might reasonably be expected to result in inventions, or discoveries, advised that to the best of their knowledge and belief no inventions or discoveries were made in the course of their work except as listed below. Such persons further advised that for the period therein covered by this

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Radiological Sciences Department

General (Continued)

report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

Inventor	Title
H.V.Clukey	Remote-Reading Escapement-Relay Counter for Integrating Dial Meter.
L.D. Test	A Simple Differential Pulse Height Discriminator.

RADIOLOGICAL ENGINEERING

The physical completion notice for the Aquatic Biology laboratory project was issued. As a result of the asbestos workers' strike, construction on the trainshed addition to the Biology laboratory has stopped. An increase in funds from $30000 to $33000 for the Personnel Meter Gatehouse Facility Improvement project was necessary to meet the lowest lump sum bid for the construction work.

A recommendation as to whether a sand filter should be built at Purex was necessary prior to completion of studies at Redox. On the basis of available information, it was recommended that a filter be installed because of the expected significant activity of individual particles and the significant increases in amount of radioactive material released to the ventilation exhaust as a Separations plant ages. In addition, a filter would minimize the potentially serious problem in the event of a process explosion or fire which would release large quantities of radioactive material.

A study of all available data on reactor effluent water is in progress with the objective of determining possible operating limitations imposed by Columbia River contamination, using present reactor cooling methods.

An analysis of the costs of the Redox plant primary shields indicated that only about 1/2 of 1% of the total structural cost could have been saved by allowing a ten-fold increase in radiation transmitted. A hundred-fold increase at about a 1% saving would have interfered with normal operation because of time limits in routinely occupied areas.

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Radiological Sciences Department

RADIOLOGICAL RECORDS AND STANDARDS SECTION

1. Radiation Monitoring

General Statistics

	August	September	1953 To Date
Special Work Permits	445	393	4,292
Routine and Special Surveys	1,335	1,294	11,724
Air Samples	1,524	1,558	11,468
Skin Contamination	89	30	190

Improved contamination control during rehabilitation work at the tritium production facility reduced the frequency of skin contamination and lowered the internal deposition of tritium oxide in the employees.

During attempts to unplug the discharge line from the dissolver in the 1-F cubicle of the multi-curie wing at the Redox laboratory, dissolver solution was forced out onto the top of the cubicle. Personnel evacuated the room immediately and received negligible exposure.

During the analysis of routine samples in one of the analytical laboratories in the 300 Area, an employee received radiation overexposure of the body and hands. Investigation indicated that the employee was following routine procedures but was handling more than the usual number of samples. This work is normally self-monitored.

A physicist received an overexposure to the fingers while handling gold foils which had been irradiated in the pile. The incident resulted from insufficient monitoring of the foils.

2. Radiological Standards

There were two Class II, six Class I, and twenty-four Informal radiation incidents reported.

The Class II incidents were the two overexposure cases described above.

The Class I incidents included: the contamination spread at the 1-F cubicle described above; discovery of contaminated equipment in an

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2. Radiological Standards (Continued)

uncontrolled burning ground; skin contamination during work at the 105-H reactor; personal contamination at the 221-B canyon and resultant spread of contamination to a home in Richland; contamination spread following an explosion in a hood at the 234-5 building; and unexpected discharge of dummy slugs from the front of the 105-B reactor.

One Class I radiation incident reported in August was reclassified as Informal.

3. Exposure Records

During the first six months of 1953, about 45 Minor Construction employees showed an accumulated whole body gamma exposure of more than 1 roentgen.

(a) Personnel Meters, and Records and Photometry

General Statistics

	August	September	1953 To Date
Gamma pencils read	210,258	211,588	1,997,832
Potential overexposures	8	12	83
Confirmed overexposures	0	0	6
Slow neutron pencils read	968	1,324	10,436
Potential overexposures	1	1	12
Confirmed overexposures	0	0	0
Beta-gamma film badges processed	35,233	38,865	342,712
Potential overexposures	19	20	333
Confirmed overexposures	0	1	19
Fast neutron badges processed	478	505	4,636
Potential overexposures	0	0	0
Confirmed overexposures	0	0	0
Lost readings (all causes)	16	21	314

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(b) Bioassay

1. Plutonium Analyses

The detection limit for plutonium was lowered to 0.05 d/m, indicating increased sensitivity by a factor of 2 over previous results with the electrodeposition method and a factor of 6.5 over the old counting method.

	August	September	1953 To Date
Samples assayed	565	302	5,641
Results above detection limit	2	0*	81
Resamples assayed	14	4	133
Results above detection limit	6	1*	42
Maximum d/m/sample	2.25	0.75	2.25

*Detection limit for these samples was still 0.10 d/m. The new limit will be applied to future results.

The resample result above detection limit is under investigation.

2. Fission Product Analyses

	August	September	1953 To Date
Samples assayed	551	365	6,364
Results above 10 c/m/sample	8	4	36

The four results above 10 c/m were additional samples on employees involved in radiation incidents, Class I, numbers 270 and 296.

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3. Uranium Analyses

Results of 351 samples were as follows:

METAL PREPARATION - 300 AREA

Job Description	End of 4th Day Exposure µg/liter Maximum	Average	Number Samples	End of 2 Days-No Exposure µg/liter Maximum	Average	Number Samples
Canning	20.0	3.2	33	12.8	2.9	36
Machining	12.9	6.8	6	8.0	6.1	3
Melt Plant	13.7	5.5	10	5.0	2.6	6
Material Handling	9.5	5.4	15	10.2	3.8	8
Testing	9.6	3.0	21	5.5	2.0	14
305 Building	2.2	1.4	3	2.4	2.4	2
Coverage	11.8	5.6	5	5.9	3.4	4
Finishing	9.8	3.5	20	5.0	1.9	15
Special Products	3.5	1.7	3	2.3	1.6	2
Slug Recovery	13.8	7.2	11	5.9	3.8	3
Technical	7.9	3.1	12	17.7	6.1	9

	Before Job Maximum	Average	Number Samples	After Job Maximum	Average	Number Samples
Car unloading	-	-	-	3.1	1.9	7
Random samples	1.0	3.4	22	-	-	-

Miscellaneous Samples (µg/liter)

	Maximum	Average	Number Samples
224-U	8.4	2.3	81

4. Tritium Analyses

	Activity Density (µc/cc x 10^3) < 2	2-20	20-35	35-75	> 75	Total	1953 To Date
Number of samples	153	40	0	0	0	193	1,156

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(c) Thyroid Checks

All thyroid checks reported were below the warning level.

(d) Hand Score Summary

There were 73,168 alpha and 67,700 beta scores reported. About 0.005% of the alpha and 1.0% of the beta scores were above the warning level. Decontamination of all high cases was attempted and successful.

4. Calibrations

Number of Routine Calibrations

	August	September	1953 To Date
Fixed Instruments	130	120	1,133
Portable Instruments	2,747	3,422	22,237
Personnel Meters	4,948	6,073	85,265
Total	7,825	9,615	108,635

BIOPHYSICS SECTION

CONTROL UNIT

Regional Survey

The general findings are summarized in the following table:

SAMPLE TYPE AND LOCATIONS	Activity Type	Average Activity Density (μc/cc)
Drinking Water		
Benton City Water Co. Well	alpha	$< 5 \times 10^{-9}$
Richland, N.Richland, Benton City Wells	alpha	< 0.5 to 1.8×10^{-8}
100 Areas	beta	0.8 to 4.2×10^{-7}
Pasco, Kennewick, McNary Dam	beta	< 0.5 to 4×10^{-7}
Backwash Solids-Pasco filter plant	beta	4.8×10^{-2} μc/g
Backwash Liquids-Pasco filter plant	beta	4.0×10^{-7}
Sand Filter-Pasco filter plant	beta	2.2×10^{-4} μc/g
Anthracite Filter-Pasco filter plant	beta	1.5×10^{-4} μc/g

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Regional Survey (Continued)

SAMPLE TYPE AND LOCATIONS	Activity Type	Average Activity Density (μc/cc)
Other Waters		
300 Area Wells #1,2,3	alpha	0.7 to 1.0×10^{-7}
300 Area Well #4	alpha	1.6×10^{-7}
Well #4 measured as uranium	U	1.8×10^{-7}
Other wells on the reservation	beta	<5 to 9×10^{-8}
Columbia River-Hanford Ferry	beta	8.5×10^{-6}
Columbia River-Below reactors	beta	8.4×10^{-6}
Columbia River-Patterson to McNary	beta	3.1×10^{-7}
Columbia River-Shore mud	beta	0.3 to 1.6×10^{-4} μc/g
Raw Water-Operating areas	beta	<0.05 to 1.0×10^{-6}
Reactor effluent retention basins	beta	3.2 to 5.0×10^{-3}
Reactor effluent retention basins	alpha	<5 to 8×10^{-9}
I^{131} in farm wastes	I^{131}	5×10^{-7}
I^{131} in Columbia River-Hanford	I^{131}	1.1×10^{-7}
Atmospheric Pollution		
Gross alpha emitters	alpha	<0.4 to 2.3×10^{-14}
Gross dose rate-Separations areas	beta-gamma	0.7 to 2.4 mrep/day
Gross dose rate-Residential areas	beta-gamma	0.3 to 0.7 mrep/day
Filterable beta-Separations areas	beta	0.7 to 2.8×10^{-11}
I^{131}-Separations areas	I^{131}	0.3 to 2.1×10^{-12}
I^{131}-Separations stacks	I^{131}	1.8 curies/day
Active particles-Wash.,Ida.,Ore.,Mont.	-	0.09 to 0.96 ptle/m^3
Active particles- Hanford Operation	-	0.3 to 3.8 ptles/m^3
Tritium (as oxides)-Reactor stacks	T	0.3 curie/day
		μc/g
Vegetation		
Environs of Separations areas	I^{131}	1×10^{-5}
Residential areas	I^{131}	5×10^{-6}
Eastern Wash. and Oregon	I^{131}	4×10^{-6}
Non-volatile beta emitters-Wash.& Ore.	beta	2 to 3×10^{-4}
Alpha emitters-Separations areas	alpha	2 to 7×10^{-7}
Alpha emitters-300 Area	alpha	7×10^{-7}

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Radiological Sciences Department

Regional Survey (Continued)

Average I^{131} emission from Separation facilities increased to 1.8 curies/day. Maximum daily emission of 12 curies on September 3 was due to failure of C-3 silver reactor at Redox plant. Average daily emission of ruthenium increased 6.4 curies/day with a maximum of 84 curies/day during the 24 hour period ending September 6.

Concentrations of contaminant in the gas stream entering the sand filter at Redox increased markedly on September 16, coincident with the removal of the H-4 oxidizing vessel from the process. Approximately 20 curies of beta particle emitters entered the sand filter on that day. Approximately 1 mc entered the stack stream from the sand filter during the 2 week period surrounding the high upstream measurement.

The concentration of radioactive particles in air continued to average greater than 0.1 particle per cubic meter at all sampling locations during late August and early September. The activity of particles collected during the period August 29 through September 3 was as high as 1000 d/m/particle. While the contribution of remote sources has not yet been completely evaluated, significant increases were noted in the measurements in the immediate environs which were coincident with the high ruthenium emission at Redox on September 4, 5, and 6. Concentrations at 200-West gatehouse during the period averaged as high as 4.9 particles per cubic meter, and at Redox as high as 10 particles per cubic meter.

A consistent upward trend in the concentration of gross beta particle emitters in 107-DR basin effluent was noted during August and September. The average concentration in September was approximately 5×10^{-3} μc/cc compared to a July average of 4.0×10^{-3} μc/cc. The concentration measured on September 22 was 6.2×10^{-3} μc/cc.

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Radiological Sciences Department

Analytical Control Laboratory

Routine analyses were carried out as follows:

Laboratory	Analyses Completed September	Analyses Completed 1953 To Date
Type Sample		
Vegetation	1535	11629
Water	2016	16976
Solids	367	2993
Air samples	480	3497
Uranium (fluorophotometer)	807	4894
Oil fog (fluorophotometer)	252	890
Special survey samples (RMSS)	41	271
Special survey samples (RMU & RS)	44	624
Phillips Petroleum - Tritium in water	7	24
Total	5549	41798
Counting Room		
Beta measurements (recounts included)	6908	57578
Alpha measurements (recounts included)	2308	72060
Control points (alpha and beta)	2731	23490
Decay curve points	5883	43606
Absorption curve points	707	3210
Total	18537	149944

Investigation of the increase in the concentration of gross beta particle emitters in 105-DR reactor effluent water during the past 3 months revealed an increase in most isotope concentrations. The increase in the predominant isotope, Mn^{56}, accounted for most of the change. Comparison of chlorinated and unchlorinated water passing through this reactor revealed higher concentrations of Mn^{56} and of gross beta particle emitters, by factors of 1.9 and 1.8, respectively, in the unchlorinated effluent, four hours after sampling. Thus, the lack of chlorination of the cooling water may be a factor contributing to the increased concentrations noted in the effluent.

A procedure was developed for the determination of K^{42} in reactor effluent water. The preliminary chemical group separations are

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Analytical Control Laboratory (Continued)

followed by extraction of trace impurities into anhydrous ethyl acetate. Results indicated that K^{42} accounts for approximately 0.5% of the activity of gross beta particle emitters in reactor effluent water.

The operating principles of the hand probe were incorporated into a counter for determination of gross beta particle activity on larger air filters. Use of this equipment will greatly decrease the time required to estimate tht total activity of particulate monitoring filters while simultaneously increasing the sensitivity of the measurements.

Control Services

A definite relation was found to exist between the total curies of active material entering the river from the reactor effluent water and the concentration of such active material in water from shoreline sampling locations at Richland and Pasco. The concentrations at both locations were lower than predicted by effluent measurements corrected for radioactive decay and river dilution. The discrepancy may possibly be due to channeling and adsorption by sediments, although these effects are not yet completely evaluated.

Further simplification of calculation methods continued with the adoption of nomographs for the calculation of tritium oxide content in reactor effluent gas. The possibility of using IBM equipment for some routine calculations and summaries was studied.

Synoptic Meteorology

Forecasts	Number made	September Percent reliability
Production	90	86.4
24-hour	60	87.9
Special	73	86.3

Temperatures averaged 67.8°F which was 3.5° above normal. Precipitation totaled 0.13 inch, which was 0.21 inch below normal.

A high wind with a peak gust of 65 mph occurred on the night of August 27 and 28.

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Radiological Sciences Department

RESEARCH AND DEVELOPMENT ACTIVITIES

Experimental Meteorology

Upper winds were plotted for the period June 24 through July 31, 1953, for comparison with air sample data from Regional Survey in an effort to establish confidence limits on the 200 mile trajectory study.

The multi-jet generator for fluorescent pigment dispersal was returned to the shop for orientation of the air jets. A new type of oil-fog generator equipped with a high volume recycling pump for agitating spray suspensions was investigated for possible use as a fluorescent pigment dispenser.

A total of 360 forecasts was made for the environs from Meteorology Tower observations using the Wind Predictor technique and the usual stringent verification procedures. A combination of light and variable winds and missing data for June lowered the average correctness; these results brought the percentage for the entire network for the first 6 months of 1953 to 73%.

Fundamental aspects of an ideal atmospheric pollution and stack discharge control program were studied in view of the present state of knowledge concerning stack parameters, meteorology, and maximum permissible concentration requirements.

Earth Sciences

A flow of hot artesian ground water was encountered by well 107-B-2 in the 100-B Area at a depth of 773 feet, or 327 feet below sea level. The water was encountered beneath an impermeable layer of basalt 116 feet thick, in a bed of volcanic tuff and white quartz sand, and rose to 31 feet from the ground surface. The temperature of the water was 130°F, but decreased to a more normal 75-80°F following further drilling and development of the well during the succeeding week. A depth of 790 feet was reached before caving of the loose sand prevented further drilling. The phenomenon suggests the possibility of a fault at depth but there is no evidence of recent movement; the geologic relations remain under continued study. The difficulties, probable depths, and problems to be encountered in obtaining emergency cooling water for the reactors from ground water supplies are indicated by this well.

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Earth Sciences (Continued)

A sequence of basalt flows and intercalated volcanic tuffs was encountered in 200-East Area in a well drilled to determine the geologic structure and the possibility of artesian aquifers discharging there into the shallower ground water. Correlation between this and adjacent areas was under way at month end.

Local southward movement of the ground water on the south side of the ground water mound beneath the T-Plant swamp was confirmed by an appreciable increase in beta-gamma emitters in a well in the 241-TY tank farm.

Contour maps were prepared showing the changes in the ground water table between 1944 and 1953, and between 1951 and 1953, during which periods the discharge of cooling water from the Redox and TBP Plants became important.

A cation exchange study of Sr^{90} adsorption by soil at various pH values showed that removal of this ion was nearly independent of its concentration at low values but greatly affected by pH. Greatest adsorption (90-95%) occurred between pH 10 and 11, considerably less as the pH was changed from 8 to 4, and little adsorption from more acid solutions.

Cs^{137} studies included its adsorption by soil from solutions of high (10-40%) salt content. Adsorption decreased somewhat with increasing cesium concentration and with increasing salt concentration.

Radiochemical analyses of effluents leached from a soil column with an oxalate-REW waste solution indicated that the first liquid to percolate to the ground water will probably contain Cs^{137} and Sr^{90} in amounts exceeding the MPC's for drinking water. The lack of adequate decontamination thus recommends against routine disposal of such wastes to ground.

Adsorption studies of Sr^{90} removal from RAW solutions by soil indicated complete removal of activity from at least ten column volumes of solution at pH 8 and 10. Cs^{137} will, therefore, limit the cribbing of this waste because of its lower adsorption rate than that of Sr^{90}. Simulated scavenged RAW waste solutions spiked with inactive Cs and Cs^{137} and passed through soil columns resulted in

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Earth Sciences (Continued)

a detectable breakthrough, estimated on the basis of trace carrier techniques to be equal to the MPC for drinking water, after 3.5 column volumes. A similar experiment with simulated unscavenged wastes achieved breakthrough on the same basis after 2 column volumes. The breakthrough effluent in the latter case was estimated to have a Cs content 1000 times that of the similar effluent from the scavenged waste.

Industrial Hygiene

The sampling program to determine efficiency of the U-Plant sand filter was completed. Thirty-five additional samples were obtained for radiochemical analysis, five for particle sizing, and eight for the measurement of dust loading. The distribution of radioactivity among the particles from 221-U building ventilation air, sampled upstream from the sand filter, was such that 50% of it was associated with particulates above the median size of 0.4 microns. Effluent from the sand filter had a median particle size of 0.8 micron. Efficiencies of the sand filter, calculated from samples covering a 17-day period in August, were 99.82% for beta, and 99.69% for alpha activity. Air entering the sand filter from the waste recovery tanks contained ammonium nitrate in quantities that prevented size analysis of other particulates. The ammonium nitrate appeared to have a crystal size of 2 microns.

Three filter materials submitted for evaluation were tested for efficiency with sodium chloride fume. Preliminary results showed the fire-resistant Fiberglas and mixed asbestos-Fiberglas media to have efficiencies greater than 99%; CWS-6 paper was 99.5% efficient under the same test conditions.

Methods

Continued tests of the laboratory multi-weir proportional sampler at low flow rates showed discrepancies which proved to be caused by variation in the weirs. Initial tests were also made of a sampler employing a circular plane weir from which is diverted a fixed fraction of the total flow. Performance compares favorably with performance of the multi-weir flow splitter at the higher flow rate.

Work was begun on developing an analytical procedure for the rapid

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Methods (Continued)

determination of fission products in urine. Since Cs^{137} and Ru^{106} are present to an appreciable extent in typical fission product mixtures encountered, work was concentrated on analytical methods for these two elements. Distillation of ruthenium directly from urine with the aid of phosphoric acid and potassium permanganate showed promise. The silico-wolframic acid procedure for Cs gave high yields when applied to urine samples.

The cation exchange-MnO_2 procedure for Mn^{56} was tested for reproducibility in 18 analyses on three different reactor effluent samples; a maximum standard deviation of 3% was obtained.

Radiochemical Standards

Counting characteristics for the prototype thin end window proportional counter were further studied. The effect on voltage vs. counting rate curves of conducting and non-conducting windows, and of anode-window spacing, were measured. Conducting windows were found to give superior voltage plateaus for short anode-window distances. At anode-window spacing of 2 cm or more, non-conducting windows gave good plateaus.

Self-absorption measurements of P^{32} beta particles in ashed aquatic biological samples were extended to include carp bone ash. Only minor differences were noted in the factor as compared with those determined for small whole fish and algae ash.

Excellent agreement was obtained for disintegration rates of I^{131} samples mounted in several configurations and counted on the first four shelves of a mica window counter. This is in contrast to data for sources of softer emitters (S^{35}, Co^{60}) which gave apparently higher disintegration rates when counted on the lower shelves than when counted on the first. A smaller, similar difference was noted for P^{32} and RaE^{210}.

A high vacuum metal evaporator for preparing extremely thin conducting films was assembled from available parts and used during the month for preparing films for 4π counter sources.

Physics

An electron monitoring chamber was built for the Van de Graaff to

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Physics (Continued)

replace the temporary one previously reported (March 1953). The improved design and the use of aluminum, which is more resistant to radiation than the plastic, were based on experience with the preliminary model. The instrument should provide very accurate control of electron exposures when used; for example, in the calibration of beta ray survey meters.

A method for the measurement of the density of film badges which have received such large doses that they cannot be read on the usual densitometer was worked out to be used if ever necessary. The method, first used at Argonne National Laboratory, involves neutron activation of the silver in the developed film badge and measurement of this activity with a geiger counter.

Studies of geiger counter tubes removed from service in portable instruments were started to accumulate statistical age data for use in preventive maintenance routines.

It was found that the output signal of the new proportional thimble chamber decreases slowly; a decrease by a factor of 1/3 in a month was noted.

IBM computation of certain integrals basic to the beta ray age-diffusion theory method of solving dosage problems was started.

The study of neutron spectrometers continued with work on electronic circuits being suspended to consider the new time of flight techniques.

The documents "An Ionization Chamber Method for the Standardization of Tritiated Water Samples" and "Age-Diffusion Theory for Beta-Ray Problems" were issued.

Instrument Development

Low background tritium counter development work yielded the information that the cone of sensitivity of a 5819 photomultiplier

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Instrument Development (Continued)

dipping into a terphenyl-toluene scintillator has an included solid angle of 140°. The efficiency of a system using a polished container was found to be twice that of one using a black container. These findings were used to design an experimental low background counter with a conventional g.m. tube. The results obtained from it should permit the designing of a system for the one liter counter needed for studying the movement of underground water.

The equipment for monitoring hog thyroids was completed, and found to have a sensitivity of 2300 c/m/μc of I^{131} and a background of 3400 c/m when operated conventionally. With the simplified background reducer developed for this purpose, the sensitivity was 1800 c/m/μc and background was 120 c/m in the laboratory. The background reducer is a two-tube fixed channel gamma-ray spectrometer set to accept the 0.364 MEV I^{131} photoelectric line.

Progress was made on the design of the telemetering system for meteorological and radiation data collected at various off-site stations. The system planned should meet the routine need for data on and about the plant site as well as an emergency need for data in the event of disaster.

Design of the wind tunnel instrument calibration facility was undertaken for Experimental Meteorology. Preliminary drawings were completed in preparation for detailed study of performance requirements.

A thermistor system was designed for measuring Columbia River bed temperatures. The accuracy of thermistors will be adequate for the purpose since the temperature differences of interest are of the order of degrees centigrade.

Study of the computing section of the wind component meter for air turbulence measurements was begun. The detector will be a hot wire anemometer array to be obtained commercially.

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BIOLOGY SECTION

AQUATIC BIOLOGY

Biological Chains
No result.

Ecology

Survey of the Columbia River

Gradually receding river levels favored shore collecting throughout the month. Average activity densities at Hanford increased substantially for all organisms and amounted to 3×10^{-2} μc/g of plankton, 6×10^{-3} μc/g of algae, 2×10^{-2} μc/g of Caddis fly larvae, and 5×10^{-3} μc/g of small fish. Maximum activity for adult fish, 7×10^{-2} μc/g, was found in the scales of a sucker; for game fish 9×10^{-3} μc/g was found in the scales of a bass that had 7×10^{-4} μc/g of muscle. Activity density levels along shore below the 100-D and 100-H Areas remained high, and are comparable to those found at Hanford. A special trip was made to obtain samples of river organisms from the lower Columbia River area. Significant amounts of radioactivity were encountered in some areas. Small fish collected about 75 miles below McNary showed 10^{-3} μc/g and at Bonneville 6×10^{-4} μc/g; plankton ranged from 5×10^{-4} μc/g at Umatilla to 5×10^{-5} μc/g at the mouth of the river. Only low levels of activity were found in whitefish of the Priest Rapids area.

Effluent Monitoring

Routine monitoring of reactor area effluent was continued without unusual incident. Juvenile trout held in 2.5% area effluent are slightly smaller than normal, but no increase in mortality has resulted below the 10% level. Pile influent water slightly retarded growth at the 5% level, but no increased mortality resulted below 25% strength.

BIOLOGY CONTROL UNIT

Biological Monitoring

The peak ruthenium activity density was attained in kidneys and other soft tissues between one and four days after oral administration of the isotope to fowl. Bone activity density reached its peak between

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Radiological Sciences Department

Biological Monitoring (Continued)

four and fourteen days. The highest activity density was attained in the kidneys, but the greater mass of the liver resulted in a greater fraction of the total dose being deposited in that organ.

Rodent thyroid activity densities increased tenfold over those of the previous month. Gross fission product contamination of rodent feces was observed in amounts up to 140 d/m/g. An extra-environs source may be indicated.

Clinical Laboratory

There were 810 routine blood analyses performed including 97 creatinine studies by two methods. Forty-five miscellaneous analyses were completed. The calcium content of sheep aortas ranged from 0.26 to 2.23 mg of Ca/g in apparently normal tissue, and from 21.01 to 79.75 mg of Ca/g of sclerotic aortal plaques.

Microscopy

Electron micrographs of PuO_2 particles were prepared in connection with the lung-particle problem. Routine development continued on "Farfilm" intermediate replicas, for the Metallurgy Unit.

Twenty-four photomicrographs of autoradiographs of plutonium contaminated skin were prepared, and 30 photomicrographs of morphological changes in bacteria. Thirteen thyroid tissues and 104 other tissues were prepared histologically for Toxicology.

Radiochemistry

Routine services were furnished by analyzing 900 samples for I^{131}, P^{32}, or Ru^{106} radioactivity, 218 samples for tritium content, and 96 for plutonium by TTA extraction.

METABOLISM

Plutonium Absorption and Metabolism

In the experiment on absorption of plutonium from the intestinal tract of rats, analyses were completed on two additional groups of rats fed plutonium concentrations 10,000 times and 20,000 times the MPC. The statistical analysis of these results is incomplete.

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Plutonium Absorption and Metabolism (Continued)

Histopathological studies and autoradiographs of pig and rat skin treated with acid solutions of plutonium promise to provide valuable information on the mechanism of entry of plutonium through the skin. Preliminary evidence indicates that strong acid may inhibit absorption of plutonium by coagulation of the tissue, and that the superficial contaminated skin layer may slough off following growth of epidermis from the margin of the damaged area, beneath the contaminated, coagulated dermis and epidermis.

Mechanism of Radiation Damage to Plants

Previously irradiated and unirradiated algae were subcultured in the presence of tracer quantities of P^{32}. The algae were then separated into various chemical fractions to determine the effect of previous irradiation on P^{32} incorporation. Difficulties encountered in the fractionation procedures prevent the drawing of conclusions at this time.

PLANT NUTRITION AND MICROBIOLOGY

Absorption and Translocation of Radioelements in Plants

An experiment was conducted in the greenhouse to determine the uptake of Ce^{144} by four species of plants. Values for uptake efficiency are: Russian thistle, 0.00023; tomato, 0.00014; beans, 0.00011; and oats, 0.000074. With the exception of oats, the differences in these values are probably not significant. These values are in the general range of those found for yttrium but do not show the wide species differences found with yttrium.

Repeated runs of spiked material indicate about a $\pm 2\frac{1}{2}\%$ reproducibility for tritium gas samples run by the Zn converter method.

RBE by Microbiological Methods

Repeated irradiations of Escherichia coli B with tritium oxide incorporated into the medium were carried out to show that the resulting growth depression and cell elongation could be satisfactorily repeated. Irradiation of E. coli B with 40 mc/ml of tritium oxide contained in the medium yields a decided decrease in optical density as compared with a non-irradiated control. Many of the cells in the irradiated culture show up to 5 times the normal elongation within four hours after inoculation, while at five hours

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RBE by Microbiological Methods (Continued)

(approximately 2500 rep) long filamentous growth is prevalent.

Streptococcus faecalis was grown under similar conditions with 84 mc/ml of tritium oxide in the medium. No effect was observed either in growth rate or morphology.

An experiment to determine the G-yield for the $Fe^{++} \rightsquigarrow Fe^{+++}$ system was carried out with specially purified tritium oxide using 1.4×10^{-3} M NaCl in the system. G-yields obtained are 14.5, 14.1, and 14.0 with an average of 14.2 molecules oxidized per 100 ev.

A preliminary test on biotin irradiated in aqueous solution indicates that none of the degradation products have biological activity as substitutes for biotin.

Genetic Effects of Internally Deposited Radioelements

All E. coli stocks isolated from the cultures exposed to P^{32} and held frozen for two weeks have been tested. No mutants were obtained. Formation of multinucleate units or cell strands may be responsible for failure to identify mutants since these are present when the cultures are examined microscopically. Growth in these test cultures grown on exceedingly low levels of phosphorus is very slight, and, by using P^{32} as a tracer, it is found that under the conditions used the bacterium is able to remove very little of the phosphorus from the medium (less than 10%). Various conditions are being tested to determine whether the phosphorus uptake by the organism can be increased. A test has been set up using Neurospora in place of E. coli. Although radiation dosage is more uncertain with a mold than a bacterium, results obtained with the mold may serve as a guide to future work with bacteria.

Work has been initiated on the development of coated colloidal particles for use in control irradiation of microorganisms.

TOXICOLOGY

Experimental Animal Farm (Toxicology of I^{131})

The ratios of I^{131} in the thyroid gland to I^{131} fed daily (Q/q)

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Experimental Animal Farm (Continued)

in September were as follows:

	5 μc/day	1.5 μc/day	0.5 μc/day	0.15 μc/day
Original ewes	2.3			2.9
1950 Offspring	1.1			3.1
1951 Offspring (from off project)	2.0	2.5	2.6	3.2 2.5
1953 Offspring	1.3			2.6

Necropsies were performed on two 6-month old ewe lambs fed 5 μc/day. The thyroids appeared normal grossly. However, one thyroid was much smaller than normal. Although microscopic examination of these thyroids has not yet been completed, the thyroids from some 5 μc animals sacrificed when 14 to 17 months of age showed histological damage. These damaged glands were also smaller in size.

A three-probed scintillation counter was delivered by the Instrument Development group of Biophysics section. Four pilot groups of 2 pigs each were established at feeding levels of 0.15, 0.5, 5, and 15 μc of I^{131}/day.

Radiochemical analysis was performed on 20 thyroid glands from beef cattle that were obtained from an army veterinary inspector in a Yakima packing plant. Levels obtained varied from background to a maximum of 0.012 μc in a 15 g thyroid gland.

In partial fulfillment of a contract with the State College of Washington, a second tracer dose of iodine was administered to 59 calves. Results showed that calves whose diet contained synthetic milk had uptake values that were about 15% less than calves being fed whole milk. The nature of this inhibitor is being investigated by the State College of Washington's Department of Animal Husbandry.

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Radioactive Particles, Metabolism and Toxicology

Studies were initiated on the tumorigenicity of plutonium oxide particles administered via the tracheobronchial route to a pulmonary-tumor sensitive strain of mice. One group of 52 control animals received barium sulphate particles in molecular equivalent to 0.12 µg of plutonium as oxide. These particles are considered innocuous and will allow a comparison between benign particles and particles that may be tumorigenic.

The lungs of 73 mice were injected with a plutonium oxide colloid. The diameter of the colloidal particles as determined by electron microscopy ranged from 0.1 to 0.7 microns. Clearance rates of the plutonium will be determined in about 18 mice by sacrificing from 0 to 64 days.

Alpha-particle Induced Gas Reactions

In two 1000-minute exposures of tank N_2O gas to a plutonium oxide source emitting 6.5×10^6 Mev/minute, it was found that the average yield of the alpha-particle induced decomposition was of the order of 10 molecules of NO_2 formed per 100 ev. A similar yield was obtained in a single five-month exposure. It would thus appear that no significant back reaction occurs.

Derivation and Listing of Applicable Dosimetric and Metabolic Equations

Work continued on a better organization of existing solutions for the differential equations describing compartmentalized models already investigated. Consideration was also given to the analysis of these systems by means of analogy with electrical circuits. Electrical analogs of this type were described recently by others in this field and provide a rapid means of determining numerical values of the rate constants involved.

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FINANCIAL DEPARTMENT MONTHLY REPORT
SEPTEMBER, 1953

Notification was received by letter dated August 31, 1953 from David F. Shaw, Manager, Hanford Operations Office, AEC, to W. E. Johnson, General Manager, Hanford Atomic Products Operation, of an audit by the AEC Finance Division of Hanford personnel administration and payroll policies and practices. On September 18, E. G. Corcoran and J. R. Hazen of the HOO Finance Division presented informally to J. P. Holmes a list of 225 audit questions directed to W. E. Johnson, C. N. Gross and six individuals in the Employee and Public Relations Department, and D. M. Johnson and six individuals of the Payroll and Auditing Section of the Financial Department. Drafting of replies to the questions was started during September.

Requirements for the mid-year review of the budget for the fiscal year 1954 were set up at a meeting of Hanford Atomic Products Operation officials with representatives of the Washington and Hanford Operations offices of the Atomic Energy Commission. It was agreed that a minimum of detail would be prepared.

Considerable work was done during September on cost estimates in connection with the proposed High G/T programs.

Based on the experience gained in the physical inventories taken the first six months of this year, plans were laid for inventories to be taken in fiscal years 1954 and 1955. The schedule calls for the first inventory in December, 1953.

The inventory of capital assets, as outlined in OPG 04.6 ("Capital Plant and Equipment Accountability and Control") began on September 28, with twelve teams in the field, each team consisting of a representative of the Financial Department and one from the custodial department. This inventory is scheduled for completion in December.

The preparation of standard cost procedures for product costs was essentially complete at the end of September and it is expected that these procedures will be issued in manual form in November. In the meantime the data thus far collected is being used for cost comparison and analysis.

In accordance with Special Agreement No. G-5 with the National Carbon Company for graphite, which contains provision for redeterminations of the price of the material, one after 40% of the contract quantity has been shipped, and another after 70% has been shipped, an internal auditor visited the contractor's offices in Cleveland, Ohio; Clarksburg, W. Va.; and Columbia, Tenn., the latter part of September to evaluate National Carbon's proposal for the first price redetermination.

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Details have been worked out for billing Bauer-Day, Inc. and Spokane Housing, Inc. for charges in lieu of taxes, to be applied toward the expense of operating the Village of Richland. These charges are equivalent to a 15-mil assessment on a 50% valuation of the cost or replacement value of the housing units constructed on the Hanford Project under the provisions of the Wherry Act. These are the first charges of this nature made in connection with the Project. On September 9, the 500 Bauer-Day housing units had been completed and 330 units (66%) were occupied at the end of the month, while 278 of the Spokane Housing units had been completed on September 30 and 232 (83%) were occupied.

At a management information meeting for exempt personnel of the Accounting Section, held in the library on September 3, the training film on graphite stacking for the 100-C pile was shown, followed by a discussion of matters of current interest and a question period.

The 1953 annual payroll review of employees covered by the Professional Salary Plan was completed during the month of September.

The Accounting Section completed the "Let's Talk It Over" program for both exempt and non-exempt employees.

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Statistics

A summary of cash disbursements and receipts (excluding reimbursements by the Atomic Energy Commission) for the months of September and August, 1953, is shown below:

Disbursements	September	August
Payrolls (Net)	$2 843 506	$2 858 025
Materials and Freight	1 741 163	1 137 434
Payroll Taxes	629 137	676 163
Payments to Subcontractors	547 048	472 020
United States Savings Bonds	235 150	140 948
Group Insurance Premium	147 642	127 375
Pension Plan - Employees' Portion	97 142	82 648
Other	150 608	124 905
Total	6 391 396	5 619 518

Receipts		
Rent	$ 119 702	$ 100 684
Hospital	62 499	68 548
Telephone	48 267	49 890
Electricity	45 274	46 586
Sundry Accounts Receivable	14 413	32 660
Bus Fares	7 639	7 406
Refunds from Vendors	1 312	3 517
Sales to AEC Cost-type Contractors	35 360	3 101
Other	8 879	3 762
Total	$ 343 345	$ 316 154
Net Disbursements	$6 048 051	$5 303 364

Advances as of September 30 and August 31, 1953, may be summarized as follows:

	September	August
Cash in Bank - Contract Accounts	$3 097 548	$4 145 598
Cash in Bank - Salary Accounts	50 000	50 000
Travel Advance Funds	125 000	125 000
Total	$3 272 548	$4 320 598

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Personnel and Organization

	Current Month	Prior Month
Personnel Changes During Month		
Employees at beginning	332	332
Additions and transfers in	13	15
Removals and transfers out	(9)	(15)
Employees at end of month	336	332
Personnel by Unit at Month-End		
General	9	8
Reimbursement Unit	4	4
General Accounting Unit		
General Accounts	19	19
Inventory Accounting	8	7
Plant Accounts	32	32
Accounts Payable	36	36
Accounts Receivable	21	21
General	3	3
	119	118
General Cost Unit		
Consolidated Costs and Budgets	6	5
Plant Auxiliary Operations	17	18
Community Operations and Real Estate	7	7
Radiological Sciences and Other	7	7
Medical	3	3
General	3	3
	43	43
Manufacturing Cost Unit		
Costs and Budgets	34	33
General	8	7
	42	40
Engineering Cost Unit		
Project Section Costs	15	16
Design Section Costs	8	8
Technical Section Costs	9	10
General	6	5
	38	39
Payroll Unit		
Preparation and Employee Records	35	35
Confidential Payroll Records	6	7
Employee Benefit Plans & Payroll Reports	22	21
IBM Procedures	1	1
General	2	2
	66	66
Internal Audit Unit	12	13
Rotational Trainees	3	1
Total	336	332

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Section Reports

The monthly reports of the three sections of the Financial Department, as listed below, are shown on the following pages:

Accounting Section	
General Accounting Unit	Ia-1 through Ia-9
General Cost Unit	Ib-1 through Ib-2
Manufacturing Cost Unit	Ic-1 through Ic-2
Engineering Cost Unit	Id-1 through Id-2
Appropriations Section	Ie-1 through Ie-2
Payroll and Auditing Section	
Payroll Unit	If-1 through If-6
Internal Audit Unit	Ig-1

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GENERAL ACCOUNTING UNIT
MONTHLY REPORT - SEPTEMBER 1953

ACCOUNTS PAYABLE

Accounts payable liability is continuing to be recorded promptly upon receipt of bona fide invoices, and invoices are continuing to be audited and paid currently as evidenced by the outstanding balance of unpaid bills on hand at September 30, 1953 of $413 142.

Volume of work handled in Accounts Payable in September, 1953 increased considerably over that of the prior month. Vouchers entered increased over 5%, from 3 081 to 3 243, with an increase in dollar value of $744 879, from $2 575 928 to $3 320 807. Freight bills handled numbered 1 475 totaling $433 117 as compared with 711 totaling $121 687 last month.

Discount earned during the month amounted to $2 621 and fiscal year to date amounts to $9 244 for a monthly average of $3 081.

Active contracts, including consultant agreements but excluding requirements contracts, number 37 and open commitments on these contracts amount to $7 628 765. This month contract payments totaled $535 370.

The largest active contracts are the three with National Carbon for the supplying of graphite. These total $10 016 133, of which $3 661 008 has been paid. Quantities of graphite shipped under contracts G-5 and G-23 have reached the point where prices are to be renegotiated according to the terms of these contracts. Until such time as price negotiations are completed, prices billed and paid are the original amounts.

The Accounts Payable Procedures Manual, issued August 15, 1952, is being reviewed and procedural changes as well as supplemental information are being incorporated.

ACCOUNTS RECEIVABLE

The gross accounts receivable balance at September 30, 1953 amounted to $379 873, an increase of $94 640 from the balance at August 31, 1953. This increase is primarily due to an increase in the balance of the rent account of $99 769. No payroll deductions were made in September from salaries of exempt personnel due to cancellation of leases and revision of rental rates.

Considerable overtime was required by Accounts Receivable personnel in September to complete work in connection with the revision of accounts receivable records due to the revision of rental rates effective October 1, 1953.

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General Accounting Unit

ACCOUNTS RECEIVABLE (CONTINUED)

On September 9, 1953, the 500 housing units constructed by Bauer-Day, Inc. were completed, and at September 30, 1953, 330, or 66%, were occupied. Of the 278 units completed by Spokane Housing, Inc. at September 30, 1953, 232, or 83%, were occupied.

Procedure development work continued on the transition of electricity billing from IBM to Burroughs procedures. A visit was made during September to the Franklin County P. U. D. at Pasco to consult with them relative to their cycle billing operation. Preliminary contacts have been made concerning printing costs of electricity bills and the purchase of a billing machine. We anticipate the cycle billing procedure through use of Burroughs machines to be inaugurated around February 1, 1954.

Out-patient invoices issued in September at Kadlec Hospital numbered 1 781 and totaled $7 979, as compared with 1 638 in August, totaling $9 246. In-patient revenue totaled $64 795, as compared with $63 696 in August. The adult patient day census remained the same as for August, 78.8.

GENERAL ACCOUNTS

Unexpended advances from the Commission amounted to $3 272 548 at September 30, 1953 as compared with $4 320 598 at the end of last month. An advance of $6 000 000 was requested this month from the Commission to cover October disbursements.

Financial statements for Hanford Atomic Products Operation and Atomic Products Division were issued for the month of August, 1953 on September 15, 1953, and the other major financial reports were issued on the scheduled dates. HAPO Financial Statements indicated a net AEC investment of $677 253 000, representing assets of $684 587 000 and liabilities of $7 334 000. An additional page was added to the HAPO Financial Statements showing project cost segregated by AEC program; i.e., fissionable materials, weapons, biology and medicine and community. There was also an addition to the 3 x 5 cards to show details of commitments and expenditures.

In connection with the present procedure of cost distribution of store orders and accounts payable vouchers through IBM, the amount of work in general ledger has increased considerably. Approximately 25 000 store orders and 3 500 accounts payable vouchers were handled this month along with daily IBM runs and weekly and monthly summaries.

Assistance was given this month to the Internal Audit Unit in preparation of a procedure to control and record the amount due General Electric from the Commission from the sale of salvage and scrap material. This is in connection with the ten per cent of revenue received by the Commission from sale of salvage and scrap material which is forwarded to us to apply against material handling costs.

Activity in the cashier's office continued to increase this month. Approximately 14 000 items were handled in September as compared to the past 10-month average of 11 000 items.

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GENERAL ACCOUNTS (CONTINUED)

In order that transfer of cost between cost units can be better controlled, a procedure was established effective October 1, 1953, wherein all cost vouchers will flow through and be controlled by general ledger. This change in procedure also establishes a central file of cost vouchers for reference purposes.

Along with present financial information which is presented graphically, charts and graphs were prepared this month on inventories, personnel information, and absenteeism.

Total travel and living expenses, including Conference expense and expense of moving household goods, aggregated $37 630 in September, 1953. Travel and living expenses only, totaled $29 491, of which $28 545 was billed to the Commission and $946 was charged to the variation account. Fiscal year to date charges to the variation account relating to travel and living amount to $1 738, which is 43% of the year to date budget. Conference expenses, none of which are billed to the Commission, amounted to $663. Fiscal year to date, these expenses total $2 664, and represent 44% of year to date budget.

INVENTORY ACCOUNTING

Tentative schedules were prepared during September for the physical inventorying of materials during FY-1954 and FY-1955. In preparing these schedules, consideration was given to the man-hours required and the experience gained at the time physical inventories were taken in FY-1953. Inventories with high turnover rates are scheduled annually, whereas others are only scheduled biennially. The first of these inventories is tentatively scheduled for December, 1953. Work will continue for the next two months in further consultation and planning, and at a later date definite dates for the taking of physical inventories will be announced.

Excess Inventory and Excess Equipment stock record cards and other related Stores documents were examined in September for the purpose of establishing the value (acquisition cost) of excess materials and equipment which has been listed with the Commission for their disposition. Beginning this month, reports will be issued showing breakdown between value at acquisition cost of excess property listed and not listed with the Commission.

An inventory account was established during the month to record and control the coal stock pile to be located in the 3000 Area excess yard. This inventory, consisting of approximately 500 tons of coal, will be the responsibility of the Plant Protection Section and will be used primarily in the 1131 Garage.

Considerable time was spent during the month with Stores personnel discussing problems and devising plans relating to the control of stand-by materials according to Section who authorized the retention of these materials through approved stock adjustment requests. In this connection, an entirely new system of coding inventory sub-accounts was established, which will be used by Stores in controlling stand-by materials and equipment.

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General Accounting Unit

PLANT ACCOUNTS

Initial steps were taken in September, 1953 to place procedures in effect for the accountability and control of capital plant and equipment as outlined in Organization and Policy Guide 04.6. A schedule for the taking of physical inventories of uninstalled capital equipment was prepared and forwarded to Department Managers. Physical inventories were started on September 28, and are scheduled to be completed on December 15, 1953. Twelve inventory teams, each of which includes a representative from Plant Accounts, are engaged in this work. Meetings were held with Section Managers to discuss the overall program and assistance was given them in establishing their Property Control Units.

Arrangements were made with Kaiser Engineers to forward us each day copies of accounts payable vouchers, purchase orders, and other documents related to construction costs on Project CA-512. With this information, unitization of this project will be expedited, and we expect to be in a position to add the project cost to completed plant accounts promptly after completion of the project.

A study was made this month to determine probable unamortized costs of other process buildings and equipment in the 100 Areas after related pile buildings have been fully depreciated. This study is one of a series which are planned, results of which will be discussed with Manufacturing Department personnel in connection with our efforts to bring depreciation accounting policies to a more realistic basis.

Depreciation costs on the export water system, the electrical distribution system, and gas purification facilities, as they apply to product cost, were reviewed and reallocations were made resulting in a more equitable distribution of depreciation costs.

The AEC Budget Division was furnished with the original cost ($3 724 079) together with detailed information relating to general purpose and office buildings in the 700-1100 Area. This information will be used by them in connection with their fire risk evaluation studies.

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General Accounting Unit

	September	August
Accounts Payable		
Balance at Beginning of Month	$ 403 762	$ 444 759
Vouchers Entered	3 320 808	2 575 928
Cash Disbursements	3 312 740 DR	2 620 545 DR
Cash Receipts	1 312	3 517
Other	-0-	103
Balance at End of Month	$ 413 142	$ 403 762
Number of Vouchers Entered	3 243	3 081
Number of Checks Issued	2 123	1 973
Number of Freight Bills Paid	1 475	711
Amount of Freight Bills Paid	$ 433 117	$ 121 687
Number of Purchase Orders Received	1 548	1 504
Value of Purchase Orders Received	$ 1 608 974	$ 643 763
Cash Disbursements		
Payrolls (Net)	$ 2 843 506	$ 2 858 025
Material and Freight	1 741 163	1 137 434
Payroll Taxes	629 137	676 163
Lump Sum and Unit Price Subcontracts	547 048	472 020
United States Savings Bonds	235 150	140 948
Group Insurance Premium	147 642	127 375
Pension Plan - Employees' Portion	97 142	82 648
All Other	150 608	124 905
Total	$ 6 391 396	$ 5 619 518

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General Accounting Unit

	September	August
Cash Receipts		
Advances from Atomic Energy Commission	$ 5 000 000	$ 6 000 000
Rent	119 702	100 684
Hospital	62 499	68 548
Telephones	48 267	49 890
Electricity	45 274	46 586
Sales to Cost-type Contractors	35 360	3 101
Sundry Accounts Receivable	14 413	32 660
Bus Fares	7 639	7 406
Refunds from Vendors	1 312	3 517
Other	8 879	3 762
Total	$ 5 343 345	$ 6 316 154

Bank Balances at End of Month		
Chemical Bank and Trust Company - New York		
Contract Account	$ 640 884	$ 983 053
Seattle-First National Bank - Richland		
Contract Account	1 568 132	2 435 059
United States Savings Bonds Account	232 740	149 750
Salary Account No. 1	20 000	20 000
Salary Account No. 2	30 000	30 000
Travel Advance Account	50 007	74 267
National Bank of Commerce - Richland		
Contract Account	888 531	727 486
Total	$ 3 430 295	$ 4 419 615

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General Accounting Unit

		September		August	
Accounts Receivable					
Hospital	$	125 713	$	120 710	
Rent		113 328		13 559	
Sundry		46 413		39 196	
Equipment Sales to Facilities		28 618		28 967	
Cost-type Contractors		28 174		45 520	
Telephones		22 463		22 062	
Electricity		14 610		14 014	
Safety Shoes		377		1 013	
Loans to Employees		177		192	
Subtotal		379 873		285 233	
Reserve for Bad Debts		29 991	CR	30 022	CR
General Ledger Balance	$	349 882	$	255 211	
Hospital					
Number Out-patient Invoices Issued		1 781		1 638	
Charges During the Month	$	73 353	$	72 943	
Collections - Cash		62 499		68 548	
- Payroll Deductions		5 851		4 933	
Rent					
Houses					
Number Houses Occupied		6 043		6 041	
New Leases and Lease Modifications		158		152	
Lease Cancellations		133		128	
Charges During the Month	$	266 297	$	245 438	
Collections - Cash		59 053		40 774	
- Payroll Deductions		115 406		203 967	
Dormitories					
Number Rooms Occupied		918		949	
New Assignments		172		130	
Removals		203		183	
Charges During the Month	$	14 905	$	14 315	
Collections - Cash		3 956		3 435	
- Payroll Deductions		10 795		11 805	
Facilities					
Number Facility Leases		152		150	
Revenue	$	56 693	$	56 475	

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General Accounting Unit

		September		August
Accounts Receivable				
Sundry				
Number Invoices Issued		302		253
Amount of Invoices Issued	$	24 667	$	6 335
Cash Received		14 413		32 660
Cost-type Contractors				
Number Invoices Issued		28		24
Amount of Invoices Issued	$	18 015	$	11 956
Cash Received		35 360		3 101
Telephones				
Working Telephones (excludes official telephones)		6 061		6 052
Telephone Work Orders Processed		348		375
Charges During the Month	$	49 595	$	50 420
Cash Received		48 267		49 890
Electricity				
Number of Bills Issued		6 627		6 410
Amount of Bills Issued	$	45 557	$	45 987
Cash Received		45 274		46 586

	Number		Amount
Uncollectible Accounts (Total to Date)			
Accounts Forwarded to Collection Agencies	547	$	45 672
Accounts Returned as Uncollectible	178		23 599
Collections	188-1)		7 350-2)
Balance at Collection Agencies September 30, 1953	208	$	14 568

(1- Includes 161 accounts collected in full and 27 accounts partially collected.

(2- Represents total collections, half of which is remitted to General Electric.

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General Accounting Unit

	September	August
Travel Advances and Expense Accounts		
Cash Advances - Beginning of Month	$ 47 889	$ 44 403
Advances During the Month	66 274	49 100
Expense Accounts Submitted	37 630 CR	39 904 CR
Cash Refunded	6 331 CR	5 710 CR
Cash Advances - End of Month	$ 70 202	$ 47 889
Outstanding Cash Advances		
Current	$ 64 333	$ 42 017
Over 30 Days	5 869	5 872
Total	$ 70 202	$ 47 889
Travel and Living Expenses		
Actual Expenses	$ 33 855	$ 39 074
Billed to Government	31 908	37 695
Balance in Variation Account at End of Month	4 791 DR	2 844 DR
Inventories		
Current Inventories		
General Supplies	$ 1 052 484	$ 1 124 382
Fuel and Lubricants	102 504	93 847
Essential Materials	3 279 757	3 082 373
Total Current Inventories	4 434 745	4 300 602
Stand-by	2 638 656	2 695 028
Bulk Steel	80 273	98 143
Special Materials	286 458	283 262
Excess Materials	2 709 988	2 850 547
Total Inventories - Gross	10 150 120	10 227 582
Less: Excess Inventory Reserve	(2 758 350)	(2 858 091)
Stand-by Inventory Reserve	(741 692)	(759 817)
Total Inventory Reserve	(3 500 042)	(3 617 908)
Total Inventories - Net	$ 6 650 078	$ 6 609 674
Spare and Excess Equipment		
Recorded in Plant Accounts		
Spare Equipment Held in Storage	$ 1 499 146	$ 1 494 519
Excess Equipment	1 646 030	1 762 868
Excess Equipment Reserve	(1 654 911)	(1 757 443)

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GENERAL COST UNIT
MONTHLY REPORT
SEPTEMBER, 1953

Instructions for the preparation of AEC Report PER-40 (Personnel Estimates by Facility from 6-30-53 to 6-30-57) were discussed with personnel who will prepare the estimates for each department. This report is also expected to provide the personnel information required for the FY 1954 Midyear Budget Review.

A meeting was held with representatives of the Atomic Energy Commission from Washington and Hanford Operation Offices to discuss requirements for the Mid-Year Budget Review. It was agreed that a minimum of detail would be prepared and that the Financial Plan recently received from the Atomic Energy Commission would represent the maximum funds to be requested for the FY 1954.

Ratings of non-exempt employees and "Talk It Over" interviews with all employees were completed during September.

Consolidated Costs and Budgets

A reconciliation of the revised Financial Plan for the 7000 Program (Community) with previous Financial Plan was made. This latter Financial Plan provided for rent increases effective October 1, 1953, recent general adjustments, a reduction in the number of new housing units to be built by private capital and revision of completion dates for those now under construction.

Inventory levels at August 31, 1953 and the required levels on June 30, 1954 as contained in the AEC Financial Plan were discussed with financial advisors and responsible department management. A summary was prepared that reflected the indicated changes in level from August 31, 1953 to June 30, 1954 and compares the indicated balance with the financial plan at the end of the fiscal year. The summary emphasizes the need for a very definite control of inventory levels.

The cost of steam and electricity used for pumping process water in each of the 100 Areas for a six-month period was analyzed to determine the comparative cost of using each method.

The utilization of the ditto machine by General Cost Unit was reviewed and an analysis of duplicating charges to Accounting Section for months of July and August was completed. Recommendations for possible reductions in future costs were included in the analysis.

Plant Auxiliary Operations

A new procedure for handling freight on gas cylinders, which has caused considerable discussion for several months, was established to the mutual satisfaction of all concerned.

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Plant Auxiliary Operations (Continued)

Detail posting work in this office has been substantially reduced by utilizing IBM tabulating services for Store Orders, office machine rentals, and duplicating and printing services liquidations.

Personnel and responsibility shifts within Statistical and Computing Section necessitated complete reallocation of budgeted funds between the four units of the Section. This was accomplished and a revised quarterly breakdown prepared for use in cost reporting. Reductions in amounts allowed by the Financial Plan for Protection of Plant and Personnel Expense necessitated revision of the budgets for Patrol and Fire. This was also accomplished and the revised figures will be used on costs reports beginning with the month of October.

Community

Starting with the month of September, housing land rental collected from Bauer-Day and Spokane Housing will be listed on the cost report as a line item in order to segregate it from the revenue collected from housing, dormitories and commercial facilities.

A tax equivalent revenue is to be billed to Bauer-Day and Spokane Housing Projects after completion of each project. This is to be billed at 15 mills on one-half assessed valuation of the property. The Bauer-Day units were completed on September 9 and this revenue will be shown on our future reports as a line item.

Medical

The report comparing Kadlec Hospital's operation to that of other hospitals throughout the state of Washington is nearing completion and should be ready for distribution early in the month of October.

Staff Departments

Some time was spent in discussion with the Technical Personnel Section concerning the problem of assigning Technical Graduates to the various departments when budgeted funds do not allow sufficient leeway to absorb the charges made for the men while on Rotational Training. Some analysis work is presently in progress to aid Mr. McLenegan in his contacts with Department and Section Managers.

We had, in the early part of September, one 3-hour meeting with Messrs. H. E. Callahan, G. D. Barr, D. G. Dayton, C. N. Gross and R. M. Broughton concerning contractual problems and how the Employee Relations Section could best protect itself from any embarrassment resulting from failure to conform to provisions of the interim contract with the Atomic Energy Commission.

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MANUFACTURING COST UNIT
SEPTEMBER, 1953

GENERAL

Safety and Security meeting was held September 10, 1953. General information meeting followed.

The "Let's Talk It Over" program for the non-exempt employees was completed during the month.

PRODUCT COST ACCOUNTING

The first draft of a procedure covering the Product Cost Report was prepared. This draft will be revised and issued as an "Accounting Methods and Procedure" in the near future.

Revisions were made in the Receipts, Shipments and Inventory statements of the Product Cost Report. These revisions were made to show a complete reconciliation of inventories including receipts, shipments and charges for conversion and depreciation.

Product Cost Transfer Vouchers covering shipments of fabricated plutonium since July 1 were revised at the request of the Atomic Energy Commission. These revisions were the result of changes in the classification of weapons (3000) and fissionable material (2000) programs by the Commission.

REPORTS AND RECORDS

Standard Costs for Separations - Operations Units were compiled for Separations Section Cost Report for period ended August 31, 1953 with the help of Separations Plant Engineering Personnel, and the "dollar variance from standard" was included on this report.

During September, 1953, the Essential Materials group has made arrangements with Manufacturing personnel in 200-W Area to experimentally compute dollar inventory consumption figures at the same time as actual physical inventories are compiled. It is expected that this procedure will result in additional time saving of one-half day, which will allow earlier Essential Material closing dates.

Coal prices under the FY 1954 contracts by vendors were computed and were used effective September 1, 1953.

In September the final journal entry from Manufacturing Cost to General Ledger was made on September 4 and the Manufacturing Department Operating Report for period ended August 31, 1953 was issued on September 10, 1953.

REACTOR SECTION ACCOUNTING

The Standard Cost report for August was used at the Sectional cost meeting held in September for explanation of variances. It is planned to issue a Reactor Section Standard Cost Manual in October.

Secret Document HW-29445, "Comparison of Irradiation Cost by Area", was issued. This study was made to show the significant factors causing cost differentials between various reactors.

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SEPARATIONS SECTION ACCOUNTING

Unit cost explanations for August and the forecast covering the period September through February for $BiPO_4$, Redox, 234-5, TBP, UO_3, and P-10 were prepared and submitted at the monthly cost meeting held September 18, 1953 in the 200-W Area.

Work on Standard Costs has progressed to the extent that a form for presentation for the standards was agreed upon at the monthly cost meeting. The Standard Cost procedure and the Standard Costs are expected to be ready for use in October.

A major portion of the month was spent in preparing cost estimates for management in connection with the proposed High G/T programs. Estimated production, cost and unit cost for two different cases were prepared and submitted.

METAL PREPARATION SECTION ACCOUNTING

Final review of the Cost Standards Program for Preparation of Slugs was completed September 25, 1953. The Standards Manual is now in printing with the expected distribution date of October 12, 1953.

Assistance was given the Atomic Energy Commission committee which is currently reviewing the SF materials accountability procedure.

Two meetings were held with area supervision for the purpose of establishing a procedure for comparing the operating efficiency of maintenance foreman.

Due to expanded and added facilities and process changes, it is necessary to prepare a revised distribution of purchased electricity. This study will be completed and in effect for the distribution of October charges.

At the Area Cost Meeting in the month of September a new method of explaining cost variances was presented. This method explains variances due to yield and production separately to reduce the distortion caused by including these factors in total variance. This isolates all other variances and facilitates the explanation. This revised method met with the approval of management and will be used at future cost meetings.

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ENGINEERING COST UNIT
MONTHLY REPORT - SEPTEMBER, 1953.

DESIGN COST

Cost reports for August were issued on September 8, 1953. Procedures for tabulating source data have been changed to permit the issuance of weekly reports not later than Wednesday following the week covered. This change was made with the idea that a report being published by the Design Section on an estimated basis could be discontinued as actual costs would be available earlier. Certain other changes will have to be made in the weekly report to provide for additional information presently reported by the Design Section, however, it is believed this can be accomplished.

While very little detail is required for the mid-year review of the budget for fiscal year, the Design Section has indicated they wish to prepare a complete budget in order to give effect to changes and revised planning which has occurred since the original submission. Historical cost data and forms for this purpose are being prepared.

The standard rate for direct engineering is being given a close review monthly as the actual cost to date of $49.04 per man-day exceeds the present standard rate of $47.00. This has resulted in an under-liquidation of costs for the first quarter of this fiscal year in the amount of $18,777.00. No adjustment of the standard rate is contemplated for the present as man-days are based on productive time and the completion of the vacation season should produce an increased number of direct man-days each month.

Information concerning cost transfers between General Electric and On-Site CPFF Construction Contractors previously reported each month in this report has been made a separate report (FE-153-M) showing current month, previous month, fiscal year to date and total to date activity.

TECHNICAL COST

August operating cost reports were issued to Technical Section and Engineering Administration Sub-Section on September 15, 1953. Research and Development detailed reports were issued on September 18, 1953. The analysis letters to the Manager - Technology and the Manager - Engineering Administration were issued on September 18, 1953.

Arrangements were completed in September for the transfer of accounting responsibilities for the Mechanical Development Shop from Manufacturing Cost to Engineering Cost - Technical Cost. The effective date of the change was September 28, 1953. An accounting procedure for the shop was written during the month to supplement an operating guide issued jointly by the Shop General Foreman and the Shop Technical Supervisor. The shop will continue to use the same Work Order forms as in the past but temporarily the costs will be summarized by hand posting. Eventually the Computing Unit will be doing the cost summarization.

It is planned that other work presently done by hand will also be performed by IBM in the near future. During September plans were made to begin summarizing Technical Section Time Distribution Reports on IBM. The effective date for IBM handling will depend upon the success of trial runs now being prepared.

A Recast of the Budget for FY-1955 and Revision of Budget for FY 1954 was published during September. All recent organizational changes in Technical Section were taken into consideration in this budget.

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Engineering Cost Unit

PROJECT COSTS

Project Section Time Distribution reports were not placed on IBM during September due to the present tight schedules in IBM. Adjustments and changes are being effected in IBM in order to have these distributions performed by IBM at an early date.

Analysis of Operating Costs for the month of August was furnished to the Project Section Manager on September 15, 1953. This analysis now compares current month's cost to budget and reflects budget utilization rather than comparison of current month costs with previous month.

Construction Work in Progress - Engineering report for the month of August was furnished the Atomic Energy Commission on September 4, 1953.

On September 28, 1953, Business Graduate E. H. Koenig was presented with a $100 suggestion award. Mr. Koenig suggested that two salary accounts, one for exempt and one for non-exempt, be adopted for the reporting and recording of production salaries in lieu of six accounts presently used. Mr. Koenig's suggestion was adopted by the Project and Design Cost groups on July 1, 1953.

Financial Closing Statements covering the following projects were issued during the month:

IR-116	Combined Civil Defense and Plant Disaster Mobile Control Center
CG-413	Expansion 234-5 Capacity

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APPROPRIATIONS SECTION
MONTHLY REPORT - SEPTEMBER, 1953

Design Section presented the proposed scope of work for CG-558 - Reactor Plant Modification for Increased Production. This formal presentation was followed by a review in W. E. Johnson's office on September 30 which resulted in a more limited course of action. A project proposal is to be prepared which will incorporate those features which will give maximum immediate gains for minimum capital expenditures.

Some concern was expressed regarding start of construction of Project CA-555 - Graphite Hot Shop ($93,000). The project proposal, which had previously been approved by the Appropriations & Budget Committee, was not transmitted to the Commission until the Company's views were disclosed to AEC. The Commission felt that the project was included in the budget approved by Congress as part of budget item 2-23X-4015 - Improvements, Alterations and Additions to Existing Plutonium Facilities at Hanford. After this informal exchange of views the project proposal was endorsed by the A & B Committee and forwarded to the Commission. Construction work will be performed under a lump-sum contract negotiated by AEC.

Copies of construction data sheets supporting the Plant and Equipment Budget for FY 1954, reported to be copies of documents submitted to Congress, were received from the Commission in September. The data sheets and the summary of the Plant and Equipment Budget will be reviewed and reported by Engineering Cost.

During the month of September, the Appropriations and Budget Committee approved project proposals for CG-562, Waste Metal Recovery Plant Modification, as follows:

CG-562, approved September 11, 1953, requested funds in the amount of $50,000 for design and procurement

CG-562, Rev. 1, approved September 28, 1953, requested total project funds in the amount of $128,000

The following project proposals or revisions were approved by the Appropriations Sub-Committee:

CA-504, Rev. 1	Improved Lighting, 760, 761 & 762 Bldgs.	Total project funds decreased from $50,000 to $47,000
CG-563	Modification of 314 Building for Fuel Development	$75,000
CG-564	Installation of Additional Ball 3-X Equipment - 105-C Building	$62,500
CA-529, Rev. 1	Personnel Meter Gatehouse Facility Improvements	Funds increased from $30,000 to $33,000

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IR-158	Replacement of 10" Water Main in 700 Area	Funds increased from $6,500 to $7,500
IR	Fire Protection, Building 272-W	$18,500

Appropriation requests amounting to $25,700 were approved by the Appropriations Sub-Committee.

The following directives and work authorities were issued during September:

CA-532 — Water Tank Replacements - Fiscal Year 1954
Directive authorized $150,000; work authority authorized GE $18,000

CG-562 — Waste Metal Recovery Plant Modifications
Directive authorized GE $50,000 for design and procurement

CG-559 — Process Tube Flow Facilities 189-D
Directive authorized GE $11,000 for design

CG-523 — Installation of Automatic Valves in Export Water Lines, 100-B, D, & F Areas
Directive increased authorized funds from $22,600 to $27,800

CA-513 — Expansion of 200 Area Facilities
Directive and work authority revised segregation of funds as follows: Total authorized funds $71,000,000; GE $5,900,000; AEC $65,100,000. Later directive reduced total authorized funds from $71,000,000 to $61,000,000

CG-560 — First Cycle Waste Supernatant Cribbing Facilities
Directive authorized GE $42,000

CG-438 — Ball Third Safety System for 105-B, D, DR, F & H
Directive increased authorized funds from $3,650,000 to $3,900,000

IR-158 — Replacement of 10" Water Main in 700 Area
Authorized funds increased from $6,500 to $7,500

IR-160 — Asbestos Shingles for Building Exteriors - 100-B, D & F Areas
Total authorized funds $16,700

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PAYROLL UNIT
MONTHLY REPORT
SEPTEMBER 1953

The 1953 annual payroll review of employees covered by the Professional Salary Plan was completed during the month of September.

Representatives of the Wage Rates Unit spent considerable time with supervisors of the Payroll Unit reviewing the duties and classifications of each non-exempt payroll job. It is expected that any necessary revisions of classifications will be accomplished in October.

A procedure was established in September in connection with controverted Workmen's Compensation cases whereby the employee, in hardship cases, may receive benefits under the Insurance Plan while awaiting final determination of his case. The procedure provides that the employee sign an agreement permitting deduction from salary payments of the amount of insurance benefits paid if the case is finally determined not to be compensable.

A study of approximately 100 insurance claims indicated that the average elapsed time taken by hospital and doctors in completing their portion of the claim form was 20.3 days, and the average time taken by Payroll in processing claims was 2.1 days. The study was requested by Employee and Public Relations Department, as one step in an attempt to reduce the elapsed time.

Collection letters were prepared and mailed by Payroll to all Good Neighbor Fund participants who had not yet paid their cash pledges for the year 1953. This work was done at the request of the Treasurer of the Fund.

In connection with the election of Trustees of the Good Neighbor Fund, Payroll arranged for preparation of mailing stickers and IBM listings of all participants in the Fund.

At the request of the Employee and Public Relations Department, Payroll distributed employee attitude survey questionnaires with pay checks of weekly paid employees on Friday, September 11. Questionnaires for monthly paid employees were delivered to department heads.

The importance of correct timekeeping was emphasized during September in conversations with supervisors who approved time cards which were not in accordance with the provisions of Organization and Policy Guide No. 18.1.

As a result of the change in rental rates effective October 1, 1953, Payroll prepared new master IBM deduction cards for weekly and monthly paid employees covering house, dormitory, and trailer space rent. These cards are used in making deductions from employees' salary checks.

Reimbursement Authorizations issued in September by Hanford Operations Office, Atomic Energy Commission, were as follows:

1. No. 209, authorizing patent award of one share of General Electric Company common stock, plus Federal withholding tax, to an employee upon the filing of a patent application for an invention made in accordance with the provisions of Section 11 of the Atomic Energy Act of 1946. This Reimbursement Authorization is a revision of Reimbursement Authorization No. 17.

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2. No. 211, authorizing revision of salary ranges for executive and administrative employees. This Reimbursement Authorization supersedes Reimbursement Authorization No. 200.

3. No. 212, authorizing revision of Reimbursement Authorization No. 207 dated July 24, 1953, to provide salary ranges for the classification Supervisor-in-Training and revised wording with respect to the 12 per cent overriding adjustment.

4. No. 213, authorizing a fund for the fiscal year 1954 for administering salaries under the Professional Salary Plan.

5. No. 214, with respect to Community firemen who are transferred to the Fire and Safety Unit of Plant Auxiliary Operations Department, authorizing their placement on the firemen automatic progression schedule in accordance with the time they were employed by General Electric as firemen.

6. No. 215, authorizing reclassification of employees in the Metal Preparation Section as a result of recent union agreements. This Reimbursement Authorization revised Reimbursement Authorization No. 203.

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Payroll Unit (continued)

STATISTICS

NUMBER OF EMPLOYEES	Total	Monthly Payroll	Weekly Payroll
Changes During Month			
Employees on Payroll at beginning of month	8 643	2 278	6 365
Additions and transfers in	89	11	78
Removals and transfers out	(183)	(18)	(165)
Transfers from weekly to monthly payroll		14	(14)
Transfers from monthly to weekly payroll		(2)	2
Employees on payroll at end of month	8 549	2 283	6 266

Number at month-end - by Payroll classifications	Sept.	August
Bargaining group - HAMTC	3 415	3 444
- Building Services	68	69
- Two Platoon Firemen	45	44
- Hanford Guards	461	465
Other weekly - non-bargaining	2 322	2 387
Executive, administrative and operating	1 777	1 761
Professional	461	473
Total	8 549	8 643

Number at month-end - by departments		
Engineering	1 533	1 560
Manufacturing	3 314	3 321
Plant Auxiliary Operations	2 079	2 109
Community Operations and Real Estate	436	455
Financial	336	332
Employee & Public Relations		
Technical Personnel	85	103
Other	117	112
Radiological Sciences	357	362
Medical	249	243
General	14	17
Law	5	5
Accountability	21	21
Property Management and Control	3	3
Total	8 549	8 643

OVERTIME PAYMENTS DURING MONTH		
Weekly Paid Employees	$55 294-a)	$45 754-b)
Monthly Paid Employees	19 313-c)	14 026-d)
Total	$74 607	$59 780

NUMBER OF CHANGES IN SALARY RATES AND JOB CLASSIFICATIONS	1 454	846

(a- Includes 4 weeks ended 9-20-53.
(b- Includes 4 weeks ended 8-23-53.
- Overtime worked during period August 1 through August 31, 1953.
(d- Overtime worked during period July 1 through July 31, 1953.

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Payroll Unit (continued)

GROSS PAYROLL PAID DURING MONTH	September	August
Engineering	$ 778 864	$ 824 578
Manufacturing	1 555 623	1 644 145
Plant Auxiliary Operations	829 090	878 749
Community Operations & Real Estate	185 260	200 904
Other	491 377	532 409
Total	$3 840 214 -a)	$4 080 785 -b)

ANNUAL GOING RATE OF PAYROLL		
Base Plus Overriding Adjustment	$45 081 690	$45 350 636
Overtime	886 844	750 875
Isolation Pay and Area Differential	1 926 758	1 918 460
Shift Differential	535 057	548 069
Total	$48 430 349	$48 568 040

AVERAGE HOURLY BASE RATES (Includes overriding adjustment)		
Bargaining group - HAMTC	$2.384	$2.379
- Building Services	1.761	1.766
- Two Platoon Firemen	2.250	2.259
- Hanford Guards	2.040	2.040
Other Weekly - non-bargaining	2.003	1.997
Executive, administrative and operating	3.361	3.349
Professional	3.643	3.612
Total	$2.527	$2.515

AVERAGE EARNINGS RATE PER HOUR	September -c)			August -c)		
	Weekly	Monthly	Total	Weekly	Monthly	Total
Engineering	$2.152	$3.508	$2.912	$2.135	$3.487	$2.881
Manufacturing	2.623	3.546	2.804	2.624	3.536	2.802
Plant Auxiliary Operations	2.245	3.263	2.389	2.237	3.266	2.380
Community Operations & Real Estate	2.271	2.943	2.492	2.235	2.947	2.455
Other	2.043	3.703	2.473	2.039	3.667	2.454
Total	$2.369	$3.478	$2.661	$2.360	$3.463	$2.646

(a- Includes payments for four-week period ended September 20, 1953, in the case of weekly paid employees.

(b- Includes payments for four-week period ended August 23, 1953, in the case of weekly paid employees. Also includes $238 397 retroactive portion of general salary increase effective June 10, 1953 for both Weekly and Monthly paid employees.

(c- Includes shift differential and isolation pay in the case of weekly paid employees and area differential in the case of monthly paid employees. Excludes overtime premiums, commissions, suggestion awards, etc.

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Payroll Unit (continued)

EMPLOYEE BENEFIT PLANS Participation in Benefit Plans at Month End	Number Eligible Sept.	Number Participation Sept.	Percent Participation Sept.	Aug.
Pension Plan	8 000	7 736	96.7%	96.3%
Insurance Plan				
Personal Coverage	8 538	8 450	99.0	98.9
Dependent Coverage	-	5 791	-	-
U. S. Savings Bonds				
Stock Bonus Plan	8 545	3 906	45.7	44.8
Savings Plan	8 545	1 007	11.8	11.5
Both Plans	8 545	4 473	52.3	51.2

Pension Plan	September	Total to Date
Number Retired	1	281-a)
Aggregate Annual Pensions Including Supplemental Payments	$122	$64 900-b)
Amount contributed by employees retired	306	85 508

(a- Includes 15 employees who died after reaching optional retirement age but before actual retirement. Lump sum settlements of death benefits were paid to beneficiaries in these cases.

(b- Amount before commutation of pensions in those cases of employees who received lump sum settlement.

	September	August
Number who became eligible for participation	87	98
Number who applied for participation	85	90
Number who elected not to participate	1	8
Replies not received	1	-

	September	Year to Date
Normal Retirement Pension Applications	1	14
Optional Retirement Pension Applications	-	10

Insurance Plan Claims - Death Benefits -c)	September	Total to Date
Number	4	132
Amount	$32 000	$823 013

Claim Payments - Accident & Health Insurance	September	August
Number of Checks	1 565	1 522
Number of Claims	991	892
Amount of Benefits	$ 80 119	$ 77 404
Total benefits paid since December 1, 1950 to date	$2 210 302	$2 130 183

(c- Total to date includes all claims under the old and new Insurance Plans and 10 deaths on which accidental death benefits were paid.

U. S. Savings Bonds Annual Going Rate of Deductions	September	August
G. E. Employees Savings and Stock Bonus Plan	$1 722 971	$1 723 113
G. E. Savings Plan	507 958	506 049
Total	$2 230 929	$2 229 162

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Payroll Unit (continued)

Employees Who Have Entered Military Service

	Total to Date				
	Called to Duty	Volunteered for Duty	Number Reactivated	Number Resigned-a)	Net
Reserve Officers	42	6	(8)	(1)	39
Enlisted Reserve	56	6	(23)	(2)	37
National Guard	7	-	(4)	-	3
Selective Service	84	-	(30)	(1)	53
Voluntary Enlistments	-	122	(4)	(5)	113
Total	189	134	(69)	(9)	245

(a- Employees who were removed from the roll to enter Military Service and subsequently had their continuous service broken.

Annuity Certificates (for duPont Service)	September	Total to Date
Number Issued	-	96

Suggestion Awards		
Number of awards	35	2 284
Total amount of awards	$480	$46 295

Patent Award Payments	September	Year to Date
Number of award	-	3
Amount	-	$75.00

PREFERENTIAL RATES	September	August
Number- Eliminated (Net)	3	8
Number Currently in Effect	666	669

Military Allowance Payments	September	Total to Date
Number	1	66
Amount	$405.29	$23 962.87

1253813

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INTERNAL AUDIT UNIT
MONTHLY REPORT
SEPTEMBER, 1953

Work continued on the audit of the operations of the Accounts Payable group of the General Accounting Unit which began in August (see August monthly report).

During the period September 14 to 26, 1953, an auditor visited National Carbon Company offices at Cleveland, Ohio, Clarksburg, West Virginia, and Columbia, Tennessee, to review production costs of graphite supplied under Special Agreement No. G-5. The review was made to evaluate the costs on which the graphite price proposed by National Carbon Company, for shipments after the first 40% of the contract quantity, was based. The agreement calls for two price redeterminations, one after 40% of the contract quantity has been shipped, and the other after 70% has been shipped.

Several auditors began an audit of Accounts Receivable - Telephone, maintained by the Accounts Receivable group of the General Accounting Unit, on September 16, 1953.

An audit of the overtime lunch program was begun on September 18, 1953.

An auditor was loaned to the SF Accountability Section for a period of two weeks to review a revised system of accounts for certain SF materials.

1253814

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PLANT PROTECTION SECTION

MONTHLY REPORT - SEPTEMBER 1953

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	Beginning of Month	End of Month	Increase	Decrease
Staff	2	2		
Administration Area Maintenance	61	61		
Security and Patrol	516	512		4 (a)
Safety and Fire Protection	154	154 (b)		
Office Unit (Laundry and Building Services, Clerical, and Records Control)	316	307		9 (c)
TOTALS	1,049	1,036		13

NET DECREASE: 13

(a) - Security and Patrol

2 - Reactivated
1 - Transferred out
3 - Deactivated
2 - Terminations

(b) - Safety and Fire Protection

1 - Transferred in
1 - Transferred out

(c) - Laundry and Building Services

1 - New Hire
2 - Reactivated
5 - Deactivated
2 - Terminations

Clerical Services

7 - New Hires
1 - Reactivated
10 - Transferred out
3 - Terminations

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SAFETY AND FIRE PROTECTION UNIT

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Injury Statistics

	AUGUST	SEPTEMBER	YEAR TO DATE	COMPARATIVE PERIOD, 1952
Major Injuries	2	0	10	14
Sub-Major Injuries	2	1	12	18
Minor Injuries	363	326	3,114	3,393
Exposure Hours	1,458,977	1,394,406	13,008,460	13,162,171
Major Injury F/R	1.37	0.00	0.77	1.06
Major Injury S/R	0.02	0.00	0.032	0.062
Penalty Days	0	0	75	375
Actual Days Lost	33	0	421	439
Minor Injury F/R	2.49	2.33	2.39	2.58
Estimated Medical Treatment Time Required	1,460 hours	1,304 hours	12,560 hours	13,716 hours

Industrial Fires

Department	Area	No. of Fires	Cause	Loss
Manufacturing Dept.	200-W	1	Combustibles too near heat and flame - grass fire	Nil
Manufacturing Dept.	200-W	1	Flammable liquids	$14.00
TOTALS		2		$14.00

Safety Activities

There were no major injuries during this period. Two sub-major injuries were recorded, both involving fractured fingers.

Six near serious accidents were investigated - four in Transportation and two in Separations Section.

There were 326 minor injuries during this period, which is a reduction of 37, or 10% improvement over August. This improvement showed up in seven of the ten areas.

The Area Injury Reduction Award contest is now being used at area staff safety meetings for the purpose of bringing to light the cause of excessive number of injuries and corrective action needed to prevent same.

All General Electric personnel has been moved from the Hanford High School area.

The 200-East area attained another no-lost-time-injury year at midnight September 3, 1953, making a total of eight years since startup without a lost time injury. The area also won the Area Injury Reduction Award for September.

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Four-year no-lost-time injury award pins were distributed to 200-East Area employees.

The study is continuing in the 200-West Area on respiratory equipment improvement by the committee with F. J. McKinnon as chairman.

The Metal Preparations group has moved from the 1717-D Maintenance Shop to the 300 Area. This move will relieve a crowded condition and should result in improved housekeeping in and around this building.

Fire Prevention Activities

Two fires occurred during the month causing a loss of $14.00.

The new 2101 Building's heat detector, automatic sprinkler system, and alarm boxes were tested and placed in service.

The three newly installed fire hydrants at the spare parts warehouse were tested and unsatisfactory conditions corrected.

An outside storage facility was recommended for the 234-5 Building laboratories.

Several water outages are being scheduled in the 200-East Area due to the tie-in of the Purex facilities.

The sprinkler and fire alarm systems in the new wing of the Central Stores has been put into service.

OFFICE UNIT

200-West Laundry	August	September
Pounds Delivered	181,342	196,785
Pounds Rewashed	5,540	11,365
Total Dry Weight	186,882	208,150
Monitoring Group		
Poppy Check - Pieces	195,669	173,947
Scaler Check - Pieces	239,621	244,936
Total Pieces	435,290	418,883
Rewash Pieces	5,773	14,284
700 Area Laundry		
Flatwork - Pounds	37,397	40,731
Rough Dry - Pounds	31,770	38,183
Finished - Pounds	2,252	2,258
Total Weight	71,419	81,172
Estimated Pieces	93,558	106,335

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The increased volume in the 200-West Laundry was due to a shutdown in 100-H Area during the month which required extra protective clothing.

Building Services

During the month of September the Saturday janitorial work was discontinued in certain of the plant buildings which will effect a savings of over $9,000 per year.

Clerical Services

Central Mail and Addressograph

The delivery of packaged "Registered Delivery" mail was transferred to Central Mail from Classified Files for the 700 and 1100 Areas on September 28, 1953, and was accomplished without missing a delivery service or encountering difficulties.

Postal and interoffice mail increased during the past period. Special delivery and registered mail also increased.

Types and Pieces of Mail Handled	September	August
Internal	1,807,976	1,801,928
Postal	92,733	79,853
Special	2,052	2,324
Total Mail Handled	1,902,761	1,884,105
Total postage used	$3,569.56	$3,124.58
Total Teletypes Handled	3,820	3,843
Total Store Orders Handled	817	587

Addressograph	September		August	
Type of List	Number of Runs	Total Copies	Number of Runs	Total Copies
Plant name list	108	253,818	97	137,568
Housing List	10	37,726	15	66,320
Payroll List	9	29,481	11	32,651
Total new plates	966		3,825	
Total corrected plates	3,861		1,672	
	4,827		5,497	

Office Equipment - Furniture

The AEC Property Section has advised Office Equipment that future requirements of office furniture will be supplied with surplus, used, refinished and new wood stock from Federal Services Administration. All materials are subject to inspection before accepting.

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Project furniture C-406 for 328 Building has been delivered with exception of a few desks and tables. It has been requested that the remaining stock be held for C-414 Project which is scheduled for the last week in November.

The following is a list of items and quantities of furniture handled during the month:

Item	Received by Credit S.O.	Issued	Salvaged
Blackboard	1	2	--
Bookcase	13	19	--
Chairs	124	258	42
Clock	--	3	--
Costumer	30	58	1
Card File	4	8	--
Cabinet	178	78	44
Desk	62	89	5
Table	24	31	2
Miscellaneous	8	14	1

Office Machines

Forty-three manual typewriters were released to AEC as surplus to our FY 1954 requirements. Twenty-five typewriters were scheduled for excess due to age and need of additional repair. Ten Brandt Cashier machines are being excessed from North Richland Bank.

The IBM inventory control listing of office machines is approximately 90% complete. Several miscellaneous detail functions need correcting before it will be an authentic document. Billings have been distributed with each unit receiving a copy of machines issued to departments, sections and units. The distribution of these sheets will serve as a monthly inventory record.

Justification to purchase one additional bookkeeping machine programmed to handle commercial electrical billings was received from the Financial Department. This machine will replace present IBM system of billing electrical accounts.

Office Machine Repair

Service calls for the month of September totaled 333. Blaw Knox had 26 calls and 700 Area had 174 calls.

Central Printing

The number of orders for printing this month fell short by 73 of the total received the previous month.

One large order representing the printing of 139,400 copies of Accident Prevention Bulletin was completed and delivered on schedule.

Work Completed	September	August
Orders Received	141	487
Orders Completed	357	448
Backlog	73	82
Copies Printed	1,351,701	2,006,905

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	September	August
Negatives Masked	692	1,108
Negatives processed	661	1,387
Photo copy prepared	231	264
Litho Plates processed	696	1,214

Stenographic Services

Five new employees were assigned to Stenographic Services in September - one steno typist and four stenographers. All five new employees appear to be highly qualified. Ten transfers were effected during the month and one employee terminated to reenter school. The working force has now been reduced to the point where additional transfers cannot be effected until additional employees are assigned to the group.

Twenty-eight temporary assignments were effected to other units. It is believed that loan requests will diminish appreciably now that the vacation season is almost past.

The work load was inconsistent throughout the entire month. Work was largely routine with the exception of a large number of rush jobs -- all of which were completed within the deadline dates specified. Assignments were charged against fifty-two different cost codes.

Breakdown of Hours	September	August
Dictation and Transcription	55	8
Machine transcription	19	36.5
Letters	12	32.5
Rough Drafts	44.5	56
Dittos, duplimats, xerography	298	300.5
Miscellaneous	230	299
Training Time	432.5	365.5
Meeting Time	4	4
Unassigned time	69	56
Vacation time	88	80
Total	1,252	1,238
Employees loaned to other departments	1,651	2,203.5
Total hours available	2,903	3,441.5

Area Mail and Duplicating

In order to provide better mail service, one mail stop was added in 190-H Building, 100-H Area and another was added in 100-K Area this month.

Arrangements were made which eliminated the mail stop at the pistol range. This mail will in the future be delivered to 100-H Patrol Headquarters. It was thus possible to reduce by one, the number of employees and vehicles assigned to the 100-F mail room.

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Space has been obtained in the 300 Area, 3760 Building, adjacent to the present Mail and Duplicating office which will permit Mail and Duplicating functions to be placed in separate offices. The space will also provide for efficient operation of the new mechanical backstripper. The backstripper and additional mail handling equipment are to be installed on October 1, 1953.

Duplicating and Mail Statistics	September	August
Orders received	2,908	3,864
Orders completed	2,797	3,752
Orders on hand	128	105
Offset plates	16,230	19,562
Offset copies	972,895	1,108,999
Stencils	334	572
Stencil copies	7,266	12,400
Ditto Masters	370	1,043
Ditto copies	9,506	32,050
Zerox Plates	963	1,248
Verifax masters	1,042	1,132
Verifax copies	2,537	2,788
Total Internal Mail	533,868	730,533

Records Control

Quantity of records received, processed and stored:

Engineering Department	46	standard	storage	cartons
Financial Department	81	"	"	"
HAPO Management	1	"	"	"
Manufacturing Department	16	"	"	"
Medical Department	32	"	"	"
Plant Auxiliary Operations Department	66	"	"	"
Radiological Sciences Department	11	"	"	"
Sub-contractors:				
Atkinson & Jones	153	"	"	"
Vitro Corporation	5	"	"	"
TOTAL	411	Standard	Storage	Cartons

Persons provided records service: 925

Cartons of records destroyed: 373

Records Cartons Issued: 239

Percentage of Records Service Center vault occupied by records is 82.8%.

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Thirty requests for file cabinets received. Twenty-six requests were filled, three requests were cancelled. Four requests for file cabinets are pending. Three fire-proof combination locked cabinets were picked up in exchange for key locked cabinets resulting in a savings of $450.00. ($225.00 cost of combination cabinet minus $75.00 cost of key locked cabinet equals $150.00 savings per cabinet exchanged)

Uniform filing was established in ten offices during the month. A total of 451 offices have installed the uniform filing system to date. Nine rechecks were made on established files.

Ten requests for authorization for records disposal were approved by the Atomic Energy Commission.

A visit was made to Vitro Corporation, New York, to make a sample audit of Vitro Corporation Security Accountability records pertaining to classified documents and drawings and prints created by Vitro under sub-contract G-148, and to arrange for transfer to General Electric of the remaining records pertaining to the sub-contract.

No errors were found in Vitro's security accountability records. The transfer of the remaining records pertaining to the sub-contract is being made by Vitro. The receipt by General Electric of these records will fulfill contract requirements except Vitro's Administrative and financial records which Vitro will retain in accordance with the provisions of the sub-contract.

ADMINISTRATION AREA MAINTENANCE UNIT

CA-504 Improved Lighting 760, 761, 762 Buildings: Work progressing satisfactorily, despite a three-week delay on part of contractor in procuring fixtures.

CA-525 Conversion of Basement, 5th Wing, 703 Building to Civil Defense Auxiliary Center: Utility tie-ins have been made.

AEC-114 New Transportation Facilities: Preliminary grading complete and footings run, on Phase I. Equipment arriving on schedule. Award made to Sound Construction on Phase II.

-- Alterations to 713 Building: Project Proposal still in hands of AEC.

AEC-111 Central Stores Warehouse: Completion date on fourth bay extended to October 15, 1953.

IR-147 Partitioning, 761 and 762 Buildings: Work completed with exception of rearrangement of radiators. Radiator parts received.

CA-434 Bio-Assay Laboratory: Phase I construction due for completion November 18, 1953. Understand bids to be opened on Phase II (utilities) October 13, 1953

Approximately twenty office moves were made during the month.

Steps were taken to supply water barrel service to excess yard buildings, to replace service formerly supplied by Kaiser Engineers.

Schedule was set up to stripe 700 Area parking lots.

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Preliminary schedule has been set up to cover interior cycle painting of major 700 Area buildings.

General Maintenance

The two 4" valves serving the irrigation pop-up sprinkler system for 703 and 705 Buildings were replaced. Old ones had been cut out by sand, and seepage was causing a soggy condition in the lawns.

Radiator valves in 703 Building are being repaired, with all discs and packing replaced. This work is performed once every four years.

Additional radiator end-sections have arrived and radiator replacements in 761 and 762 Buildings will be completed soon.

Test runs have been made of the 1131 Garage and Central Stores boilers and heating systems, and minor repairs made.

Banding of the 784 smoke stack and replacement of lightning rods and grounding cables are complete.

The turbine on No. 1 boiler feed pump and stokers on No. 1 and No. 2 boilers have been overhauled.

Several main line steam pits, which were below ground level, are being brought up to grade to prevent the pits from filling with water.

Two defective boiler tubes in the Central Stores boiler have been replaced by the contractor.

A number of miscellaneous jobs were completed for the hospital.

Fluorescent lights in 760 Building drafting room annex were cleaned and tubes replaced, to improve lighting efficiency.

The Mobile Civil Defense bus job is progressing. Some material has been received and additional shipments are expected in October.

Two carpenters worked two weeks in 300 Area assisting in the installation of 150 feet of Hauserman partitions and related work.

Dock and stair repair work is progressing on 3000 Area warehouses. Steel plate will be installed on the dock runways next week.

Stairs and landings for the 703, 761, and 762 Buildings were repaired and are being repainted. Several of the 4' x 4' rail posts were replaced.

Several new fire prevention signs were made, and dates changed on others, in preparation for Fire Prevention Week.

Steam Operation

Boiler at 1131 Area will be fired on a 24-hour basis starting October 5.

Heating steam was being supplied to most 700 Area buildings at the end of the month.

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No. 2 boiler at 784 Heating Plant was in service until September 9, when the load was transferred to No. 4 boiler. No. 2 boiler had been in continuous operation since December 2, 1952.

Only a few minor repairs remain to be performed on No. 3 boiler. No. 2 boiler will receive its regularly scheduled major overhaul.

Considerable attention has been directed this past summer to the boiler feed-water system in order to assure an adequate, dependable supply of water to the boilers at all times. Boiler feed-water regulators, pumps, and turbines have been thoroughly overhauled.

The quantity of steam generated at the 784 Heating Plant was 34.7% less than in September, 1952.

As of the close of the month substantially all of the main steam lines had been energized in preparation for the coming heating season.

Soft water sent to Kadlec Hospital averaged approximately 5,100 gallons per day.

Coal consumed:	514.60 net tons
Steam generated	7,719.0 M. lbs.
Steam leaving plant	6,561.1 M. lbs.
Steam delivered	4,833.1 M. lbs.
Total water softened	1,282,900 gallons
Total soft water sent to Kadlec Hospital	151,530 gallons
Total soft water sent to 784 Heating Plant	1,131,370 gallons

SECURITY AND PATROL UNIT

Document Report

Number of classified documents unaccounted for as of September 1, 1953: 413
(153 of the above 413 documents are chargeable to E. I. du Pont de Nemours & Company)

Number of classified documents recovered during the month of September: 12

Number of classified documents remaining unaccounted for as of October 1: 401
(153 of the above 401 documents are chargeable to E. I. du Pont de Nemours & Company)

The Non-Technical Document Review Board held three meetings during September and reviewed a total of 107 classified documents. Of this number -

20 were downgraded to "Restricted"
19 were downgraded to "Official Use Only"
13 were declassified
38 had their classification retained, and
17 were not within the scope of the Board.

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Security Education

Five security items appeared in the Works NEWS during the month.

There were 326 security meetings held and attended by 4,249 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:

"Signal 99" was shown at three meetings each with an average attendance of fifteen employees, or a total attendance of 45 people.

"The Defense Rests" was shown at four meetings each with an average attendance of thirty people.

"The Man on the Left" was shown at one meeting with 21 employees present.

"Sabotage" was shown at three meetings, each with an average attendance of 42 employees.

"Fitting 'U' Into Security" was shown at one meeting with 40 people present.

GE Security Bulletin No. 79 entitled "Security Slide Rule" was distributed on September 30.

Two thousand copies of the security "A-B-C" pamphlet with the slogan "Just Your Lunch" were distributed to all operations personnel during September.

The following security posters were posted during the reporting period:

450 copies of the large size poster bearing the slogan "Prevent Espionage" were posted in all the plant areas.

200 copies of the bus size poster with the same slogan were posted in the plant busses during September, 1953.

100 copies of the poster furnished by the Munitions Board, Washington, D. C., bearing the slogan "Be Sure It's Secure" were posted in the plant areas.

1,100 leaflets also furnished by the Munitions Board bearing the same slogan as the poster "Be Sure It's Secure" were distributed to employees.

Organization and Policy Guide No. 15.2 entitled "Departmental Security Meetings" was revised and issued during September.

Forty-four employees of the General Electric Company received a "Q" security orientation talk from either a representative of Security or a Security Patrol Supervisor during the month of September.

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Statistical Report of Security Patrol Activities

	100-B	100-D	100-F	100-H	100-K	200-E,W	300
Pat Searches	94	96	75	91	0	384	2
Escorts	4	4	21	27	23	50	62
Ambulance Runs	0	2	4	4	2	6	7
Passes Issued:							
One day temporary	78	13	7	19	2	28	42
Travel	3	0	0	0	0	0	71
Red Tag	0	94	27	57	0	534	114
Telephonic	12	0	0	0	15	0	6
Supervisors' post contacts	465	399	356	251	231	882	564
Security Patrol Activities computed by hours:							300 & 700
Security File Check	167	314	377.8	265.3	566	479	1,472
Building Check	191	70		4	579	448	768

Arrest Report

Violations	Number of Violations	Cont. Cases from August	Cases Cleared	Pending	Fined	Dismissed
Speeding	4	1	2	3	0	1
Public Intoxication	2	0	2	0	0	0
Passing in a "No Passing" Zone	0	1	1	0	0	0
Negligent Driving	1	0	1	0	1	0
	7	2	6	3	1	1

Citation tickets issued: 7

Security Patrol Training

211 Security Patrolmen received classroom instruction during the month of September.

227 Security Patrolmen attended Firearms Training during the month.

Safety Class	1/2 hour
Security Class	1 hour
Operations Class	3/4 hour

Security Patrol Post Changes

On August 31, 1953, the Area Building Roving foot patrol post in the 100-F Area was discontinued. This was a twenty-four hour post with one man assigned.

Two area rovers were discontinued September 1, in the 300 Area. These rover posts were manned twenty-four hours daily with one man assigned to each post.

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On September 1, a temporary construction post requiring one man twenty-four hours was established at the 105-KW, Corridor 9, 100-K Area.

Two men were assigned to a temporary construction post which was established September 9 at the 105-KW airlock, 100-K Area.

Field Inspection Activities

Contacts made to locate unaccounted for documents:	21
Searches conducted to locate unaccounted for documents:	9
File combinations changed :	9

General

The Frank Mayer Engineering Company of Los Angeles, with whom Special Agreement G-27 was made May 7, 1953, closed out its contract on September 18, 1953. Their contract was for engineering services here on site, and upon completing the work the employees of the Frank Mayer Engineering Company executed Security Termination Statements.

The Military Liaison Committee visited Hanford September 22 and 23, 1953. Visits to the plant areas were made and members of the committee attended a series of meetings.

Operation at the 2101 Building, 200-E Area, was put on a shut-down basis September 23, due to a strike of the members of the Machinists' craft.

Photo identification passes laminated and issued:	924
"Q" type badges assembled and distributed to the proper areas:	423
"A" badges received from the areas:	325
Visitor, construction and "Q" badges received from areas for repair:	55

Daily Log Entries - 2,735 additions and 383 withdrawals

"Q" clearances issued:	63
Formal "P" clearances issued:	27
"P" approvals granted and issued:	52

On the rephotographing project, the following photographs were processed by the Security Office during September:

Number of "A" badges	382
Number of "B" badges	2,219
Photos for passes	547
TOTAL	3,148

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HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING SEPTEMBER 30, 1953

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
ENGINEERING DEPARTMENT - ADMINISTRATION SECTION							
I. Visits to other Installations							
A. B. Greninger to: Knolls Atomic Power Lab. Schenectady. New York	Review of assistance to Hanford projects	K. H. Kingdon K. R. Van Tassel J. W. Belanger	9-28-53	10-1-53	X		
ENGINEERING DEPARTMENT - TECHNOLOGY SECTION							
I. Visitors to this Works							
R. C. Boldt Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss radiation experiments	J. A. Berberet	9-17-53	9-17-53	X		100-D XXX 100-H 105 300 XXX; 700
R. J. Carr Radiation Laboratory Berkeley California	Discuss Berkeley sample processing and forming chemical separations	E. M. Kinderman	8-10-53	9-5-53	X		200-W Redox, 222-T 300 XXX
S. E. Dismuke Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss hot laboratory problems	L. D. Turner	9-16-53	9-17-53	X		100-B 105-B 300-L XXX
M. J. Feldman Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss hot laboratory problems	L. D. Turner	9-16-53	9-17-53	X		100-B 105-B 300-L XXX
T. F. Fisher Knolls Atomic Power Lab. Schenectady, New York	Shutdown of KAPL-108 irradiations	J. A Berberet C. W. Gillard	9-28-53	10-9-53	X		100-D 105 100-H XXX 300 303; 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class	Restricted Data Unclass. Areas
E. R. Gaerttner Knolls Atomic Power Lab. Schenectady, New York	Consultation on reactor physics problems	J. E. Faulkner W. J. Ozeroff	9-14-53	9-16-53	X	100-B 105-C 100-D 105, 189 200-W Redox 300 XXX
K. H. Gayer Wayne University Detroit, Michigan	Mass spectometry work	G. J. Alkire	8-27-53	9-2-53	X	100-B 108 300 XXX
E. K. Hulet Radiation Laboratory Berkeley, California	Experiments in chemical separations	E. M. Kinderman	9-30-53	10-22-53	X	200-W 222-S 300 XXX
R. F. Koenig Knolls Atomic Power Lab. Schenectady, New York	Discussion on KAPL-114 and on corrosion and metallurgy laboratories	J. A. Berberet R. S. Dalrymple	9-23-53	9-24-53	X	100-B 105-C 100-H 105 200-E XXX 300 303
J. P. Scheuer National Lead Company Fernald, Ohio	9-H testing techniques	E. C. Wood	9-14-53	9-18-53	X	100-B 105-C 300 303 300-L 303
H. A. Saller Battelle Memorial Institute Columbus, Ohio	Discuss uranium alloys and coatings and corrosion	R. W. Benoliel E. A. Eschbach	9-15-53	9-16-53	X	100-B 105-C 200-E XXX 300 303; 700
J. B. Sampson Knolls Atomic Power Lab. Schenectady, New York	Consultation on reactor physics problems	J. E. Faulkner W. J. Ozeroff	9-14-53	9-19-53	X	100-B 105-C 100-D 105, 189 200-W Redox 300 XXX
A. F. Scott Reed College Portland, Oregon	Discuss separation of radio elements	A. H. Bushey	9-30-53	10-1-53	X	300 XXX
H. B. Stewart Knolls Atomic Power Lab. Schenectady, New York	Consultation on reactor physics problems	J. E. Faulkner W. J. Ozeroff	9-14-53	9-16-53	X	100-B 105-C 100-D 105, 189

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass Areas
T. M. Snyder Knolls Atomic Power Lab. Schenectady, New York	Discuss future reactor development	F. W. Albaugh W. J. Ozeroff	9-14-53	9-15-53	X	100-B 105-C 100-D 105, 189 200-W Redox 300 XXX
II. Visits to other Installations						
W. J. Bailey to: International Nickel Co. New York, New York	Conference on fuel fabrication and equipment	E. N. Skinner	9-15-53	9-15-53	X	
W. J. Bailey to: Knolls Atomic Power Lab. Schenectady, New York	Conference on fuel fabrication and equipment	K. H. Kingdon	9-16-53	9-17-53	X	
W. J Bailey to: Sylvania Electric Products Bayway, New Jersey	Conference on fuel fabrication and equipment	H. H. Hausner J. L. Zambrow	9-17-53	9-18-53	X	
J. A. Berberet to: Phillips Petroleum Co. Arco, Idaho	Consultation regarding Material Test Reactor slug exposure facility	W. B. Lewis	9-30-53	10-1-53	X	
A. G. Blasewitz to: Los Alamos Scientific Lab Los Alamos, New Mexico	Attend Air Cleaning Meeting sponsored by AEC	- -	9-20-53	9-23-53	X	
L. P. Bupp to: National Carbon Co. Clarkesburg, West Virginia	Consultation on manufactur of graphite-reactor grade	V. C. Hamister E. H. Wells	9-17-53	9-18-53	X	
L P. Bupp to: Brookhaven National Lab. Upton. Long Island, New York	Attend symposium on irradiation effects in graphite	G. J. Dienes	9-14-53	9-16-53	X	
J. J. Cadwell to: Phillips Petroleum Co. Arco, Idaho	Consutation regarding Material Test Reactor slug exposure facility	W. B. Lewis	9-30-53	10-1-53	X	
A. B. Carson to: Los Alamos Scientific Lab Los Alamos, New Mexico	Consultation on relationship of LA specifications to Hanford exposure	J. Hall	9-8-53	9-9-53	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
A B. Carson to: North American Aviation Downey, California	Discuss reactor safety development program	N. E. Huston C. Starr	9-10-53	9-11-53	X		
E. A. Eschbach to: Argonne National Lab. Chicago, Illinois	Consultation on fuel element development program	F. Foote	9-14-53	9-15-53	X		
E. A. Eschbach to: Battelle Memorial Inst Columbus, Ohio	Consultation on fuel element development program	H. R. Nelson	9-15-53 4-1-53	9-16-53 10-1-53	X X		
E. A. Eschbach to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on fuel element development program	K. H. Kingdon C. E. Lacy D. W White	9-16-53 4-1-53	9-25-53 10-1-53	X X		
E. A. Eschbach to: U. S. Atomic Energy Comm. New York, New York	Consultation on fuel element development program	R. L. Kirk	9-17-53	9-18-53	X		
E. A. Eschbach to: General Engineering Lab. Schenectady, New York	Consultation on fuel element development program	C. W. George	9-16-53	9-25-53	X		
E. A. Eschbach to: Sylvania Electric Products Bayside, New Jersey	Consultation on fuel element development program	H. H. Hausner	9-17-53 4-1-53	9-18-53 10-1-53	X X		
E A. Eschbach to: Ames Laboratory Ames, Iowa	Consultation on fuel element development program	F. H. Spedding	4-1-53	10-1-53	X		
W. S. Figg to: Mallinckrodt Chemical Wks. St. Louis, Missouri	Discuss continuous fluorination methods	C. D. Harrington	9-29-53	9-30-53	X		
W. S Figg to: New Brunswick Lab. New Brunswick, New Jersey	Discuss continuous fluorination methods	C. J. Rodden	10-1-53	10-2-53	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class	Restricted Data Unclass	Areas
W. S. Figg to: Institute for Atomic Research Ames, Iowa	Discuss continuous fluorination methods	F. H. Spedding	9-28-53	9-28-53	X		
J. M. Fouts to: General Eng. Lab. Schenectady, New York	Conference for design of underwater weighing equipment	J. L. Matrone	9-9-53	9-10-53	X		
O. H. Greager to: Knolls Atomic Power Lab. Schenectady, New York	Review of assistance to Hanford projects	J. W. Belanger K. H. Kingdon	9-29-53	9-30-53	X		
O. H. Greager to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Review specifications for Hanford shipments to Rocky Flats	F. H. Langell	10-1-53	10-2-53	X		
D C. Kaulitz to: Phillips Petroleum Co. Arco, Idaho	Consultation regarding Material Test Reactor exposure facility	W. B. Lewis	9-30-53	10-1-53	X		
G. R. Kiel to: Radiation Laboratory Berkeley, California	Discuss engineering and chemical technology pertaining to separations processes	S. G. Thompson	9-17-53	9-18-53	X		
G. R. Kiel to: Cal. Research & Dev. Co. Livermore, California	Discuss separations process development	T. E. Hicks	9-17-53	9-18-53	X		
W. T. Kattner to: Feed Materials Production Center National Lead Company Fernald, Ohio	Metal quality discussions and development of uranium fabrication techniques	G. W. Wunder	7-20-53	1-1-54	X		
W. T. Kattner to: Argonne National Lab. Chicago, Illinois	Metal quality discussion and development of uranium techniques	B. W. Dunnington	7-20-53	1-1-54	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: Mallinckrodt Chemical Wks. St. Louis, Missouri	Metal quality discussions and development of uranium fabrication techniques	W. M. Leaders C. D. Harrington	5-10-53	1-1-54	X		
G. E. McCullough to: Argonne National Lab. Chicago, Illinois	Discuss fuel element development program	F. G. Foote	9-14-53	9-15-53	X		
G. E. McCullough to: Battelle Memorial Inst. Columbus, Ohio	Discuss fuel element development program	H. R. Nelson	9-15-53	9-16-53	X		
G. E. McCullough to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element development program	K. H. Kingdon	9-16-53	9-25-53	X		
G. E. McCullough to: U. S. Atomic Energy Comm. New York, New York	Discuss fuel element development program	R. L. Kirk	9-17-53	9-18-53	X		
G E. McCullough to: General Engineering Lab. Schenectady, New York	Discuss fuel element development program	C. W. George	9-16-53	9-25-53	X		
G. E. McCullough to: Sylvania Electric Products Bayside, New Jersey	Discuss fuel element development program	H. H. Hausner	9-17-53	9-18-53	X		
W. W. Marshall to: Argonne National Lab Chicago, Illinois	Consultation on spectrochemical analysis	M. Fred	9-8-53	9-12-53	X		
J. E. Meinhard to: Argonne National Lab. Chicago, Illinois	Discuss electrochromatography	H. H. Strain	9-14-53	9-15-53	X		
J E. Meinhard to: Ames Laboratory Ames, Iowa	Discuss electrochromatography	F. H. Spedding	9-15-53	9-15-53	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class	Restricted Data Unclass	Areas
P. H. Reinker to: Los Alamos Scientific Lab Los Alamos, New Mexico	Consultation on relationship of LA specifications to Hanford exposure	J. Hall	9-8-53	9-9-53	X		
P. H. Reinker to: North American Aviation Co. Downey, California	Discuss reactor safety Development program	N. E. Huston	9-10-53	9-11-53	X		
W. C. Riley to: Brookhaven National Lab. Upton, Long Island, New York	Symposium on radiation damage in graphite	G. J. Dienes	9-14-53	9-16-53	X		
W. C. Riley to: Battelle Memorial Inst. Columbus, Ohio	Coordination of Hanford and Battelle graphite programs	H. Z. Schofield W. A. Hedden	9-17-53	9-18-53	X		
J. D. Sprowl to: International Nickel Co. New York, New York	Conference on fuel fabrication and equipment	E. N. Skinner	9-15-53	9-15-53	X		
J. D. Sprowl to: Sylvania Electric Products Bayside, New Jersey	Conference on fuel fabrication and equipment	H. H. Hausner J. L. Zambrow	9-17-53	9-18-53	X		
J. D. Sprowl to: Knolls Atomic Power Lab. Schenectady, New York	Conference on fuel fabrication and equipment	D. W. White C. E Lacy	9-16-53	9-17-53	X		
C. E. Wade to: Phillips Petroleum Co. Arco, Idaho	Consultation regarding Material Test Reactor slug exposure facility	W. B. Lewis	9-30-53	10-1-53	X		
M. T. Walling, Jr. to: Argonne National Lab. Chicago, Illinois	Discuss spearations chemistry	W. M Manning	9-14-53	9-25-53	X		
M. T. Walling, Jr to: Oak Ridge National Lab Oak Ridge, Tennessee	Discuss separations chemistry	F. W. Hurd F. Bruce	9-21-53	10-2-53	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass	Areas
A. T. Whatley to: Brookhaven National Lab. Upton, Long Island, New York	Symposium on radiation damage in graphite	G. J. Dienes	9-14-53	9-16-53	X		
R E. Woodley to: Brookhaven National Lab Upton, Long Island, New York	Symposium on radiation damage in graphite	G. J. Dienes	9-14-53	9-16-53	X		
M Altman to: Aircraft Nuclear Propulsion Project (personnel) Arco, Idaho	Consultation on heat	H. Lichtenberger	9-3-53	9-4-53	X		
P. F. Gast to: California Research & Development Livermore, California	Discuss reactor develop-	J. Q. Cope	8-10-53	9-12-53	X		
A. W. Thiele to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Discuss technical problems on neutron spectrum measurements	J. M B. Kellogg	8-31-53	9-1-53	X		
ENGINEERING DEPARTMENT - DESIGN SECTION							
I. Visits to other Installations							
R. H. Beaton to: Knolls Atomic Power Lab. Schenectady, New York	Review of assistance to Hanford Projects	J. W Belanger K. R. Van Tassel	9-28-53	9-30-53	X		
R. H Beaton to: General Engineering Lab. Schenectady, New York	Review of assistance to Hanford Projects	K H. Kingdon	9-28-53	9-30-53	X		
R. C. Mann to: Aircraft Nuclear Propulsion Project Arco, Idaho (personnel)	Engineering studies and evaluation on colored television chains and details of graphic panelboards	J. M. Frame J. H. Julien	9-10-53	9-10-53	X		
R C. Mann to: Aircraft Nuclear Propulsion Project Cincinnati, Ohio	Engineering studies and evaluation on colored television chains and d hic panelboards	J. S. Parker	9-11-53	9-12-53	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass	Areas
R. C Mann to: Vitro Corporation of America New York, New York	Engineering studies and evaluation on colored television chains and details of graphic panelboards	J. C. Tourek	9-14-53	9-18-53	X		
ENGINEERING DEPARTMENT - PROJECT SECTION							
I. Visits to other Installations							
M G Patrick to: General Engineering Lab. Schenectady, New York	Design of underwater examination equipment	E S. Baker J. M. Brown	9-9-53	9-11-53	X		
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT							
I. Visits to other Installations							
F Clagett to: California Research & Development Livermore, California	Nuclear engineering problems for personnel transfers	J D. Cravath	8-31-53	9-1-53	X		
W J Harty to: California Research & Development Livermore, California	Nuclear engineering problems for personnel transfers	J. D. Cravath	8-31-53	9-1-53	X		
D. W. McLenegan to: Radiation Laboratory Berkeley, California	Progress in atomic energy engineering and personnel discussions	G. Everson	9-24-53	9-25-53	X		
R. C. Mann to: Aircraft Nuclear Propulsion Project Cincinnati, Ohio	Engineering design and instrumentation problems	J. S. Parker	9-11-53	9-12-53	X		
C. N. Gross to; General Engineering Lab. Schenectady, New York	Review of assistance to Hanford Projects	K. H. Kingdon	9-28-53	9-30-53	X		
C N. Gross to: Knolls Atomic Power Lab. Schenectady, New York	Review of assistance to Hanford Projects	K. R Van Tassel J. W Belanger	9-28-53	9-30-53	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
MANUFACTURING DEPARTMENT							
I. Visitors to this Works							
R A. Ahrens Knolls Atomic Power Lab. Schenectady, New York	Training and assistance in 100 Areas	J. W. Baker E. T. O'Sullivan W. N. Koop D. S Lewis	7-13-53	9-5-53	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231, Redox, 221-U 300 303
J. H Christensen Knolls Atomic Power Lab. Schenectady. New York	Training and assistance in 100 Areas	J. W. Baker E. T. O'Sullivan W. N. Koop D. S Lewis	7-13-53	9-5-53	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231. Redox, 221-U 300 303
M. Duck Knolls Atomic Power Lab Schenectady. New York	Training and assistance in 100 Areas	J. W Baker E. T. O'Sullivan W. N. Koop D. S. Lewis	7-13-53	9-5-53	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231, Redox, 221-U 300 303
T J. Henry Knolls Atomic Power Lab. Schenectady, New York	Training and assistance in 100 Areas	J. W Baker E. T. O'Sullivan W. N. Koop D. S. Lewis	7-13-53	9-5-53	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231, Redox, 221-U 300 303
W. R. Johnson Knolls Atomic Power Lab. Schenectady, New York	Training and assistance in 100 Areas	J. W. Baker E T. O'Sullivan W. N. Koop D. S. Lewis	7-13-53	9-5-53	X		100-B 105-B 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231, Redox 231-U 300 03

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class	Restricted Data Unclass	Areas
E E. Kazmierczak Knolls Atomic Power Lab Schenectady. New York	Training and assistance in 100 Areas	J. W. Baker E. T. O'Sullivan W. N Koop D. S. Lewis	7-13-53	9-5-53	X	100-B 105-B. 105-C 100-D 105 100-F 105 100-H 105	
			8-19-53	8-19-53	X	200-W 231, Redox, 221-U 300 303	
W B Leng Knolls Atomic Power Lab. Schenectady New York	Training and assistance in 100 Areas	J W. Baker E T. O'Sullivan W. N. Koop D S Lewis	7-13-53	9-5-53	X	100-B 105-B 105-C 100-D 105 100-F 105 100-H 105	
			8-19-53	8-19-53	X	200-W 231 Redox, 221-U 300 303	
J. J Rasmussen Jr. Knolls Atomic Power Lab. Schenectady, New York	Training and assistance in 100 Areas	J. W Baker E. T. O'Sullivan W. N. Koop D. S Lewis	7-13-53	9-5-53	X	100-B 105-B 105-C 100-D 105 100-F 105 100-H 105	
			8-19-53	8-19-53	X	200-W 231 Redox 221-U 300 303	
J W. Richards Knolls Atomic Power Lab Schenectady, New York	Training and assistance in 100 Areas	J W Baker E. T O Sullivan W. N Koop D. S. Lewis	7-13-53	9-5-53	X	100-B 105-B. 105-C 100-D 105 100-F 105 100-H 105	
			8-19-53	8-19-53	X	200-W 231, Redox, 221-U 300 303	
T. M. Shepherd Knolls Atomic Power Lab Schenectady. New York	Training and assistance in 100 Areas	J. W. Baker E. T O'Sullivan W. N. Koop D. S. Lewis	7-13-53	9-5-53	X	100-B 105-B 105-C 100-D 105 100-F 105 100-H 105	
			8-19-53	8-19-53	X	200-W 231, Redox 221-U 300 303	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
J. W. Stacey Knolls Atomic Power Lab. Schenectady, New York	Training and assistance in 100 Areas	J. W. Baker E.T. O'Sullivan W. N. Koop D S. Lewis	7-13-53	9-5-53	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231 Redox, 221-U 300 303
R L. Teal Knolls Atomic Power Lab. Schenectady New York	Training and assistance in 100 Areas	J. W. Baker E. T. O'Sullivan W N Koop D. S. Lewis	7-13-53	9-5-53	X		100-B 105-B. 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231. Redox, 221-U 300 303
L. M. Warner Knolls Atomic Power Lab. Schenectady, New York	Training and assistance in 100 Areas	J. W. Baker E. T. O'Sullivan W. N. Koop D. S Lewis	7-13-53	9-5-53	X		100-B 105-B. 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231, Redox, 221-U 300 303
J. Yankovich Knolls Atomic Power Lab. Schenectady, New York	Training and assistance in 100 Areas	J. W. Baker E. T O'Sullivan W. N. Koop D. S Lewis	7-13-53	9-5-53	X		100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231, Redox, 221-U 300 303
G. L. Yeo Knolls Atomic Power Lab. Schenectady, New York	Training and assistance in 100 Areas	J W. Baker E. T O'Sullivan W. N. Koop D. S. Lewis	7-13-53	9-5-53	X		100-B 105-B. 105-C 100-D 105 100-F 105 100-H 105
			8-19-53	8-19-53	X		200-W 231 Redox 221-U 300 303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass. Areas
A. V McKeon Navy Reactor Group Schenectady. New York	Training for responsibilities of radiation protection for Submarine Intermediate Reactor for US Navy	P. C Jerman L. V. Barker J. G. Myers A R. Keene	7-13-53	9-3-53	X	100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105 200-E 201-C 200-W 221-T, 221-U Redox 300 303
M W. Tucker Navy Reactor Group Schenectady, New York	Training for responsibilities of radiation protection for Submarine Intermediate Reactor for US Navy	P. C. Jerman L. V. Barker J. G. Myers A. R. Keene	7-13-53	9-3-53	X	100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105 200-E 201-C 200-W 221-T, 221-U Redox 300 303
R. S. Fasoldt Knolls Atomic Power Lab. Schenectady New York	Training and assistance at Hanford for reactor services	J. W. Baker	9-21-53	9-25-53	X	100-B 105-B, 105-C 100-D 105, 189 100-F 105 100-H 105 200-E 2101
G W. Wallace Knolls Atomic Power Lab. Schenectady, New York	Training and assistance at Hanford for reactor services	J. W. Baker	9-21-53	9-25-53	X	100-B 105-B, 105-C 100-D 105 189 100 F 105 100-H 105 200 E 2101
G. W. Wunder National Lead Company Fernald, Ohio	Discuss production schedules	J. E. Maider	9-18-53	9-18-53	X	300 303 700

II. Visits to other Installations

H. A. Carlberg to: General Engineering Lab. Schenectady New York	Review of assistance on Hanford Projects and inspect reactor construction	K. H. Kingdon E. S. Baker E. P. Lee	9-28-53	9-28-53	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
T. W. Hauff to: Knolls Atomic Power Lab. Schenectady, New York	Review and discuss fuel element and reactor development and radiation monitoring practices	L. L. German E. P. Lee J. J. Burke	9-29-53	10-1-53	X		
T W. Hauff to: General Engineering Lab. Schenectady, New York	Review of assistance to Hanford Projects	K. H. Kingdon	9-28-53	9-28-53	X		
I. Visitors to this Works (cont'd)							
P. B. K'Burg E. I. du Pont de Nemours & Co Savannah River Works Aiken, South Carolina	Observe radiation monitoring activities in Reactor Section	P. C. Jerman J. G Myers	9-22-53	9-23-53	X		100-H XXX, 100-B 105-C
Ja-27 MANAGEMENT							
I. Visitors to this Works							
L. J. D'Antonio U. S. Atomic Energy Comm. Washington, D. C.	Re-evaluate SF material requirements	V. D. Donihee C. J. Shortess	9-15-53	10-2-53	X		All Areas-All Bldgs.
D. E. George U. S. Atomic Energy Comm. Washington, D. C.	Re-evaluate SF material requirements	V. D. Donihee C J. Shortess	9-15-53	10-2-53	X		All Areas-All Bldgs.
W. E. Gilbert U. S. Atomic Energy Comm. Washington, D C.	Re-evaluate SF material requirements	V. D. Donihee C. J. Shortess	9-15-53	10-2-53	X		All Areas-All Bldgs.
R F Lumb U. S. Atomic Energy Comm. Washington, D C.	Re-evaluate SF material requirements	V.D. Donihee C. J. Shortess	9-15-53	10-2-53	X		All Areas-All Bldgs.
D. F McCarthy U. S. Atomic Energy Comm. Washington, D. C.	Re-evaluate SF material requirements	V. D. Donihee C J. Shortess	9-15-53	10-2-53	X		All Areas-All Bldgs.

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
D. F. Musser U. S. Atomic Energy Comm. Washington, D. C.	Re-evaluate SF material requirements	V. D. Donihee C. J. Shortess	9-15-53	10-2-53	X		All Areas-All Bldgs.
W. M. Swinton U. S. Atomic Energy Comm. Washington, D C.	Re-evaluate SF material requirements	V. D. Donihee C. J. Shortess	9-15-53	10-2-53	X		All Areas-All Bldgs.

RADIOLOGICAL SCIENCES DEPARTMENT

I. Visitors to this Works

P. K'berg E. I. du Pont de Nemours & Co. Savannah River Works Aiken, South Carolina	Consult on health physics problems	W. A. McAdams	9-14-53	9-25-53	X		300 XXX 100-B 108 200-W XXX 700

Ja-28

II. Visits to other Installations

F. E Adley to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Attend air cleaning meeting	H. Schulte	9-21-53	9-23-53	X		
D. W. Pearce to: Knolls Atomic Power Lab. Schenectady, New York	Review assistance to Hanford projects	K. H. Kingdon	9-28-53	9-29-53	X		
J. De Pangher to: Radiation Laboratory Berkeley, California	Discuss neutron measurements, scintillation counting and time of flight techniques	W. Powell B. Linlor	9-8-53	9-9-53	X		
H. A. Kornberg to: General Engineering Lab Schenectady, New York	Review of assistance to Hanford projects	K. H. Kingdon	9-28-53	9-29-53	X		
H. M Parker to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on radiation protection organization	K. R. Van Tassel L. L. German	9-23-53	9-25-53	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
H M Parker to: Aircraft Nuclear Propulsion Project Cincinnati, Ohio	Consultation on radiation protection	D. R Shoults J. S. Parker	9-29-53	10-2-53	X		
H. M. Parker to: Donner Laboratory Berkeley, California	Attend Bio-Medical Director's Meeting on biophysics and biology	J. H. Lawrence J. C. Bugher	10-5-53	10-8-53	X		
D. W. Pearce to: General Engineering Lab. Schenectady, New York	Review of assistance to Hanford projects	K. H. Kingdon	9-28-53	9-28-53	X		
R. C. Thompson to: Argonne National Lab. Chicago, Illinois	Inspect biological experiments with tritium, plutonium toxicity and therapy	A M. Brues W. Manning	9-7-53	9-11-53	X		
M. H. Weeks to: Argonne National Lab. Chicago, Illinois	Inspect biological experiments concerning plutonium toxicity and therapy	A M Brues	9-7-53	9-11-53	X		
PLANT AUXILIARY OPERATIONS DEPARTMENT- ADMINISTRATIVE							
I. Visits to other Installations							
H. D. Middel to: General Engineering Lab. Schenectady, New York	Review of assistance to Hanford Projects	K. H. Kingdon	9-28-53	9-28-53	X		
H. D. Middel to: Knolls Atomic Power Lab. Schenectady, New York	Review of assistance to Hanford projects	K. R. Van Tassel J. W. Belanger	9-28-53	9-30-53	X		
PLANT AUXILIARY OPERATIONS DEPARTMENT-STATISTICS AND COMPUTATIONS							
I. Visitors to this Works							
J. H. Davidson General Engineering Lab Schenectady, New York	Study statistical methods as applied at Hanford	B. F. Butler	9-9-53	9-9-53	X		100-D 105 100-F 108 200-W Redox 300-L 303

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PURCHASING AND STORES SECTION
PLANT AUXILIARY OPERATIONS DEPARTMENT
SUMMARY - SEPTEMBER 1953

Instructions were received from A.E.C. to screen all requisitions for stainless steel through Kaiser Engineers and Blaw-Knox. This procedure is effective October 1, 1953.

Through negotiations with Byron-Jackson Pump Company the FOB terms on HWC 1108 were changed which allowed the use of a reduced rail freight rate from Los Angeles, Calif., to the Project. The savings in freight charges will approximate $1250.

Our appeal for reinstatement of the original directed date for delivery of the four heavy transformers for the 100-K Area resulted in a new General Electric Company promise of the original date (January 1954) on the first unit and improved delivery on the balance.

As a result of a trip to Los Angeles, Calif., by G. E. representatives a very substantial improvement in delivery dates of a D-12 pot and a series of process pumps was arranged.

The movement of Standby material from 100-B Area to 100-H Area was completed thus eliminating a serious fire hazard to this very important class of material. The long recognized fire hazard in 200-W Area storage still exists, and there appears to be no building immediately available for a move.

As a direct result of the Stock Adjustment Request program (assignment of departmental responsibility for Standby items and Spare Equipment Held in Storage) 92 Declarations of Excess were prepared covering 913 items for an approximate value of $61,049. The total number of items removed from stock is now 1235 valued at about $103,427.

Screening of requisitions issued by the project for direct charge purchases and for construction contractors' procurement is being handled more rapidly through Stores as all screening is done in Surplus Material Records. This eliminates an extra processing at Central Stores.

The number of requisitions issued by General Supplies Records for stock replenishment has decreased from 750 per month to about 500 per month in September through more careful analysis and use of the ABC system of inventory control. This reduction will result in a decrease of purchase orders required and shipments to be received.

The fourth bay, Unit D, of Central Stores Warehouse was accepted from the contractor September 29, 1953.

Organization & Personnel	8-31-53	9-30-53	Change
Employees on Roll	287	278	-9

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PURCHASING AND STORES SECTION
ADMINISTRATION UNIT
SEPTEMBER 1953

Due to the strike at General Electric Company's Pittsfield plant, the directive issued in February, 1953 for delivery of four heavy transformers for 100-K Area was set back by approximately one month. Our appeal for reinstatement of the original directed date resulted in a new General Electric promise for the original directed date on the First Unit and improved delivery on the balance. This promise was obtained through negotiation between Washington, A.E.C and General Electric Company.

A marked increase in interest has been shown during the month in the A.E.C. emergency stock of stainless steel pipe, tubing, bar, plate and sheet held by Tube Sales and Edgcomb Steel Company.

The following table shows the dollar value of business, by cost category, and the number of procurement actions placed with different types of vendors. Dollar amounts are based on the net value of purchase orders and alterations as transmitted to A.E.C.:

September 1953	VENDOR TYPE			
Cost Category	Government Agency	Small Business	Big Business	Educational and other
$0 - $ 24.99	$ 22.00	$ 3,071.34	$ 1,614.23	$ 81.47
$25 - $ 499.99	780.00	67,537.76	36,866.03	106.47
$500 - $ 24,999.99	———	172,976.64	188,663.27	———
$25,000 - $ Up	———	324,800.00	565,231.90	———
	$802.00	$568,385.74	$792,375.43	$187.94
Number of Actions	4	1,013	556	11

Vendor Contacts	175
Claims Processed	1
Damage Reports Processed	9
Over & Short Report Processed	6
Accounts Payable Requests Handled	341
Difference Slips Processed	43
Clearance Slips & Purchase Order Change Approvals	236
Material Exception Reports	225
Return Orders Issued	135

Shown below is a summary of the net value of procurement actions placed with vendors for manufactured or shelf items in the states of Wash., Oregon, Idaho and Other Areas.

State	Manufactured	Shelf	Total
Washington	$ 416,299.93	$113,539.35	$ 529,839.28
Oregon	113,312.71	36,541.08	149,853.79
Idaho	———	———	———
Other	605,581.16	76,476.88	682,058.04
Total	$1,135,193.80	$226,557.31	$1,361,751.11

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PURCHASING AND STORES SECTION
ADMINISTRATION UNIT
SEPTEMBER 1953

	G	D	Total
Requisitions on hand 9-1-53			
Operations Procurement	550	0	550
Construction Procurement	0	134	134
A.E.C. Procurement	127	41	168
Total	677	175	852
Requisitions Assigned during September			
Operations Procurement	1597	0	1597
Construction Procurement	0	271	271
A.E.C. Procurement	302	37	339
Total	1899	308	2207
Requisitions Placed during September			
Operations Procurement	1487	0	1487
Construction Procurement	0	287	287
A.E.C. Procurement	196	48	244
Total	1683	335	2018
Requisitions on hand 9-30-53			
Operations Procurement	660	0	660
Construction Procurement	0	118	118
A.E.C. Procurement	233	30	263
Total	893	148	1041

Purchase Orders Placed	HW	HWC
Operations Procurement	1228	
Essential Material	32	
Construction Procurement		207
Local Purchase	8	5
Total	1268	212

Value of purchase Orders Placed		
Operations Procurement	$ 432,849.20	
Essential Material	512,742.80	
Construction Procurement		$ 344,495.13
Local Purchase	31.96	25.04
Total	$ 945,623.96	$ 344,520.17

Alterations Issued	Increase	Decrease	No Change	Total
HW Operations	47	35	1	83
Essential Material	5			5
HWC Construction	17	8	4	29
Total	69	43	5	117

Vaule of Alterations Issued	Increase	Decrease	Total
HW Operations	$ 6,190.35	$ 7,758.40	$ 13,948.75
Essential Material	11,672.24		11,672.75
HWC Construction	72,830.00	11,270.21	84,100.21
Total	$90,692.59	$19,028.61	$109,721.20

Government Transfers	OR	ORC
	1	0

Organization & Personnel	8-31-53	9-30-53	Change
Employees on Roll	30	27	-3

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PURCHASING AND STORES SECTION
CONSTRUCTION PROCUREMENT UNIT
SEPTEMBER, 1953

Instructions have been received from the Atomic Energy Commission, dated September 21, 1953 subject "Procedure for Utilization of CPFF Construction Contractors Stainless Steel". This procedure requested that we screen all purchase requisitions for stainless steel through Kaiser Engineers and Blaw-Knox. This is being put into effect as of October 1.

Expediting assistance was requested through the A.E.C. on purchase order HWC 1707 for four 30/40/50,000 KVA, 3 phase, 220 KV transformers and the delivery of the first transformer has been reinstated to January 1954.

During the month of September requisitions assigned to the Construction Procurement Unit decreased 8% over August. Requisitions placed during the month of September increased 1% over August. Requisitions on hand at the end of September were approximately 12% less than those on hand at the end of August.

Organization and Personnel

	8-31-53	9-30-53	Change
Employees on Roll	12	12	0

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PURCHASING AND STORES SECTION
OPERATIONS PROCUREMENT UNIT
SEPTEMBER - 1953

Statistical and General

Incoming requisitions have increased slightly in quantity over last month and the residual workload of the unit has increased proportionately. It is still subnormal but if the rate of increase continues, it should reach normal levels within 4 to 6 weeks.

Negotiations are continuing with General Chemical Division, Allied Chemical & Dye, on the modification of the ANN contract. Several points remain to be cleared to the satisfaction of all concerned.

Essential Materials contracts in process are as follows:

1. Methyl Isobutyl Ketone - not yet returned from the Commission; promised first week in October.

2. Steam Coal - approval has been received from the Commission for the placement of Item 1 (approximately 100,000 tons for delivery via the Milwaukee Railroad) with Bair-Collins Company, Roundup, Montana. Approval has been given to begin shipments immediately and the contract will be negotiated as soon as possible.

3. Sodium Bismuthate - supplemental contract for increased quantity has been negotiated with General Chemical and ready for G. E. approvals.

4. Sodium Dichromate - supplemental contract negotiated; approval received from Commission, and in force.

5. Chlorine - supplemental contract negotiated; on-plant approval secured; ready for submission to General Manager for approval. Bids have been received from vendors covering our requirements for the coming year and are being reviewed.

6. Lime - bids from vendors covering our requirements for the coming year have been received and are being reviewed.

Organization and Personnel

	8/31/53	9/30/53	Change
Employees on roll	32	32	-0-

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PURCHASING AND STORES SECTION
STORES UNIT
SEPTEMBER 1953

Statistical and General

The review of Automotive Parts for Excess items was completed. Material valued at $30,192 was approved and cleared as excess of which $16,337 has been transfered to the Excess Account.

The movement of Standby material from 100-B Area to 100-H Area was completed thus eliminating a serious fire hazard to this very important class of material. The long recognized fire hazard in 200-W Area storage still exists, and there appears to be no building immediately available for a move.

As a direct result of the Stock Adjustment Request program (assignment of departmental responsibility for Standby items and Spare Equipment Held in Storage) 92 Declarations of Excess were prepared covering 913 items for an approximate value of $61,049. The total number of items removed from stock is now 1235 valued at about $103,427.

Through the persistent efforts of Stores the importance of returning Returnable containers is beginning to be realized by the using departments. Investigation and follow-up of returnable container procedures is resulting in better control records.

Revision of record arrangement in Standby Material Records sub-unit is underway and will result in more convenient access to cards and in a breakdown of material by responsible sections rather than departments as is now the case.

Screening of requisitions issued by the project for direct charge purchases and for construction contractors' procurement is being processed more rapidly through Stores as all screening is done in Surplus Material Records. This eliminates an extra processing at Central Stores.

The number of requisitions issued by General Supplies Records for stock replenishment has decreased from 750 per month to about 500 per month in September through more careful analysis and use of the ABC system of inventory control. This reduction will result in a decrease of purchase orders required and shipments to be received.

The fourth bay, Unit D, of the Central Stores Warehouse was accepted from the contractor September 29, 1953.

Organization and Personnel	8-31-53	9-30-53	Change
Employees on Roll	200	194	-6

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PURCHASING & STORES SECTION

TRAFFIC UNIT

September, 1953

STATISTICAL AND GENERAL

Through negotiations with the Byron-Jackson Pump Company on HWC-1108, we were successful in changing the FOB terms which will allow us to use a reduced rail freight rate from Los Angeles to the Project. The savings in freight charges on this order will amount to approximately $1,250.00.

A reduced rate on Ammonium Silico Fluoride from Carteret, New Jersey has been established with the rail carriers which will save approximately $212.00 freight charges per carload from this point. This reduction climaxes negotiations which were begun over three years ago with the railroads.

As a result of rate reductions obtained from the carriers, there was a total savings in freight charges for the month of September amounting to $2,389.40. This makes a total savings from September 1, 1946 to date of $1,751,563.61.

Savings Report

1. Rate reductions obtained from carriers:

Commodity	Origin	Savings for September, 1953	Savings from 9-1-46 Thru August, 1953	Savings from 9-1-46 to date
Extrusions, Aluminum	Phoenix, Ariz.	42.62		
Limestone	Aragonite, Utah	$1,280.00		
Machinery, C/L	San Francisco, Cal.	194.78		
Sulfamic Acid	Graselli, N. J.	872.00		
		$2,389.40	$1,749,174.21	$1,751,563.61
2. Freight Bill Audit		530.98	113,842.78	114,373.76
3. Loss and Damage Overcharge Claims		610.13	130,558.49	131,168.62
4. Ticket Refund Claims		196.19	32,700.26	32,896.45
5. Household Goods Claims		00.00	17,276.59	17,276.59
		$3,726.70	$2,043,552.33	$2,047,279.03

Work Volume Report

Completed Travel Requests		164
Reservations resulting from above:	Rail	98
	Air	186
	Hotel	228
Expense Accounts checked		156

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PURCHASING & STORES SECTION
TRAFFIC UNIT
September, 1953

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Work Volume Report Cont.

Household Goods & Automobiles	Movements Arranged Inbound	1
	Movements Arranged Outbound	1
	Insurance Riders Issued	3
	Insurance Bills Approved	2
Ticket Refund Claims	Filed	2
	Collected - Number	8
	Collected - Amount	$196.19
Freight Claims	Filed	1
	Collected - Number	11
	Collected - Amount	$610.13
	Over and Shorts Processed	5
	Damage Reports Processed	10
Freight Bill Audit Savings		$530.98
Freight Shipments Traced		39
Quotations	Freight Rates	235
	Routes	185
Bills Approved	Air Express	12
	Boat	1
	Carloading	95
	Express	125
	Rail	930
	Truck	171
Carload Shipments	Inbound	1,162
	Outbound	15

Report of Carloads Received

Commodity	CMSTP&P	NP	UP	Total
Aluminum Ingots			1	1
Aluminum Sulphate	2	1	1	4
Asphalt	2	2		4
Bichromate of Soda	1			1
Caustic Soda	12	8	19	39
Chlorine	1	1	1	3
Coal (Kenilworth, Utah)			569	569
Coal (Kemmerer, Wyo.)			489	489
Furnace Liners	2	8		10
Lacquer Solvents		1		1
Lime Rock	3		1	4
Machinery			2	2
Methyl Isobutyl Ketone	1			1
Nitrate of Soda			1	1
Nitric Acid		8	15	23
Pallet Boards	1			1

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PURCHASING & STORES SECTION
TRAFFIC UNIT
September, 1953

Report of Carloads Received (cont.)

Commodity	CMSTP&P	NP	UP	Total
Petroleum Naphtha		1		1
Salt		1	1	2
Soda Ash			1	1
Steel Containers			1	1
Sulfamic Acid			1	1
Trichlorethylene		1		1
Merchandise cars			2	2
Total	25	32	1,105	1,162

Organization & Personnel	8-31-53	9-30-53	Change
	11	11	0

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U. S. ATOMIC ENERGY COMMISSION
HANFORD OPERATIONS OFFICE
RICHLAND, WASHINGTON

DATE: June 22, 1955

TO: [illegible]

Subject: NOTICE OF CHANGE IN CLASSIFICATION

Notice has been received from the General Electric Company Non-Technical Document Review Board, Hanford Atomic Products Operations, Richland, Washington covering the following change in classification action effective March 10, 1955.

Hanford Document No. 52430 G. E. Document No. HW-29513-I

Doc. Date 10-23-53 Original Classification Restricted

Title or Subject: Transportation Section Monthly Report-September 1953

Author(s) or Originator M. T. Rice

Pages No-1 thru No-7 (X) Downgraded to Official Use Only

( ) Classification Cancelled

According to our records you have copy(ies) 9 of 12 Series A

INSTRUCTIONS

Block out all present classification markings, which may be inconsistent with the changed classification indicated above, and re-mark in accordance with existing AEC Security Regulations.

REMARKS: This action applies only to the "Transportation Monthly Section" portion of doc. No. HW-29513 and does not effect the classification of any other parts of the report.

This document was transmitted to you from Hanford on 10-26-53
Registry No. _____

Lee E. Speer
LEE E. SPEER, Chief
Classified Document Control

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HW-29513

TRANSPORTATION SECTION
MONTHLY REPORT
September 1953

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GENERAL

Transportation Section personnel forces decreased from 498 to 495 by 8 transfers in, 2 new hires, 3 reactivations - personal illness, 7 transfers out, 7 terminations and 2 deactivations - personal illness. A reduction of personnel in the Track and Road Maintenance Unit involving 4 Drivers, 4 Servicemen, and 1 Helper-Sanitation, was effective September 28. This reduction was accomplished by consolidating crews, termination of mosquito control program, and a decrease in seasonal activity. In all cases the men affected were able to transfer to other classifications or find jobs in the immediate locality.

The non-exempt phase of the "Let's Talk It Over" program was completed in September with the exception of six employees who are absent because of illness or other justifiable reasons. This program was conducted in conjunction with the annual ratings of non-exempt people and the completed rating sheets have been forwarded to the Employee Relations Section.

Completed a manpower survey of Transportation requirements through FY 1958 by the major projects of the current expansion program.

Mutual arrangements have been made whereby the Financial Department will handle the yellow file copy coverage on all work orders from the Atomic Energy Commission in connection with their normal pre-work review of such work orders.

An informal agreement has been reached by the Atomic Energy Commission, Financial Department, and the Transportation Section, that future rentals of DC units for Operations' use or HO units rented to civic organizations or construction contractors by means of a work order from the Atomic Energy Commission, will be in accordance with Construction Equipment Usage Rates Revised August 1, 1953.

Satisfactory progress continued on the New Consolidated Transportation Facilities. The contract for Phase II of construction was awarded to the Sound Construction and Engineering Company on September 17. Invitations for bid on all items of new equipment have been sent out. Awards have been made to equipment vendors on the majority of these items and the others are under consideration. Four alternate plans by the using agency for improved access roads, partial underground drainage, railroad details, and lubrication facilities have been incorporated.

RAILROAD ACTIVITIES

Commercial cars handled during September returned to normal with the resumption of volume coal receipts and increased 178% over August. The following recapitulation indicates the distribution of commercial cars handled:

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Carload Movements -	Loads In	Empties In	Loads Out	Empties Out
General Electric Company	1049	28	29	1036
Blaw-Knox	37	-	-	39
Dukes Electrical Co.	1	-	-	1
Grove-Shepard-Wilson-Kruge Co.	8	-	-	6
Haughton Elevator Co.	2	-	-	2
L. A. Hopkins Co.	7	-	-	7
Kaiser Engineers	164	-	-	173
D. V. Libby Co.	3	-	-	4
Soule Steel Co.	2	-	-	2
Sound Construction & Engineering Co.	5	-	-	5
Steele Construction Co.	13	-	-	13
Atomic Energy Commission	74	-	-	70
A.E.C. - Kaiser Engineers	102	-	-	95
Corps of Engineers	3	-	-	3
U.S. Army	18	-	-	15
	1488	28	29	1471

Process service returned to normal following production difficulties and actual cars handled increased 20.5% over August.

The increase in railroad activities required a total of 317.5 man-hours of overtime during September most of which occured on Saturdays and Sundays for process service.

Special service included the handling of 16 cars of ballast primarily for construction forces.

Total car movements including process service totaled 3,389 in September compared to 1,414 in August; 1,726 in July; 3,275 in June; 2,617 in May; 2,278 in April; 2,314 in March; 2,691 in February; and 2,730 in January.

Locomotive 39-3729 was struck by a construction truck at a crossing on the By-Pass Highway near the 1100 Area Coal Spur on September 10 at 8:15 A.M. There were no injuries and damages totaled approximately $775 to Plant equipment and property and an estimated $500 to the construction truck.

Completed annual inspections on railroad cars 10B-3640, 10B 3642, 10B-3643, 10B-3645, and 10D-3656.

Installed a new piston and liner in the No. 1 cylinder of locomotive 39-3730. The unit was released for service on September 1 and failed for the second time after about six hours of operation. Disassembly of the engine revealed that the No. 5 piston and liner were badly scored and the others showed signs of scuffing. The Alco Service Branch in Spokane was contacted and their serviceman arrived on September 9. He was unable to determine any definite reason for the failure and has contacted the factory. New pistons, cylinder liners, and rings have been ordered.

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Transportation Section

Installed a reconditioned cylinder head and valves on locomotive 39-3726 replacing a cracked head and a broken exhaust valve on the No. 6 cylinder.

Routine inspection and minor repair services were performed on August 28, September 10 and 24, for the U.S. Army car operated off-plant by the Atomic Energy Commission.

Railroad track maintenance activities included lining, surfacing, and dressing of trackage requiring 4,498 man-hours: installation of ties, rail and other track materials requiring 279 man-hours; distributing and handling materials requiring 366 man-hours; weed control requiring 940 man-hours; removing sand and oiling switches requiring 150 man-hours: road crossings requiring 101 man-hours; and special work orders requiring 214 man-hours.

AUTOMOTIVE ACTIVITIES

The Plant Bus System transported .35% fewer passengers in September than in August. Passenger volume would have reflected an increase had it not been for the thirty day month which included a holiday. The following statistics indicate the magnitude of service rendered:

Passenger volume	140,983
Revenue - bus fares	$ 7,048.13
Earnings - transit advertising (August)	$ 149.20
Bus trips	6,630
Bus miles - passenger carrying	198,046
Passenger miles	4,906,211

The following is a comparative breakdown of average daily round trips to the Plant Areas:

Passenger buses - 100-B	11
Passenger buses - 100-D	12
Passenger buses - 100-F	11
Passenger buses - 100-H	8
Passenger buses - 100-K	6
Passenger buses - Hanford	1
Passenger buses - 200-West	31
Passenger buses - 200-East	5
Passenger buses - 300 Area	6
Passenger buses - Riverland	2
Passenger buses - White Bluffs	1
Passenger buses - North Richland	4
700-300 Area Shuttle	16
Inter-Area Passenger Shuttle & Express	2

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Two Plant buses were involved in an accident at the 101 Building railroad crossing on Route 2N at approximately 3:00 P.M. on September 11. These buses were transporting a total of 22 Patrolmen to the 100-D and 100-H Areas for the No. 3 Shift. The lead bus made a normal stop at the crossing and had resumed

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a forward motion when it was struck from behind by the second bus which had failed to stop. Subsequent investigation revealed that the driver of the second bus may have suffered a mental blackout momentarily as there was no mechanical failure involved. Eight minor injuries were sustained and a property damage of approximately $7,000.

The Richland Bus System transported 21.9% more passengers in September than in August. The marked increase is normal and resulted from the resumption of school. The following statistics indicate the volume of service rendered:

Total passengers including transfers	10,167
Revenue - bus fares	$ 717.81
Earnings - transit advertising (August)	$ 7.37
Bus trips	1,194
Bus miles - passenger carrying	6,328
Passenger miles	26,864

The Military Liaison Committee arrived at the A.E.C. Airport in Richland on September 21 and departed at 12:00 noon on September 23. Transportation was furnished throughout the course of their visit without incident including a general Plant tour on September 22.

Off-Plant chauffeured automobile trips (Company business and/or official visitors) totaled 101 which were rendered to the following locations as indicated:

Benton City, Washington	4
Hinkle, Oregon	5
Kennewick, Washington	7
Pasco, Washington	63
Pendleton, Oregon	12
Sunnyside, Washington	3
Walla Walla, Washington	1
Yakima, Washington	5
A.E.C. Airport	1

The following tabulation indicates the volume of Drivers Test Service rendered:

Applicants:	Male	30	Number tests given	50
	Female	20	Number rejected	0

Permits issued:	Limited to driving with glasses	13
	Unlimited	37

Permits reissued:	Rehires	15
	Expirations	329

The following tabulation indicates the volume of fuel distribution by Equipment Maintenance personnel:

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Transportation Section

	Gasoline	Diesel Fuel	50 Cetane	Kerosene	White Gas
Stock at start of month	42,265	21,940	19,900	1,280	130
Received during month	123,523	19,700	12,200	1,642	318
Dispensed during month	112,558	22,015	26,400	1,257	169
Stock at end of month	53,230	19,625	5,700	1,665	279

The following tabulation indicates the volume of inspection and maintenance service rendered to Hanford Atomic Products Operations' automotive and heavy equipment by Equipment Maintenance personnel:

Motor overhauls	43
Class A Inspections and Repairs	98
Class B Inspections and Lubrications	1059
Bi-weekly Inspections - buses	155
Other routine maintenance repairs and service calls	2104
Accident repairs and paint jobs	52
Tire repairs	522
Wash jobs	502
	4,535

The following tabulation indicates the Plantwide usage of automotive equipment:

Code	Type	No. of Units	Total Mileage
1A	Sedans	336	413,359
1B	Buses	91	174,360
1C	Pickup Trucks	460	222,274
1D	Panel,Carryall,Sta.Wagon	153	107,815
1E	Armored Cars	2	220
1G	Jeeps	2	999
68 Series	Trucks	205	67,929
		1,249	986,956

Two of the new General Motors 53-passenger coaches were received on September 29. The remaining twenty are expected to be received at the rate of four per week. These units will replace twenty-eight 37 and 41 passenger buses which have been requested by the Atomic Energy Commission for the construction program. A comparative utilization study on 41-passenger buses vs. 41-passenger buses augmented by twenty-two 53-passenger buses indicated a potential cost reduction savings of $52,109.40 annually from the larger capacity units.

Five additional DC vehicles have been authorized to receive maintenance services from the Transportation Section. A total of 34 units are now being maintained of which 18 have been assigned to the 700 Area Motor Pool and 16 are engaged in Title III Work.

Conducted a survey of the machine shop equipment in the custody of the Transportation Section and furnished a listing of future needs to Property Management for possible upgrading.

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Transportation Section

Reviewed and recommended minor changes in Procedure #G-4, Transfer of Automotive Materials, that was prepared by the Stores Unit. The Transportation Section is the sole user of these materials and is responsible for inventory control in the area garages.

The Atomic Energy Commission has advised that with the expected reduction in construction activities a considerable volume of construction equipment and motor vehicles will be made available for possible upgrading. The Equipment Control Office has prepared a listing of anticipated needs for consideration in this connection.

Completed a study on the Richland Outer Area Parking Lot Motor Pool for the period June 25 through August 23. From this report it was decided that the pool operation will continue. Results of the ten weeks' survey are being reviewed with Section Managers by Equipment Control representatives. Effective with September a monthly summary of activities and recommendations will be furnished to Section Managers.

A daily report form has been designed and placed into effect to assist in the maintenance of regulated cranes. The equipment operator is to furnish the number of hours operated and note any needed repairs. From this endeavor it is hoped that equipment availability and performance can be improved.

Repair materials valued at approximately $1,200 were excessed and salvaged from the area garages and Riverland.

The boiler and heating system for the 1131 Building has been serviced in readiness for winter operation which is scheduled for October 5.

Modification of the heating system on 1952 Ford sedans to permit the entrance and circulation of fresh air is in progress and 53 units have been completed to date.

LABOR ACTIVITIES

The following tabulation indicates in tons the volume of road asphalt material handled by Road Maintenance personnel:

	MC 1	MC 3	MC 4	MC 5
Stock at start of month	0	19.4	0	19.63
Received during month	0	38.21	0	39.00
Used during month	0	14.00	0	8.00
Stock at end of month	0	43.61	0	50.63

The following tabulation indicates the volume of road aggregate materials handled by Road Maintenance personnel:

	3/4" to 0 Pre-mix Tons	½" to 0 Pre-mix Tons	5/8" Chips Cu.Yd.	1/4" Chips Cu.Yd.	3/4" Crushed Rock Cu.Yd.
Stock at start of month	306	96	729	6,338	1,116
Made during month	0	263	550	0	0
Used during month	230	332	12	278	112
Stock at end of month	76	27	1,267	6,060	1,004

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Maintenance of primary roads required 840 man-hours; secondary roads 113 man-hours; Manufacturing Area walkways, parking areas, and related ground maintenance 527 man-hours.

Miscellaneous labor and equipment services for the 300 Area required 1064 man-hours.

Movement of equipment and material and other miscellaneous labor services for the 100 and 200 Areas required 705 man-hours.

Administration Area maintenance services required 698 man-hours; ice handling 88 man-hours; mosquito control 333 man-hours; and miscellaneous work orders for the Community 94 man-hours.

Handling of materials and equipment for the Stores Unit included 19 carloads and 259 truckloads and required 2,798 man-hours.

The daily trucking service between Richland and the Manufacturing Areas handled 357 cases of acid, 1,648 cylinders of compressed gas, and 724 tons of operational supplies requiring 1,710 man-hours.

The handling of office furniture, equipment, and records involved 194 moving jobs requiring 960 man-hours.

Hauling telephone material and equipment, and weed cleanup at electrical sub-stations required 464 man-hours.

Hauling material from Central Stores to the Minor Construction Warehouse in White Bluffs required 79 man-hours.

Completed the cleaning of the 300 Area retention basin which was begun in August. Approximately 17,000 cubic yards of silt were removed to facilitate proper drainage requiring a total of 804 man-hours.

Moved 17 machines weighing from 5,000 pounds to 25,000 pounds from the 101 Technical Shops in the 100-D Area to the 328 Building in the 300 Area requiring 251 man-hours.

Assisted in structure repairs to the 115 KV lines and moved approximately 500 poles from the distribution yard in the vicinity of the 200-North Area to the 3000 Area Excess Yard requiring 418 man-hours.

Two wash basins and a hot water tank have been installed in the old White Bluffs Railroad Station. This facility is the headquarters for two track maintenance section crews.

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20-O Mageehon
21-ES Staples

October 6, 1953

ELECTRICAL DISTRIBUTION AND TELEPHONE SECTION

MONTHLY REPORT

September 1953

GENERAL

The Section total work force was one hundred and sixty-nine (169) as of September 30. No change from the previous month.

A new process load power peak was established during the month, exceeding the billing demand of last month by 1,500 KW.

Date	Demand KW	August Comparative KW Demand
9-29-53 (8:30 AM-9:00 AM)	112,500	111,000

All non-exempt rating sheets have been prepared and reviewed by supervision. Interviews are now being held and the October 15 completion schedule will be met. To date, one grievance has been received because of rating comments, however, it is felt that supervisors are performing the rating process with sincere interest, straight forwardness and fairness.

Several officials of the General Telephone Directory Company have arrived and begun compiling the January 1954 issue of the Richland telephone directory.

The 200-E Area completed eight consecutive years without a lost time injury. The Electrical Distribution Unit contributed over one-third of the safe total exposure hours.

ELECTRICAL DISTRIBUTION UNIT

Maintenance and Operation

Critical power conditions were set up for fifteen days throughout the month to continue the close inspection and Doble testing of the 230 KV system in preparation for the K Area's loads. To date 40% of the system has been inspected and hardware checked and tightened. Pressure areas at connection points are being wire-brushed and treated with a mixture of petrolatum and zinc oxide recommended by the Plant Metallurgist to reduce oxidation.

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LECTRICAL DISTRIBUTION UNIT

Maintenance and Operation (Continued)

The following unusual incidents occurred on the power system during the month:

On September 12 at 10:30 PM, the 151-D substation operator observed arcing on the east 230 KV dead-end structure. Inspection showed the bonding had been broken by vibration of the structure guys. A critical power condition was established and the line was removed from service nine minutes for repair with no loss of production time.

On September 15 at 2:10 AM, the 230 KV breaker serving Redox and TBP tripped when a cat shorted a bushing. Successful reclosure was made in one minute with no production loss.

On September 15 at 10:44 AM, a backhoe rig operated by the Valley Construction Company struck a 2300 volt line and telephone cable near the 212-R Area. The control jammed causing the boom to raise over the cab and sweep into the lines breaking two poles, crossarms and lines for an estimated backcharge of $825.00. Emergency generators picked up at the Gable Mountain and BY Exchange loads during the five hour outage.

On September 15 at 7:35 PM, sparks were observed dropping from the 13.8 KV line serving the 2101 Building, Purex Construction, and the Army Camp at 200-E. The fault was a loose hot line clamp and service was restored at 11:14 PM after a thirty-three minute power outage.

n September 24 at 3:26 PM, telephone repairmen working at the 251 Substation inadvertently tripped the Hanford blackout circuit. Reclosure was made at Hanford at 3:49 PM, restoring power to White Bluffs and 100-K construction.

A survey of substation grounds indicated satisfactory results from this Spring's initial application of soil sterilant for weed control. A reduced application, ten pounds per acre, will be made prior to the Fall rains to gain the full leeching benefit.

System Expansion and Planning

Completion of the telemetering installation on Plant lines will be delayed until January when final shipments of equipment will be received.

Two 15 KVA transformers were added to the 313 Building substation to provide power for construction of the building addition.

Line switches supplying 7.2 KV power to the abandoned Hanford High School and Well No. 1 have been opened.

The Electrical Distribution general ledger inventory account items for 230 KV reserve materials, other hardware, and poles stand at $27,000, $38,000 and $12,000 respectively for an account total of $77,000. Poles valued at $7,636 and other material at $1,036 were excessed during the month.

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TELEPHONE UNIT

Maintenance and Operation

Rearranged the circuit so the control loop to station KILR (Gable Mountain) can be closed in case of emergency, allowing the Patrol Emergency Officer (Richland) to use the Gable Mountain transmitter.

The telephone and radio work shops and storerooms were moved to the 744 Building during the month.

An employee of the Howard P. Foley Construction Company damaged a combination trunk and local exchange cable in Richland manhole 18 on September 2. A ladder pierced the lead sheathing and water penetrated far into the cable. Temporary repairs restored all service after 30 hours. The total temporary and permanent repair costs to be backcharged are estimated at $4,700 by the Telephone Unit.

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	5892	976	59	283	3915
N.Richland	355	254	143	28	457
Process Areas	31	1681	367	--	1565
Total	6278	2911	569	311	5937

Richland Exchange four-party service:

	September 23, 1953	August 23, 1953
Number of Subscribers	1041	946
Number of vacant sides	163	154

One hundred and twenty-one (121) new requests for residential telephone service were received, making the backlog three hundred and twenty-three (323).

Service orders during the month were as follows:

Residential and commercial	331
Official (permanent)	173
Official (temporary)	97
Total	601

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ELEPHONE UNIT (Continued)

System Expansion and Planning

The following work was done on the fifth and sixth housing program facilities:

1. Installed tip cable fanning strips on main distribution frame.
2. Completed testing and verifying of the underground and aerial systems serving the M-1, K-4 and western part of K-1 Areas. Approximately twenty faults were found.
3. Fourteen emergency telephones and two pay stations were installed throughout the Areas.

Four additional voice amplifiers were installed on trunk circuits to the Blaw-Knox switchboard.

Designed and directed the installation of accurate automatic equipment to register the number of calls completed over the official leased lines to Kennewick.

Reviewed the telephone plans for the proposed new Safeway Store as submitted to the City Engineer for a building permit.

R B Britton
ELECTRICAL DISTRIBUTION
AND TELEPHONE SECTION

RB Britton:MAW:ag

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POWER STATISTICS
ELECTRICAL DISTRIBUTION AND TELEPHONE SECTION
FOR MONTH ENDING SEPTEMBER 30, 1953

720 Hours

	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)	30055	26965	45300	44800	89.2	83.6
A-4 Out (100-D)	16420	16115	24400	23700	90.4	94.4
A-5 Out (100-H)	9936	7704	14550	14550	91.8	73.5
A-6 Out (100-F)	7930	7450	11700	11700	91.1	88.4
A-8 Out (200 Area)	5400	5436	9360	9720	77.5	77.7
TOTAL OUT	69741	63670	105310**	104470**	89.0	84.6
MIDWAY IN	70468	64531	102400*	102400*	92.5	87.5
115 KV System						
B1-S4 Out (N.Rich.)	1507	1493	822	3341	71.8	62.0
B1-S5	108	94	518	432	28.0	30.3
Richland	7474	7552	15040*	17280*	66.8	60.7
BB3-S4 Out (300 Area)	1360	1320	2800	3120	65.3	58.8
TOTAL OUT	10449.	10459	21180**	24173**	66.3	60.1
Benton In	10660	10800	33600*	35600*	42.6	42.1
So. Richland In	-	-	-	-	-	-
TOTAL IN	10660	10800	33600**	35600**	42.6	42.1
66 KV System						
B9-S11 Out (100-K)	744	792	1760	1840	55.0	59.8
B7-S10 Out (W.Bluffs)	366	327	1103	1125	43.2	40.4
Hanford Out	38	39	300**	300**	16.5	18.1
TOTAL OUT	1148	1158	3163**	3265**	47.3	49.2
HANFORD IN	1129	1149	2700*	3100*	54.4	51.5
Project Total						
230 KV Out	69741	63670	105310**	104470**	89.0	84.6
115 KV Out	10449	10459	21180**	24173**	66.3	60.1
66 KV Out	1148	1158	3163**	3265**	47.3	49.2
TOTAL OUT	81338	75287	129653**	131908**	84.3	79.3
230 KV In	70468	64531	102400*	102400*	92.5	87.5
115 KV In	10660	10800	33600**	35600**	42.6	42.1
66 KV In	1129	1149	2700**	3100**	54.4	51.5
TOTAL IN	82257	76480	138700	141100	79.7	75.3

* Denotes Coincidental Demand
** Denotes Non-Coincidental Demand

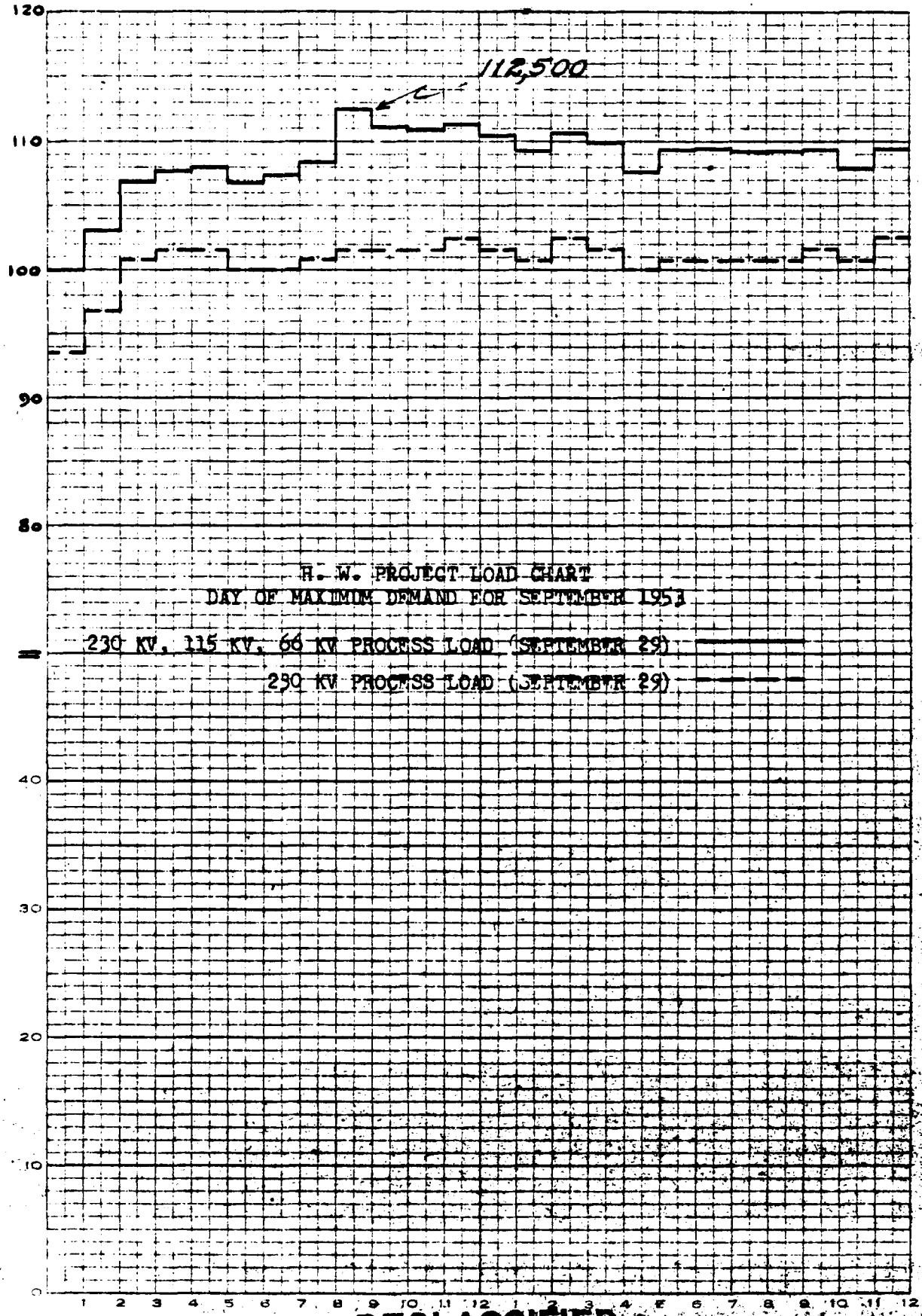
Average Power Factor - 230 KV System 90.6
Average Power Factor - 115 KV System 86.9
Average Power Factor - 66 KV System 88.6

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PLANT AUXILIARY OPERATIONS DEPARTMENT
STATISTICAL AND COMPUTING SECTION

MONTHLY REPORT - SEPTEMBER, 1953

Personnel Statistics

Following is the month end summary of personnel:

Statistical and Computing Section

	As of 8-31-53			As of 9-30-53			Net Change		
Unit	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
General	1	1	2	1	1	2	0	0	0
Statistics	8	9	17	20	8	28	+12	-1	+11
Computing	19	33	52	9	32	41	-10	-1	-11
Graphics	1	11	12	1	11	12	0	0	0
Procedures	10	4	14	10	3	13	0	-1	- 1
TOTAL	39	58	97	41	55	96	+ 2	-3	- 1

Statistics Unit

	As of 8-31-53			As of 9-30-53			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	3	0	3	4	0	4	+1	0	+1
Precision & Quality Control	1	1	2	1	1	2	0	0	0
Technical Statistics	3	1	4	3	1	4	0	0	0
Mathematical Analysis	0	0	0	3	0	3	+3	0	+3
Numerical Analysis	0	4*	4	8	3	11	+8	-1	+7
TOTAL	8	9*	17	20	8*	28	+12	-1	+11

* Includes one rotational trainee.

One Junior Engineer was added to the Precision and Quality Control function on September 8, 1953, and a member of the Precision and Quality Control function was transferred to the Administrative Statistics function. One Technical Graduate was transferred to the monthly role as a Junior Engineer effective September 1, and transferred from the Numerical Analysis to the Mathematical Analysis function. Ten exempt personnel were transferred from the Computing Unit effective September 1, with two Mathematicians to the Mathematical Analysis function and two Mathematicians and six Junior Engineers to the Numerical Analysis function.

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Computing Unit

	As of 8-31-53			As of 9-30-53			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	2	1	3	2	1	3	0	0	0
Analysis and Programming	11	3	14	1	3	4	-10	0	-10
Operation	6	29	35	6	28	34	0	-1	- 1
TOTAL	19	33	52	9	32	41	-10	-1	-11

One Office Machine Operator was hired on 9-1-53 and two Office Machine Operators terminated effective 9-18-53. Four Mathematicians and six Junior Engineer were transferred to the Statistics Unit on 9-1-53.

Mr. George Miller of the Theoretical Physics group spent four days in the computing facility to become better acquainted with the machines. It is expected that this training will enable Mr. Miller to perform more efficiently in his position as liaison between the two groups.

Graphics Unit

	As of 8-31-53			As of 9-30-53			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	1	2	1	1	2	0	0	0
Illustrators	0	9	9	0	9	9	0	0	0
Graphic Designer	0	1	1	0	1	1	0	0	0
TOTAL	1	11	12	1	11	12	0	0	0

Procedures Unit

	As of 8-31-53			As of 9-30-53			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
Engineering Assistant	0	1	1	0	0	0	0	-1	-1
Procedure Analysts	9	0	9	9	0	9	0	0	0
TOTAL	10	4	14	10	3	13	0	-1	-1

One Engineering Assistant terminated effective 9-8-53.

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FOR THE MANUFACTURING DEPARTMENT

The first set of data for calculation of operating limits has been received from H reactor. Standard procedures similar to those used on data from other areas will be used on this data to yield such information as tube temperature limits, tube flow and power, and tube film coefficients. In addition, data from DR, B, D, and C reactors have been processed to yield essentially the same information. Continuing efforts are being made to "mass produce" reports of this type. However, since each reactor possesses unique characteristics requiring special techniques, and since not all of the information is pertinent to all of the personnel involved, separate procedures in some phases of the calculation must still be allowed for.

An effort is being made to simplify the task of recording reactor data. This is to be accomplished through the use of master decks. One master deck will be prepared for each reactor, and will contain information on individual tubes which can be expected to remain reasonably constant from one operating period to the next. Such information includes tube number, panellit gauge base and correction factor, orifice size, tube status, and header number. When any of these quantities is changed during shutdown or otherwise, formal notice will be given and the appropriate corrections made in the master deck. In this manner it will be possible to eliminate the entry of over 6,000 items of information each time data on a reactor is compiled.

The routine monthly statistical report on 300 Area production for the month of July was issued. (Document HW-29316, "Statistical Quality Report - 300 Area", to W. W. Windsheimer from the Statistics Unit.) This report is to be discontinued with the reporting of September's results.

A straight line relationship between Chemical Assay and Specific Gravity measurements on AT solutions S-plant runs had been given, but recent measurements seemed to indicate that this relationship was somewhat in error. It was desired to fit a new line on the basis of 52 points based on recent data. The problem was complicated somewhat by the existence of errors of measurement for both variables. Further, these errors of measurement, although known for each measurement, varied from point to point. Thus, the line could not be fitted by the usual methods. Estimates for the parameters were given, together with confidence limits. Also, the procedure for calculating these results was outlined step by step, since the customer involved encounters problems of a similar nature quite frequently. (Letter from J. L. Jaech to D. C. Bixby, "Relationship Between Chemical Assay and Specific Gravity Measurements in S-Plant Runs", dated September 21, 1953.)

Work is being continued on the statistical study of trends in power materials consumption.

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For the Manufacturing Department, 3 routine IBM reports and 30 non-routine IBM jobs were completed for a total of 33 IBM service requests.

A set of thirty lecture aids are being prepared for the Manufacturing Departments Radiation Monitoring Unit illustrating radiation hazards and personnel protection measures.

A set of five production and cost charts were prepared for the Manufacturing Department for use at the Military Liaison Meeting of September 21, 1953.

Routine graphics work for the Manufacturing Department included completion of fifty-nine master plates of the 1954 Fiscal Year series of Control Charts. This also included posting August figures to these plates and publication of the September issue.

49 3/4 hours were spent on forms for the Manufacturing Department.

FOR THE ENGINEERING DEPARTMENT

An experiment was designed for the Physical Metallurgy Sub-Unit to investigate the effect of exposure level on the nature of irradiation damage to uranium crystal structures. A design was selected which took into consideration material and reactor costs, and which would give the needed information in an efficient and unconfounded manner. (Secret Rough Draft from D. W. Gaylor to R. P. Hurst, "Proposed Experimental Design for Examining the Nature of Irradiation Damage to Uranium Crystal Structures", dated September 29, 1953.)

Statistical analyses were made on the minimum thickness, maximum thickness, and appearance of the bonding layer of slugs canned with two different bronze bath compositions, dip bath compositions, dip temperatures, dip times, and with and without dip agitation. The purpose of this experiment was to find which of the five canning conditions or combination of conditions have a significant effect on the production of an optimum type of bonding layer. The experiment gave direct information enabling improvements to be made in the quality of canned slugs. (Secret Rough Draft to H. A. Johnson from Virginia Clark, "Statistical Analysis of Minimum Thickness, Maximum Thickness, and Appearance of the Bonding Layer for Test # 346-A" dated September 10, 1953.)

Analysis has begun on an experiment to determine whether manual or mechanical canning produces higher quality slugs. Since an addition to the canning building with new canning lines is now being designed, this information is essential in insuring the use of optimum methods for the future.

At the request of the Pile Fuels Sub-Section, limits based on the previous eight months data were obtained for bare slug dih and egg TDS values. These limits are to be used in establishing specification limits on these variables.

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The study of the trends and variation associated with chemical impurities present in Mallinckrodt metal was concluded. A formal report is being issued. This study was conducted for the Engineering Department, the Manufacturing Department, and the Atomic Energy Commission.

Considerable work was done on the study of "K" pile graphite reactivity for the Pile Technology Section of the Engineering Department. As a result, a new sampling plan was recommended which will permit a substantial reduction in test pile operating time. (Document HW-29337, "Proposed Double Sampling Plan for "K" Pile Graphite", to R. L. Dickeman from D. O. Richards.)

An essentially new technique for harmonic analysis of empirical data is being set up at the request of the Graphite Studies group. The aim is to determine the effect of radiation of graphite on its manner of reflecting x-ray beams. From this one can determine the extent of derangement of the crystalline structure of the graphite. This problem requires considerable theoretical as well as computational work, since the peaks to be resolved are very sharp and the "background" is very broad. However, preliminary results are quite favorable.

Computational work on the study of corrosion rates of slugs is continuing. In this study the variables suspected of influencing the rate of corrosion are recorded, and significant correlations between these varibles and the corrosion rate sought. The computational work involves the listing of the data in a number of orders, and taking various summations. When the preliminary studies are completed, the work will become routine. Among other things, it is felt that tube power may be correlated with corrosion rate. A great deal of past data has been tabulated pertaining to this, and an attempt will be made to see if a significant correlation exists between corrosion rate and tube power - all other factors being considered.

When plotting corrosion rate against surface temperature, it has been noted that the resulting curves may vary considerably from tube to tube. It is felt that this is due to the fact that the formula for calculating the surface temperature of a slug, which cannot be measured directly, is incorrect. Specifically, the present formulation does not take into account the existence of a thin film on the slug made up principally of aluminum oxide. The weight and thickness of this film is not measurable. On the basis of data from six tubes, an attempt is being made to find some measure of this film and its relationship to surface temperature such that the resulting curves of corrosion rate versus surface temperature more nearly agree.

A search is continually being made to determine conditions that will decrease the slug rupture rate. Along this line, an in-pile production test consisting of nine tubes of metal was made in an attempt to compare the effect of certain variables such as can wall thickness and type of metal on rupture rate. Two-hundred and sixty-seven slugs were used in this test. Three slugs were observed to rupture, all of which were 4-inch "IKE" slugs with can wall thickness of 35 mils. It was desired to know the apriori probability of this outcome - all ruptures occurring in this one type slug assuming chance distribution of failures - when there were eight different types in the test. A small probability

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indicated that the particular slug under consideration was more susceptible to rupturing than were the others in this test. (Verbal report from J. L. Jaech to L. W. Lang, dated September 23, 1953.)

Since present plans call for increasing the power level of the piles, there exists the problem of determining the expected rupture rate under the new operating conditions. This problem is complicated by the fact the experience data showing the cumulative rupture rate up to 600 MWD/T at every 50 MWD/T interval is available only for group 7 metal slugs. The rupture rate at 600 MWD/T was known for groups 8 and 9 metal, but the behavior of the metal up to this point was unknown. Thus it was necessary first to predict the behavior of group 7 slugs under increased power levels, and then to draw inferences as to the behavior of group 9 metal. (Letter from J. L. Jaech to M. E. Forsman, "Estimating Rupture Rate of Group 9 Slugs Under Increased MWD", dated September 22, 1953.)

A problem submitted by the Theoretical Physics group concerns the behavior of a pile when the power level is rising out of control. Assuming that the uranium was in the form of hollow slugs and is now melted down by the tremendous heat into half-circular cylinders, the effect of the more compact distribution on the "sink strength" of the fuel elements is desired. Specifically, it is asked whether the sink strength could be increased by an amount sufficient to reverse the runaway and shut the pile down.

An attempt is being made to set up a mathematical model of the proposed hollow-slug reactor using the integral equation approach of transport theory. Realizing that the problem couched in this form can at best be only approximated, the same problem is being simultaneously treated by diffusion theory methods. A step-by-step comparison of the corresponding results can then be made.

The calculation of the effective cross-section for fission neutrons in four different media has been completed. Cross-section data was obtained from graphs, and the energy distribution of fission neutrons obtained from the results of a previous computation. The effective cross-section was obtained by numerical integration over the entire energy range. The effective cross-sections will be used in the second part of this problem in which the ratio of fast to thermal fissions in a water moderated heterogeneous reactor is sought. The work is part of a new pile design study.

In determining the gamma absorption coefficient, a problem arises which concerns the precision of a slope estimate ina linear relationship when both the dependent and independent variables vary in precision from point to point. Theoretical considerations and methods of evaluation pertinent to this problem have been derived. Application to the particular problem awaits receipt of data.

A meeting was held pertinent to the "Disaster" problem. A review of the material abstracted from the pile supervisor's logs and summarized by the Statistics Unit was made and a tentative outline for a future course of action was agreed upon.

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A study was completed for the Separations Technology Sub-Section to estimate the precision of statements of plutonium content of buttons. (Document HW-29277, "Statistically Determined Precision of Plutonium Content of Buttons", dated September 8, 1953, from N. D. Peterson to A. E. Smith.) Included was the estimation of a constant factor to be applied to scale weights to correct for impurities in the content of buttons.

Four tables involving natural logarithms are being prepared for use in production cost studies. About 28,000 table entries are to be computed, each involving the calculation of at least one logarithm. Direct computation of these logarithms would result in prohibitive expense. Instead, advantage is taken of the closeness of the table interval, and an expansion formula is used in which one logarithm may be calculated from the previous one. Accuracy checks being made include correcting the logarithm values periodically, and taking second differences of the entire table.

Statistical analyses were made of the results of a sample audit of the records of certain classified documents and prints originated by the Vitro Corporation. (Letters, "Results of Sample of Classified Documents Originated by Vitro Corporation", from L. W. Smith to C. G. Stevenson and "Results of Sample of Classified Prints Originated by Vitro Corporation", from L. W. Smith to J. Durbin.)

The study being made of the Classified Files is to the point that recommendations have been made orally and a written report is being prepared. The principal recommendations are:

1. Centralized Classified Files in the 3760 Building
2. An IBM record keeping system
3. A plan for destruction of excess copies of documents

For the Engineering Department 30 non-routine IBM jobs were completed.

48 1/2 hours were spent on forms design for the Engineering Department.

Requests were received from the Engineering Department to develop background material for three displays to be used in the Board of Director's Meeting. In addition, background material is being prepared for a "Cloud Chamber" display which will include drawings showing paths of radioactive particles and identifying types of particles.

Work was accelerated on the 105K Model construction progress so that it could be used at the Military Liaison Meeting of September 21, 1953. Final assembly and painting work on both the 105K Process Model and the Purex Facility Overall Model was completed in September. Additional touch-up and minor revisions will be completed in the first week of October.

Work continued in the construction of the 202-A Purex Building Section Model. Engineering has assigned a liaison engineer to this project for interpretation of the latest Vitro piping and process drawings. Graphics is expediting work on this model in an effort to have the architectural features, process vessels, and equipment developed to such an extent that it may be used to advantage as a technical display.

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Routine graphics work for Pile Technology included preparation of three charts for Document HW-29334 titled "Corrosion of Chronic Acid Cleaned Slugs at 95°C"; completion of nineteen graphs for Document HW-28260 titled "Stresses in Hollow and Split Hollow Internally Cooled Slugs"; general revisions to Document HW-27819 titled "Electron Microscope Study of Hydrons Oxide Film Formation in Hanford Piles"; mounting and touch-up of two photos for Document HW-29334 titled "Slugs Discharged From F Pile"; preparation of a nomograph and five graphs for a report titled "Film Conditions in 100 Area Pile Experimental Tubes"; completion of one illustration, one flow diagram, three photos retouched, and five graphs for Document HW-29021 titled "Experimental Thermal Conductivities of Various Gasses and Gaseous Mixtures at Zero Degrees Centigrade."

Routine graphics work for Fuel Technology included completion of two graphs for Document HW-29075 titled "The Rejection of Slugs From the 250 Tons of Rods Heat Treated at the Feed Materials Production Center"; and touch up and mounting of six photos to be used in the Monthly TAR Report (HW-29393).

Graphics work was performed on a rush basis in preparation of fourteen large visual aid charts to be used by Process Engineering and Design in lectures on the Expansion Program.

Routine graphics work for Process Engineering included layout and completion of nine graphs for Document HW-27318 titled "100 B & C Area Expansion".

Routine graphics work for Advanced Technology included completion of thirteen graphs and three tables for a report titled "Uniform Enrichment Study".

FOR THE PLANT AUXILIARY OPERATIONS DEPARTMENT

An analysis of the occurrence of major injuries at Hanford Atomic Products Operation was completed by a new technique developed by the Statistics Unit. This technique is more sensitive than any previously published method. It allows a more precise analysis of past data and will permit the rapid detection of future changes in the basic underlying major injury rate. (Letters, "Analysis of the Occurrance of Major Injuries", from L. W. Smith to B. F. Butler, and "Analysis of Major Injury Occurrences", from L. W. Smith to F. J. McKinnon.)

A survey of Computing Unit operations was made to determine what application of statistical quality control might be most fruitful at this time. It was felt that an analysis and control of machine room errors held the most promise. Studies along this line are continuing.

An explanation of the statistical techniques employed in the purchase order study(reported last month) was prepared for the Procedures Unit to assist the Unit in the presentation of the results. (Letter, "Statistical Techniques Used in the Purchase Order Study", from Joan V. Cannon to E. W. Slusher.)

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A review of the order pattern of the Permit Authorization Card led to the establishment of the form as a stores item. Consolidated ordering will result in an estimated annual printing saving of $700.00.

A final revision of the distribution lists for operations purchase orders will reduce annually the number of copies from 572,000 to 288,200, a reduction of 283,800 copies. These copies represent some 567,000 sheets of paper.

An IBM system of pricing duplicating services is being developed. A trial run will be made to compare the charges computed by a formula with the charges now made from a schedule.

Work was continued on the development of a procedure for preparation of the plant telephone directory by use of IBM equipment.

24 new or revised IBM internal operating procedures were prepared by the Procedures Unit for the Computing Unit.

Special graphics work for the Board of Director's Meeting included revising a number of the business discussion charts; redesigning mechanics of the chart display stand; design and preparation of identification badges; design of place cards; design of a lectern; layout of floor space in the North Hall of the Library for placement of displays and seating arrangement; preparation of a flight plan Area Map; and completion of a set of floor plans of the Desert Inn.

23 hours were spent on forms design for the Plant Auxiliary Operations Department.

For the Plant Auxiliary Operations Department, 7 routine IBM reports and 4 non-routine IBM jobs were completed for a total of 10 IBM service requests.

FOR THE COMMUNITY OPERATIONS & REAL ESTATE DEPARTMENT

Procedures were written for the Electric Billing application to provide for new route and folio numbers to include all new residential housing, whether occupied or not.

6 1/4 hours were spent on forms design for the Community Operations and Real Estate Department.

For the Community Operations and Real Estate Department, 2 routine IBM reports and 2 non-routine IBM jobs were completed.

FOR THE RADIOLOGICAL SCIENCES DEPARTMENT

The Aquatic Biology Unit has conducted an extensive radio biological-ecological survey of invertebrates in the Columbia River extending from the western boundary of the Hanford Atomic Products Operation downstream to McNary Dam to detect possible effects of effluents being discharged into the River from the pile areas. Early studies have demonstrated the importance of lower organisms

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as concentrators of radioactive materials. The distributions of the abundance of species found in the River were not apparent from the data. Thus, statistical analyses were conducted to determine if there were any definite patterns in the distributions of the species which would be useful in studying the concentration of radioactive materials by these organisms. (Secret Rough Draft from D. W. Gaylor to R. H. Whittaker, "Distributions of Aquatic Invertebrates in the Columbia River", dated September 18, 1953.)

Estimates and tolerance limits for body tissue deposition for several groups of high level plutonium chronically fed rats are being computed. The results of this experiment along with the first experiment dealing with lower dosages may aid in establishing the maximum permissible concentration of plutonium in drinking water.

Computational work is proceeding on the expected beta ray dose from two different physical models. One of these models is that of two semi-infinite slabs in contact with beta rays being emitted throughout one slab; the other is that of a plane source imbedded in an infinite medium. The problem is to determine the dosage at various points in the non-emitting material. The calculations are based on the age-diffusion theory and involve extensive numerical integration. The calculated dosages will be averaged over the beta spectrum and compared with experimentally determined dosages as a check on the theory.

Routine computational work included the Station Wind Study on July data, Aquatic Biology calculations, sheep thyroid and radioanalysis calculations, and weather calculations.

For the Radiological Sciences Department, 5 routine IBM reports and 6 non-routine IBM jobs were completed for a total of 11 IBM service requests.

5 1/2 hours were spent on forms design for the Radiological Sciences Department.

Preliminary sketches of display backgrounds, one for a "Ground Water Mound Display" and one of "Radiation Protection Equipment", were approved and work is in progress to complete these displays for the Board of Director's Meeting.

A number of chart and graph plates requested by the Radiological Sciences Department were made into slides to be used in an off-site lecture.

FOR THE MEDICAL DEPARTMENT

Based on a preliminary statistical analysis of blood count data in which it was indicated that statistically significant differences exist between the white blood count mean values for 700 Area and outer area employees, a recommendation was submitted to the Medical Department proposing that a comprehension study be made to determine the reason for the differences. (Letter, "Proposed Blood Count Study", from L. G. Waters to P. A. Fuqua, M. D.)

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A meeting was held to discuss the establishing of an IBM record of first aid visits to identify those persons who are accident prone.

1/2 hour was spent on forms design for the Medical Department.

For the Medical Department 4 routine IBM reports were completed.

FOR THE EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

Over eighty-five per cent of the Employee Attitude Survey Questionnaires have been returned. The answers are now being keypunched and the development of machine procedures for tabulation and subsequent statistical analysis has been initiated. The analysis will be similar to that employed in last year's study. In addition, the results for the two years will be compared in order to ascertain changes in employee attitudes during the past year.

Additional services were rendered to the Salary Administration Section in the analysis of National Salary Survey data. These services involved curve fitting to express the relationship between monthly salaries and years since first degree for Hanford chemical engineers, and the formulation of the distribution of salaries for various E.A.O. positions so that particular percentage points of these distributions could be obtained.

A change in procedure will eliminate the typing of automatic wage increases. This recording will be made by IBM equipment from master cards prepared by Payroll.

Procedures were produced for the preparation of three special IBM reports for Salary Administration. Preparation of routine procedures and panel wiring is continuing.

3 1/4 hours were spent on forms design for the Employee and Public Relations Department.

Routine graphics work for the Employee and Public Relations Department included plotting of August data to the Personnel Separations Chart; completion of Personnel Turnover charts; preparation of a new set of organization charts for the new Organization Directory; and layout and completion of a schematic flow diagram titled "HAPO Heat Recovery System" to be used in an off-site publication.

For the Employee and Public Relations Department 8 routine IBM reports and 6 non-routine IBM jobs were completed for a total of 14 IBM service requests.

FOR THE FINANCIAL DEPARTMENT

12 1/4 hours were spent on forms design for the Financial Department.

Investigation of the Overtime Lunch Authorization form led to a reduction in the number of required copies.

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IBM operating procedures were developed and published for the cost distribution of printing and duplicating charges.

A procedure was developed for the gathering of 2nd and 3rd quarters of 1953 payroll hours for calculation of 1954 vacations.

The first of a series of procedures for preparing 941-A Quarterly Report of Wages Taxable under the Federal Insurance Contributions Act was written.

New revised procedures for stores orders distribution were written and published.

Procedures for distribution of accounts payable vouchers were rewritten to provide for additional reports on engineering work orders and projects.

An IBM procedure was written for preparation of the "Exempt Force Report".

The procedure for preparation of the "Area Location Report" was altered to include exempt personnel.

Proposed forms for IBM preparation of the exempt salary roll have been developed in rough draft and two calculator panels are nearly complete. The procedural work of a payroll system is approximately one-fifth complete.

Certain changes were made in the reports prepared on exempt salary distribution.

A special listing was prepared of the exempt payroll master file for the maintenance of an alphabetical sequence code in the file.

A vacation audit file was prepared for exempt and non-exempt employees to be used to prepare a report of those employees who have not yet taken their vacations.

An IBM card file was created which will become the new rent deduction file effective October 1, 1953.

A rent reference listing was prepared to segregate leases as they are returned.

Mailing labels were prepared for solicitation of membership into the Good Neighbor Fund. Labels were also prepared for distribution of ballots for election of board members and membership identifications.

A twenty-seven page report titled "HAPO Cost Charts" was prepared by Graphics for the Financial Department. Charts in the report cover fiscal years from 1948 to 1954 and show cost of Production, Fabrication, and Uranium Recovery.

Routine graphics work for the Financial Department included plotting of monthly data to a set of Financial Summary Charts; completion of two charts on Operating Costs and Budgets; and plotting of figures to the Monthly Absenteeism Charts.

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For the Financial Department, 116 routine IBM reports and 17 non-routine IBM jobs were completed for a total of 133 IBM service requests.

FOR THE ADMINISTRATIVE STAFF

A project was initiated for the Accountability Section on the screening of buttons for conformity to specifications and to the estimated experience factor. For this project, a study was completed and reported orally on the degree of agreement between plutonium content as measured analytically and as estimated by theoretical computations for each button.

Analysis was made of Dow and Los Alamos shipper-receiver differences reported since the last statistical analysis.

Jointly for Accountability and the Process Sub-Section of the Manufacturing Department, a series of studies are in progress on errors in the measurement of UO_3 powder. A study was completed on random errors and sampling biases involved in the measurement of uranium content. After receipt and analysis of data for a similar study of U^{235} measurement, both studies will be incorporated into a formal report.

3126 forms have been classified as to subject. This classification file will assist in the study of paper problems by making possible the review of similar forms to bring about consolidation of similar reports.

Investigation is being made of excessive paper work brought about in the recording and reporting of cost data.

The reactor plant-wide to the system of distributing communications indicates that some revision needs to be made. A system which will allow for highly selective distribution is being considered. Also, thought is being given to directing certain types of communications through established organizational channels rather than direct to each exempt employee.

FOR THE ATOMIC ENERGY COMMISSION

A booklet of revised area plot plans was prepared by Graphics for the Atomic Energy Commission to distribute to members of the Military Liaison Committee.

Routine graphics work for the Atomic Energy Commission included preparation of eight graphs and one map for the Manager's Data Book; completion of a 300 Area Process Flow Chart; rendering of flow charts of the UO_3 Process and of the TBP Processes; posting current data to the Internal Audit Program Sheets; and plotting August figures to the 100 K and 200 A construction cost charts.

SUMMARY

During the month of September 112 statistical, mathematical, procedural, and graphical problems were completed, and as of September 31, a backlog of 217 problems were on hand. In addition 146 routine IBM reports and 87 non-routine IBM jobs were completed for a total of 233 IBM service requests.

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Department Serviced	Percent of Services Rendered				
	Units				Statistical & Computing Section
	Statistics	Procedures	Computing	Graphics	
Manufacturing	23	3	5	21	11
Engineering	41	21	12	30	23
Plant Auxiliary Operations	2	27	1	3	6
Community Operations & Real Estate	0	1	4	0	2
TOTAL OPERATING DEPARTMENTS	66	54	22	54	42
Radiological Sciences	12	1	2	8	5
Medical	0	0	0	0	0
Employee and Public Relations	7	8	3	4	5
Financial	0	29	70	15	40
Administrative Staff	7	10	0	9	4
TOTAL STAFF DEPARTMENTS	26	48	75	36	54
Atomic Energy Commission	8	0	3	10	4
TOTAL	100	100	100	100	100

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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SUMMARY -- SEPTEMBER, 1953

The number of applicants interviewed in September was 1,387, as compared with 1,512 for August. In addition, 113 new applicants applied by mail. Open, nonexempt nontechnical requisitions decreased from 275 at the beginning of the month to 109 at month end. Eighty-eight employees were added to the roll and 181 removed during the month. Separation rate increased from 1.43% for fiscal month of August to 2.62% for fiscal month of September. During September, 49 new requests for transfer to other type work were received by Employment and 50 transfers were effected. Attendance recognition awards were distributed to 128 employees in September, including 38 employees who qualified for three-year awards.

Three employees died during the month and one employee retired. One hundred and forty-one visits were made to employees confined to Kadlec Hospital and 36 checks were delivered to employees confined at the Hospital or at home. At month end, participation in the Pension Plan was 96.7%, in the Insurance Plan 99% and the Employee Savings and Stock Bonus Plan 45.7%. At month end there were 735 registered under Selective Service and 754 military reservists were on the roll. Since August 1, 1950, 299 employees have terminated to enter military service, of which 74 have returned, 9 have not claimed reemployment rights, leaving 216 still in military-leave status.

A total of 66 new employees attended orientation meetings. Of this number, 81.8% have signed up to participate in the Pension Plan, 98.4% in the Insurance Plan, and 86.3% in the Good Neighbor Fund.

Forty-four adopted suggestions were approved for awards in September, resulting in cash awards totaling $765, with a total net savings of $7,793.67.

All employees were given an opportunity to participate in the follow-up Attitude Survey conducted September 10 and 11. Over 80% participation was realized. Most of the completed questionnaires were delivered by September 16 to the Statistics and Computing people who will analyze the results. At month end about one-third of the questionnaires had been processed through IBM key punch operation with the key punching job scheduled for completion by not later than mid-October.

Invitations have been sent to all pensioners to attend the annual luncheon in their honor scheduled to be held at the Officers' Club, October 20, 1953.

During September two KAPL trainees reported to HAPO for training in the Reactor Section.

On September 18, 1953, a summons and complaint was served on the Company on behalf of for damages alleged to have occurred on June 17, 1952, when he was a passenger in a government bus involved in a collision near the 300 area. Total amount claimed is $28,750 with costs.

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PRIVACY ACT MATERIAL REMOVED

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Employee and Public Relations
Summary

On September 24, 1953, a summons and complaint was served upon the Company on behalf of parents of age 3, who was drowned in an irrigation ditch in Richland, August 28, 1953, alleging negligence in the maintenance of an irrigation ditch. Total amount claimed is $30,343 plus costs.

Effective September 14, 1953, agreement was reached by the Company and the HAMTC whereby all Community firemen are considered to have on file requests for transfer to the Industrial Fire Organization. This is in line with a previous agreement with the Council leading to the orderly transfer of Community personnel to more permanent assignment.

Training and Development programs and activities for September, 1953, were as follows: Management Orientation was presented on Tuesday, September 1, with 10 new exempt personnel in attendance. Special Supervisory Considerations was held Wednesday, September 9, with 14 attending. Basic Economics was presented on Tuesday and Wednesday, September 29-30, with an attendance of 16 supervisors. Policy Panel Seminar scheduled at the Pistol Range for September 14-18 was cancelled because of insufficient enrollment. Labor Management Relations and Labor Law was held Thursday, September 10, with an attendance of 14 exempt personnel. Principles and Methods of Supervision was presented to two groups during two weeks of September 14-25, with a total of 38 supervisors attending. PMS Groups 52, 53, and 54 were awarded certificates of completion at a dinner meeting in the Desert Inn on Wednesday evening, September 30, attended by 64 members and guests. Conference Leading was conducted on Friday, September 11 and Friday the 28th with a total attendance of 24. Management Conferences on Human Relations was begun by three groups on September 23, 24, and 30 with an enrollment total of 42. Professional Management Development meeting "Effective Presentation" was held Tuesday evening, September 15, with 43 in attendance. Management Panel Forum meeting "How to Create Enthusiasm in Safety Meetings" was presented September 24 to 29 exempt employees. Customer Relations program was presented to 52 medical personnel on September 21 and 22. At the request of R. E. Curtis, Supervisor of Technical Personnel, Robert E. Latta, Tech Grad, is observing Training for three weeks in an endeavor to gain more self-confidence.

Three Management News Bulletins were developed and distributed to all exempt employees.

The policies governing the nonexempt rating system at Hanford were reviewed in the GE NEWS, coinciding with actual ratings during September.

First phases of a Basic Rescue Training course developed in the 200 Areas were covered in a photo feature by the GE NEWS. As advanced training progresses, a full-page photo feature is planned.

PRIVACY ACT MATERIAL REMOVED

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Employee and Public Relations
Summary

The GE NEWS was presented with a certificate of appreciation by the Richland JayCees at a dinner meeting. The certificate was in recognition of the plant newspaper's publicizing the 1953 Atomic Frontier Days.

The Employee Attitude Survey conducted during the month was aided by Employee Communications through GE NEWS stories and photos, and through arranging for distribution and collection of the Attitude Survey collection boxes to and from each work area throughout the plant.

Safety information received major emphasis throughout the month in the GE NEWS. Specific safety items included Separations Safety Stampede, 200-E Area completing 8 years without a major injury, and the safety training given new employees in the 100-D Area.

The health bulletin for October, "At Ease!," and the safety topic for October, "So Nobody Loses," were prepared. The safety topic is a special fire prevention issue.

The Salary Plan booklet, prepared by Dr. W. I. Patnode, was produced and distributed to all exempt employees.

Copy and layouts for two full-page advertisements to appear in the special GE Anniversary issue of the Tri-City HERALD--as well as artwork for the cover of the issue--were prepared at the request of Public Relations.

"The Community Operations Annual Report," a single sheet, two-color photographic summary of the year's operations, was prepared, produced and distributed to Richland residents. This work was done at the request of the Manager--Community Operations.

Good Neighbor Fund publicity in the GE NEWS included announcement story concerning the Board of Trustees elections. Follow-up publicity included a full page devoted to pictures of all candidates with a short biographical sketch of each.

Operations performed by the Plant Auxiliary Operations Department appeared as the first in a series of GE NEWS features to be devoted to reviewing functions of all HAPO Departments. A double-page feature was used to pictorially portray all of the various components of the Department.

Patent applications to provide one share of GE stock to employee-inventors provided the GE NEWS lead story material. Syndicated story was localized for Hanford, and was supplemented by syndicated picture of GE employees who have received a GE share of stock for a patent application.

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Employee and Public Relations
Summary

A preliminary meeting to outline plans for a cost reduction program in the Separations Section was held with R. W. Harvey, Separations, and a number of engineers in 200-W area who will write the basic material. Employee Communications will edit and produce the material and arrange for proper publicity. The program is scheduled to start shortly after January 1, 1954.

75th Anniversary promotion was provided in the September 18 GE NEWS through a lead story on Baby Derby to pay off in shares of General Electric stock to babies born to employees on October 15. Story was localized for this plant.

The News Bureau produced 22 releases during the month. Of these, 13 were sent to the local list, including radio stations. Three were distributed to Northwest daily newspapers, and six received special distribution.

From reports to date concerning the amount of advertising space already sold, it now appears certain that the Tri-City HERALD will publish a special edition on or about October 11. The edition will recognize GE's 75th Anniversary, the scheduled visit by the Board of Directors to Hanford, and point out the significance to the three towns and surrounding area of the almost continuous expansion at Hanford. It will indicate that this almost continuous expansion at the plant has taken place since 1947, and that it was begun only a few months after General Electric assumed responsibility for operation of the plant and the town of Richland as prime contractor to the Atomic Energy Commission on September 1, 1946.

Arrangements were completed this month for holding two press conferences in Richland on October 15. The first will be a breakfast session with Messrs. Cordiner, Reed, Belanger, McCune, and Johnson present to discuss the significance of the Company's 75th Anniversary, and GE's plans for the future. They also are expected to touch upon GE's views about business potential in the West, and opinions concerning the future of atomic energy. The second press conference will be held to afford visiting newspaper, radio, and press association representatives an opportunity to interview W. E. Johnson and D. F. Shaw about developments in plant and town operation.

The article on Hanford technical accomplishments for the January issue of the GE REVIEW is ready for declassification action by AEC's Oak Ridge offices, if this is determined to be necessary and has been submitted for public information policy clearances by AEC in Washington.

Arrangements have been made for a member of Public Relations to represent the Manager of Public Relations at a two-day meeting of the Atomic Energy Commission's Industrial Information Committee at Pittsburgh. The meeting will be held during the same week in which the Company's Board of Directors will visit Richland.

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Employee and Public Relations
Summary

A total of 254 photography assignments were covered during the month of September.

The Community News Letter and News Digest were distributed to community leaders in Pasco, Kennewick and Richland during the month.

"Getting the Job Done," the feature length 16mm motion picture produced for Engineering Department was completed and previewed with 40 supervisors of Minor Construction. Favorable comments were received on this film which is to be used for training new construction personnel whose work will be largely in radiation zones.

Manufacturing Department informed us that over 3795 people have been shown the two motion pictures, "Operation Sample" and "No Comedy in Errors," produced for them.

Nine papers were submitted by Hanford Atomic Products Operation authors for clearance during the month.

Arrangements were made for providing the Manager of Technical Personnel Section with General Electric's film, "A is for Atom," for showing at the American Society of Electrical Engineers' Meeting in San Diego, California, in December.

The Company has agreed to a consent election involving representation for 108 radiation monitoring Inspectors "A" and "B". On September 22, 1953, a call was received from the Secretary of the Building Trades Council requesting a meeting to firm up understandings with regard to the assignment of work to maintenance and Minor Construction forces. Discussions are continuing with AEC regarding language to be included in Appendix "B" and current reimbursement authorizations on the subject of overtime lunches. Grievances continued to be presented in which the Council alleges that technical personnel are doing bargaining unit work. The Company has received no word from the Council relative to the draft of a proposed revised contract for Community Firemen. A meeting was held on September 8 with the HAMTC to discuss a jurisdictional agreement between the Instrument Guild and the Plumbers-Steamfitters. Three discharge cases were investigated during the month.

A state-wide agreement with the Plumbers has been signed. The dispute between Machinists and Millwrights in the 2101 Building flared up on September 10 resulting in a Machinists' work stoppage the following day. Father Carmody, Seattle University, served as arbitrator in a wage dispute between Kaiser and the Technical Engineers. On September 14, Office Workers of Blaw-Knox voted 143 to 28 in favor of representation by Office Employees Local 100. Cisco Construction Company (nonunion) is the apparent low bidder on the contract for erection of a 230 KV substation for "K" area.

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Employee and Public Relations
Summary

Recruiting

To maintain our university contacts which have been built over several years, we have planned a schedule of recruiting visits at a modest number of universities for both Ph.D. and bachelor degree candidates.

Technical Personnel Transfers and Losses

This office is giving first attention to any employees who are seeking or may need a new opportunity. We are exploring possibilities within Hanford, and with other GE divisions or AEC sites as may be needed.

Education

The School of Nuclear Engineering is in full operation. Twelve graduate-level courses in science and engineering have a total registration of 167 students, and seven college-level courses are operating with an additional enrollment of 124, making a total of 291 registrations.

Rotational Training Program

With 69 trainees, this program is just within the personnel ceiling. We are asking the cooperation of Section Managers in the negotiating of suitable assignments and, in turn, more permanent placements for these trainees.

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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SEPTEMBER, 1953

ORGANIZATION AND PERSONNEL

General

Effective September 1, 1953, C. N. Gross was appointed Manager, Employee and Public Relations Department.

Effective September 1, 1953, G. G. Lail was appointed Consultant to the Manager, Employee and Public Relations Department.

Effective September 14, 1953, Ruth Van De Mark, Secretary A, transferred to Plant Auxiliary Operations Department.

Effective September 14, 1953, Doris Lewis, Secretary A, transferred from Manufacturing Department to Employee and Public Relations Department.

Employee Relations

Effective September 9, 1953, Susan Loveless, Stenographer, was added to Employment.

Effective September 18, 1953, Sharon S. Anderson, Motor Messenger, was added to Investigations and Personnel Records.

Effective September 18, 1953, Betty H. Waldbauer, General Clerk D, terminated for personal illness.

Effective September 29, 1953, Margaret M. Gant, Messenger, was added to Investigations and Personnel Records.

Public Relations

Effective September 28, 1953, E. E. Shorthill, Reproduction and Photography D, and James L. Hascall, Reproduction and Photography B, were transferred to Public Relations Section from the Technical Section Photographic lab. The transfer was in accordance with agreement by both departments to consolidate personnel within the classification into one organization.

Union Relations

Effective September 8, 1953, Wm. C. Berlin, Jr., Wage Analyst, transferred from Radiological Sciences to Wage Rates.

Effective September 18, 1953, Elouise M. Schmidt, Stenographer, Wage Rates, resigned.

Effective September 30, 1953, Nola H. Bruhn, Stenographer, was added to Wage Rates.

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Employee and Public Relations

ORGANIZATION AND PERSONNEL

Salary Administration

Effective September 1, 1953, W. P. McCue, Manager, Salary Administration, transferred to the Manufacturing Department.

Effective September 1, 1953, W. I. Patnode was appointed Manager, Salary Administration.

Effective September 1, 1953, G. C. Swanson, Supervisor, Salary Control Records, transferred to the Financial Department; he was replaced by L. C. Stewart.

Technical Personnel

Effective September 11, 1953, Ruth Romanow, General Clerk C, resigned.

Trainees - Beginning of Month 71 - End of Month 69

Net Change:	Placement in departments	2
	Resignations (military)	0
	(other)	2
	New Hires	2

Number of Employees on Roll	Sept.-1953
Beginning of Month	197
End of Month	200
Net Change	3

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Employee and Public Relations

EMPLOYEE RELATIONS

ACTIVITIES

General

All employees were given an opportunity to participate in the follow-up Attitude Survey conducted September 10 and 11. Over 80 per cent participation was realized. Most of the completed questionnaires were delivered by September 16 to the statistics and computing people who will analyze the results. At month end about one-third of the questionnaires had been processed through IBM key punch operation with the key punching job scheduled for completion by not later than mid-October.

Personnel Practices

Employment

	August, 1953	September, 1953
Applicants interviewed	1,512	1,387

439 of the applicants interviewed during September were individuals who applied for employment with the Company for the first time. In addition, 113 applications were received through the mail.

Open requisitions	August, 1953	September, 1953
Exempt	-0-	1
Nonexempt	275	109

Of the 275 open, nonexempt, nontechnical requisitions at the beginning of the month, 176 were covered by interim commitments. Of the 109 open, nonexempt, nontechnical requisitions at month end, 61 were covered by interim commitments. During September, 84 new requisitions were received requesting the employment of 98 nonexempt, non-technical employees.

	August, 1953	September, 1953
Employees added to the rolls	102	88
Employees removed from the rolls	149	181
NET GAIN OR LOSS	- 47	- 93

Separation:

	Fiscal Month August, 1953		Fiscal Month September, 1953	
	Male	Female	Male	Female
Including employees who were laid off for lack of work	.94%	3.53%	1.97%	5.44%
Excluding employees who were laid off for lack of work	.94%	3.47%	1.93%	5.44%

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EMPLOYEE RELATIONS

Over-all Separation:

	Fiscal Month August, 1953	Fiscal Month September, 1953
Including employees who were laid off for lack of work	1.43%	2.62%
Excluding employees who were laid off for lack of work	1.41%	2.56%

During September, 17 employees left voluntarily to accept other employment, 8 left to enter military service, and 2 left to enter business for self.

Transfer Data

Accumulative total of requests for transfer received since 1-1-53	432
Number of requests for transfer received during September	49
Number interviewed in September, including promotional transfers	80
Transfers effected in September, including promotional transfers	56
Transfers effected since 1-1-53 including promotional transfers	410
Transfers effected in September for employees being laid off	4
Number of stenographers transferred out of steno pool in September	9
Transfer requests active at month end	320

ADDITION TO THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
New Hires	2	56	2	60
Re-engaged	-	-	1	1
Reactivations	3	22	1	26
Transfers	1	-	-	1
TOTAL ADDITIONS	6	78	4	88

TERMINATIONS FROM THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
Actual Terminations	14	135	1	150
Removals from rolls (deactivations)	3	28	-	31
Transfers	-	-	-	-
TOTAL TERMINATIONS	17	163	1	181

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EMPLOYEE RELATIONS

GENERAL

	8-1953	9-1953
Photographs taken	416	362
Fingerprint impressions	157	150

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	8-1953	9-1953
General Electric cases	80	91
Facility cases	29	34
TOTAL	109	125

INVESTIGATION STATISTICS

	8-1953	9-1953
Cases received during the month	156	75
Cases closed	316	171
Cases found satisfactory for employment	101	109
Cases found unsatisfactory for employment	3	9
Cases closed before investigation completed	24	27
Special investigations conducted	5	10

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	6123
One-year awards made in September for those qualifying in August	44
Total two-year awards to date since January 1, 1950	1736
Two-year awards made in September for those qualifying in August	46
Total three-year awards to date	548
Three-year awards made in September for those qualifying in August	38

During September, 17 people whose continuity of service was broken while in an inactive status were so informed by letter.

Effective September 14, 1953, agreement was reached between the Company and the HAMTC whereby all Community firemen are considered to have on file requests for transfer to the Industrial Fire Organization. This is in line with a previous agreement with the Council leading to the orderly transfer of Community personnel to more permanent assignments.

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EMPLOYEE RELATIONS

Three half-day meetings on the use of the intensive or patterned interview were held during the month. The first two were conducted on a trial basis with three people in the Employment group attending each session. The third was attended by three Supervisor Selection Evaluators from Transportation, Reactor, and Separations Section. The program consists of comparison and results obtained from interviews; the interviewers job, the patterned interview technique, rating forms, note taking and demonstration of the interview. In general the program follows the GE Personnel Selection Program.

Supervisor Selection Program- Eleven supervisory candidates were tested including candidates from Transportation Section, Metal Preparation Section and Separations Section.

Clerical - Twenty applicants for clerical positions were tested with the Minnesota Clerical Test. In addition a battery of aptitude tests were given to one female employee, who is not able to satisfactorily perform the duties of her job, in an effort to find what type work she would be better suited for.

Metal Handlers - Two more new employees in this classification were tested to add to the data for that validation study.

Employee Benefits

The following visits were made with employees during the month:

Employee contacts made at Kadlec Hospital	141
Salary checks delivered to employees at Kadlec Hospital	33
Salary checks delivered to employees at home	3

At month end participation in Benefit Plans was as follows:

	August	September
Pension Plan	96.3%	96.7%
Insurance Plan	98.9%	99 %
Employee Savings and Stock Bonus Plan	44.8%	45.7%

Three employees died during September, namely:

M-651-532	Engineering
W-7411-725	Financial
W-8203-627	Manufacturing

Twenty-nine letters were written to deceased employees' families during September concerning payment of monies due them from the Company, and also to answer their questions.

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EMPLOYEE RELATIONS

Since September 1, 1946, 132 life insurance claims have been paid totaling $823,013.00.

One employee retired during September, namely:

Byron L. Kibler	W-15447-541	Normal Retirement

During September, 28 letters were written to retired employees providing them with information of general interest. To date 264 employees have retired at Hanford, of which 135 are continuing their residence in the vicinity.

Orientation of new employees was presented daily throughout the month. A total of 66 employees attended this program. Of this number, 81.8% signed up to participate in the Pension Plan, 98.4% in the Insurance Plan, and 86.3% in the Good Neighbor Fund.

One Board of Trustees' meeting for the Good Neighbor Fund was attended by a member of this group during September. The percentage of participation in the Fund at the end of September is 63% . Considerable time was spent in assisting with several activities in connection with the Good Neighbor Fund Program. As a member of the Board of Trustees, one member of this group gave a talk at the Community Chest Kick-Off Luncheon representing the Good Neighbor Fund.

During September, considerable time was spent on details in preparation for the coming retired employees Get-Together Luncheon to be held on Tuesday, October 20, at the Camp Hanford Officers' Club. Letters of invitation were sent to all retired employees inviting them to the dinner. To date, 53 cards have been returned accepting our invitation. Ten letters of invitation were also sent to Company management.

Military Reserve and Selective Service

Statistics with respect to employees who are members of the military reserve are as follows:

Number of reservists on the rolls	754
Number of reservists classified in Category A	112

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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	3	
Number of reservists classified in Category D	39	
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		735
Employees registered who are veterans		220
Employees registered who are non-veterans		515
Deferments requested to date (including renewals)		1101
Deferments granted		852
Number of employees for which deferments have been requested		205
Number of employees classified in Category B	1	
Number of employees classified in Category C	2	
Number of employees classified in Category D	202	
Deferments denied and appealed at state levels		5
Deferments denied and appealed at local levels		0
Deferments denied and held pending appeal at national level		0
Deferments denied by local board and not appealed		5
Deferments denied by state board and not appealed		28
Deferments denied at national level (by Gen. Hershey's office)		2
Deferments denied at national level (by President)		5
Deferments requested, employees later reclassified		92
Deferments requested, later withdrawn		81
Deferments pending		26

Military terminations since 8-1-1950 are as follows:

Reservists recalled		130
Selective Service		164
Women employees enlisted		5
	TOTAL	299

Employees returned from military service:

Reservists		57
Selective Service		17
	TOTAL	74

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Known number not claiming reemployment rights	9
Number of employees still in military-leave status	216

Suggestion System, Workmen's Compensation and Liability Insurance

	August	September	Total Since 7-15-47
Suggestions Received	171	257	12395
Acknowledgements to Suggestors	173	223	
Suggestions Pending Acknowledgement	41	76	
Suggestions Referred to Departments for Investigation	173	223	
Suggestions Pending Referral to Departments	41	76	
Investigations Completed & Suggestions closed	89	112	
Suggestions Adopted - No award	1	2	
Adopted Suggestions Approved by Committee For Award	36	44	
Total Net Cash Savings	$6,515.29	$7,793.67	
Total Cash Awards	$ 745	$ 765	
No. of Suggestions Out for Investigation	633	643	

An award of $100 was made to an employee in the Separations Section for his suggestion of an automatic range changing switch for use on instruments covering three ranges and used in conjunction with a chart recorder. This suggestion resulted in considerable labor savings.

An employee in the Accounting Section also received a $100 award for his suggestion pertaining to a revision of salary accounting procedure. Considerable labor savings were realized through adoption of this suggestion.

The second highest award was made to an employee in the Project Section for his suggestion to use a multilith ball-point pen in a LeRoy lettering device to permit lettering directly on a duplimat master. The adoption of this suggestion resulted in labor and material savings.

Liability Insurance

B-6194484 -- While employed by the Morrison-Knudsen Company on February 24, 1948, sprained his ankle. He was treated for approximately a month and discharged apparently free of symptoms. In February, 1951 he brought suit against the General Electric Company and the Morrison-Knudsen Company based upon fraud and negligence on the part of the doctors employed by the General Electric Company in failing to advise him of the severity of his injury and in failing to report the injury to the Department of Labor and Industries. A jury trial was conducted in the Benton County Superior Court and was awarded $15,051 based upon negligence rather than fraud. The case was appealed to the

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State Supreme Court and on September 4, 1953, the Supreme Court's opinion was filed reversing the Superior Court judgement and dismissing the action. The case made some new law in that it held that the responsibility for filing a claim for Workmen's Compensation benefits rests upon the injured workman himself rather than upon his physician or employer. The case may now be considered closed unless the plaintiff petitions for a rehearing before the Supreme Court. The reversal of the judgement, of course, results in a savings of $15,051. Case Closed.

Bus Collision, 300 Area, B-6835621 — On June 17, 1952 a collision occurred near the 300 Area involving four government busses and a station wagon. Four persons subsequently brought suit against the General Electric Company and Mr. G. H. Fisher who was driving the bus in which they were injured. The four causes of action were settled for a final figure of $68,186.55. On September 18, 1953, a fifth Summons and Complaint was served on behalf of Mr. who was also riding in the bus in which the other four persons were injured. The total amount claimed is $28,750 with costs. The action arises out of the same incident involved in the cases of The Travelers will arrange for the defense.

vs. General Electric Company and Harold Petty, B-6835762 — On August 28, 1953, age 3, was drowned in the irrigation ditch at a point near the intersection of Duportail and Thayer Drive. He had left his home approximately one half mile away and wandered down to the ditch which was unfenced at that particular location. On September 24, 1953, a Summons and Complaint was served upon the General Electric Company and Mr. Harold Petty. The action is for damages for wrongful death arising out of the alleged negligence of General Electric in maintaining an irrigation ditch in the City of Richland. The total amount claimed is $30,343 plus costs.

Bus Collision, Hanford, B-6835767 — On September 11, 1953, a bus was stopped at the Hanford 101 railroad crossing and was in the process of starting up when it was struck from the rear by a second bus driven by Mr. A. G. J. Thede. Both bus drivers complained of injuries and six passengers sustained minor injuries. Everyone returned to work following first aid treatment. The action was reported to the Travelers for handling.

Life Insurance

Code information which is known only to Home Office Life Underwriters Association has been furnished 68 insurance companies and investigation agencies during the month of September, 1953. 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.

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EMPLOYEE RELATIONS

Insurance Statistics

	August, 1953	
Claims reported to Department of Labor and Industries	Long Forms	Short Forms
	31	400

	September, 1953	
	Long Forms	Short Forms
	45	352

Total Since September, 1946 - 17,477

Claims reported to Travelers Insurance Company	August, 1953	September, 1953
	9	*9

Total Since September, 1946 - 770

* Of the claims reported to Travelers Insurance Company during the month of September, three were bodily injury claims and six were property damage claims.

Training Program - Collateral Contractors

During the month of September two KAPL trainees reported to HAPO for a one week training period in the Reactor Section.

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TRAINING AND DEVELOPMENT

Training and Development programs and activities for September 1953 were as follows:

MANAGEMENT AIDS:

MANAGEMENT ORIENTATION was presented on Tuesday, September 1, with 10 new exempt personnel in attendance. This program highlights reviews of official sources of information and current management responsibilities. C. N. Gross, Manager of Employee and Public Relations Department, represented senior management at an informal luncheon at the Desert Inn.

SPECIAL SUPERVISORY CONSIDERATIONS, a program to give new supervision a better working knowledge of Company procedures and supervisory leadership, was held Wednesday, September 9, with 14 attending.

BASIC ECONOMICS was presented on Tuesday and Wednesday, September 29-30, with an attendance of 16 supervisors. This course deals with economics in industry and the free enterprise system.

POLICY PANEL SEMINAR scheduled at the Pistol Range for September 14-18 was cancelled because of insufficient enrollment.

LABOR MANAGEMENT RELATIONS AND LABOR LAW provides supervisory management with the principal contents of labor laws and a better understanding of their own legal responsibilities as agents of the Company. This meeting was held Thursday, September 10, with an attendance of 14 exempt personnel.

MANAGEMENT SKILLS:

PRINCIPLES AND METHODS OF SUPERVISION was presented to two groups during two weeks of September 14-25, with a total of 38 supervisors attending. PMS Groups 52, 53, 54 were awarded certificates of completion at a dinner meeting in the Desert Inn on Wednesday evening, September 30. W. E. Johnson, General Manager, was the speaker of the evening. Members and guests present were 64.

CONFERENCE LEADING, a program that stimulates group thinking by actual participation of those supervisors enrolled, was conducted on Friday, September 11 and Friday 28. Total attendance was 24.

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MANAGEMENT DEVELOPMENT:

MANAGEMENT CONFERENCES ON HUMAN RELATIONS was begun by three groups on September 23, 24 and 30. Group enrollment total is 42. The intent of this 12-hour course is to offer supervision a practical study of human relations experiences on the job.

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PROFESSIONAL MANAGEMENT DEVELOPMENT MEETING "Effective Presentation" was held Tuesday evening, September 15, with 43 in attendance. The series of this program on various refresher subjects consist of 15 evening meetings, allowing all exempt personnel to select those subjects of most interest and significant to their work. The subject "Effective Presentation" was discussed by W. W. Chamberlain, instructor in Report Writing in the Graduate School of Nuclear Engineering.

MANAGEMENT PANEL FORUM — These forums are a series of meetings which give all exempt personnel an opportunity to participate in open discussions conducted by recognized specialists on policies and procedures of the Company. The meeting "How to Create Enthusiasm in Safety Meetings" was lead by F. W. McKinnon, Manager of Safety and Fire Section, and E. J. Walsh. There were 29 exempt employees present.

HOW OUR BUSINESS SYSTEM OPERATES (HOBSO II) was presented to three pilot groups on September 28 and 29, with a total of 23 supervisors participating. This program covers the effects of war-time economy, government controls, and post-war economy.

OTHER TRAINING ACTIVITIES:

SUPERVISOR'S HANDBOOK — Following is a summary of handbook distribution during the month:

Number issued	7
Number returned	6
On hand	173

Of the 173 on hand, 47 are not usable because of missing pages and 19 have to be checked for completeness. The remaining 107 are ready for issuance.

A member of the training staff spoke to 22 members of the Beta Sigma Phi Sorority Tuesday evening, September 28, on "The Spoken Word and How To Develop Confidence in Speech Making".

At the request of W. A. Halteman, Public Relations Section, a Training member showed the film "Graphite" to 14 Union Relations employees on Monday, September 14.

A member of Training gave a speech to 35 members of Beta Sigma Phi Sorority (Beta Kappa Chapter) Tuesday evening, September 23, on "Anyone Can Become a Good Public Speaker".

At the request of R. E. Curtis, Supervisor of Technical Personnel, Robert E. Latta, Tech Grad, is observing Training for three weeks in an endeavor to gain more self-confidence.

CUSTOMER RELATIONS program, requested by Dr. W. D. Norwood, Director of Kadlec Hospital, was presented to 52 medical personnel on September 21 and

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22. The content of this program is primarily concerned with the personal considerations of customers and what do people think of you.

REQUESTS FOR MATERIAL — During the month there were 18 requests for transcripts of program attendance, 11 copies of "Laws of Engineering", 8 for 1953 Training Objectives, 13 Business English References, and 385 "Let's Talk It Over" check sheets for use of supervisors in their interviews with non-exempt employees.

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EMPLOYEE RELATIONS

EMPLOYEE COMMUNICATIONS

Operations performed by the Plant Auxiliary Operations Department appeared as the first in a series of GE News features to be devoted to reviewing functions of all HAPO Departments. A double-page feature was used to pictorially portray all of the various components of the Department.

The policies governing the nonexempt rating system at Hanford were reviewed in the GE News, coinciding with actual ratings during September.

First phases of a Basic Rescue Training course developed in the 200 Areas were covered in a photo feature by the GE News. As advanced training progresses, a full-page photo feature is planned.

The GE News was presented with a certificate of appreciation by the Richland JayCees at a dinner meeting. The certificate was in recognition of the plant newspaper's publicizing the 1953 Atomic Frontier Days.

Safety information received major emphasis throughout the month in the GE News. Specific safety items included Separations Safety Stampede, 200-E Area completing 8 years without a major injury, and the safety training given new employees in the 100-D Area.

GE Graduate School of Nuclear Engineering was given continued publicity on registration for classes. Follow-up included publishing of the registration blank, an editorial cartoon, and a schedule for first class meetings.

Promotions of four employees from nonexempt to exempt salary roll, and the transfer of one employee, were publicized in the GE News in two different issues.

Suggestion System was given feature promotion in a full page of pictures and story material concerning the most recent award winners.

Good Neighbor Fund publicity in the GE News included announcement story concerning the Board of Trustees elections. Follow-up publicity included a full page devoted to pictures of all candidates with a short biographical sketch of each.

Community Chest Drive in 1953 received prominent treatment in two issues of the GE News during the month, with pictorial handling on the new drive chairman and publicity on the porchlight canvass of Richland. Members of the GE News staff attended the kickoff dinner held at the American Legion building.

Adult Education Program was given initial send off in the GE News with announcement of class registration and details concerning class meeting places, fees, and times.

Availability of housing in Richland was reviewed in GE News to remind employees that Wherry Act housing is immediately available, and that only those that still desired government-owned housing are being carried on the GE housing list.

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EMPLOYEE RELATIONS

Patent applications to provide one share of GE stock to employee-inventors provided the GE News lead story material. Syndicated story was localized for Hanford, and was supplemented by syndicated picture of GE employees who have received a share of stock for a patent application.

Credit Union information will be published from time to time in the GE News as a result of arrangements made with the official Credit Union organizer at Hanford. Story was also published advising that application has been made by nonexempt people to establish a credit union.

A special feature on HAPO "hot" water, Columbia River water used to cool reactors, was localized for use in the GE News.

At the request of the Atomic Energy Commission prominent treatment in the GE News was given to a story concerning registration for Civil Defense Training classes.

Fire prevention month publicity included publishing a proclamation by the General Manager in reference to a proclamation by the President of the United States concerning fire prevention during October. Additional material on this subject included news story and several photos.

A preliminary meeting to outline plans for a cost reduction plan in the Separations Section was held with R. W. Harvey, Separations, and a number of Engineers in 200-W Area who will write the basic material. Employee Communications will edit and produce the material and arrange for proper publicity. The program is scheduled to start shortly after January 1, 1954.

The Employee Attitude Survey conducted during the month was aided by Employee Communications through GE News stories and photos, and through arranging for distribution and collection of the Attitude Survey collection boxes to and from each work area throughout the plant.

Copy and layouts for two full-page advertisements to appear in the special GE Anniversary issue of the Tri-City HERALD—as well as artwork for the cover of the issue—were prepared at the request of Public Relations.

New Suggestion Plan booklets were mailed to nonexempt employees' homes along with a letter from the General Manager. In addition, information to Supervisors, including a booklet for supervisors on the revised Suggestion Plan, was mailed to exempt employees at their plant addresses.

An Employee and Plant Community Relations script prepared in New York for presentation at individual plant locations was edited for possible use at Hanford.

Reprints from the FREEMAN magazine on "How to Save Taft-Hartley" were distributed to management lists 1, 2 and 3. Approximately 300 copies were made available to Public Relations for community distribution.

Three Management News Bulletins were developed and distributed to all exempt employees. In addition, a letter to Hanford management from the Manager, Employee Relations, was developed to inform exempt employees of the furloughing of approximately 28 expeditors due to disputes between construction machinists and mill-

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wrights. The letter was not distributed however due to the return to work of the two construction crafts.

The health bulletin for October, "At Ease!," and the safety topic for October, "So Nobody Loses," were prepared. The safety topic is a special fire prevention issue.

Assistance was given Employee Benefits with the annual Pensioners' Dinner through preparation of the letter of invitation, a map showing the location of the Camp Hanford Officer's Club, and self-addressed return post-cards.

The monthly meeting of the Safety Program Committee was attended and the minutes prepared. The monthly meeting of the Health Activities Committee was attended by members of Special Programs in their capacity as information and communications advisors.

The Salary Plan booklet, prepared by Dr. W. I. Patnode, was produced and distributed to all exempt employees.

A permanent symbol and letterhead-stationery embodying this symbol were designed and produced for the Nucleonics Employee Good Neighbor Fund.

The three 700 Area public information racks were serviced weekly.

"The Community Operations Annual Report," a single sheet, two-color photographic summary of the year's operations was prepared, produced and distributed to Richland residents. This work was done at the request of Manager--Community Operations.

Copy, photographs and layout for "here's hanford"--a booklet to be presented to the Board of Directors during their October visit--were prepared. Galley proofs have been corrected.

The following posters were put up throughout the plant: weekly Sheldon-Claire and Elliot Service Company posters; 150 copies of an AEC-GE security poster; 95 copies of a special security poster; 40 copies of A Supervisor's Association poster. In addition, all Suggestion System boxes were checked and three sets of posters placed in them.

Twenty-eight projection engagements were filled. In these, films were shown to approximately 900 people. "A is For Atom" was shown 13 times to approximately 375 people. (This film was shown three additional times by other projectionists). "Wonderland of Vision," which was secured to accompany the monthly health topic, was shown five times to approximately 160 people. Eighteen films were ordered from off-site during the month.

First photos for "1953 At Hanford" were taken in 100-D Area, in line with Employee Communications responsibility for editing and producing the year's annual report.

Art work supplied during the month to the GE News by the Employee Communications commercial artist included: layout of a two-page GE News photo feature, layout for two-page photo and copy feature on the Good Neighbor Fund, and an editorial cartoon.

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Booklet art work was completed during the month for: "here's hanford," the safety topic and October health bulletin (7 illustrations), Atomic "Test" recruiting brochure.

Final art work was prepared for two full-page GE advertisements for the Tri-City HERALD, scheduled for October, and a full-page drawing to be used as the cover for the edition. The latter was a wash drawing of the entire Tri-City Area.

Miscellaneous art work during the month included: a layout map of North Richland, illustrations for two GESA bulletins, lettering for HOBSO visualizers, cover layout for pamphlet of a technical recruiting poster, extensive retouching of the new Radiometallurgy Building photo for use in Atomic "Test", layouts for four safety match book covers, layout for a fire prevention sign, and cover layout for a "Radiation Protection Standards" manual.

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PUBLIC RELATIONS

During the month of September, the News Bureau issued 22 releases. The breakdown by category, distribution, and content was as follows:

Plant or Company		Distribution	
Organization Changes	1	Local	13
Pay and Benefits	1	Daily	3
Employment Services	3	Tri-City Herald	1
Good Will	5	Columbia Basin News	2
Technology and Research	4	Special	3
Public Health	1		
Recreation and Library	1	Content	
Util. and Pub. Works	3	Information only	2
Safety, Fire, Security	2	Picture only	2
Real Estate	1	Short news story	14
Total	22	Long news story	4

One of the news releases was a condensation of a speech given by a Hanford author at the annual meeting of the Phycological Society of America at the University of Wisconsin. A representative of the University requested and received 125 copies of the release for distribution in the Madison, Wisconsin area.

From reports to date concerning the amount of advertising space already sold, it now appears certain that the Tri-City HERALD will publish a special edition on or about October 11. The edition will recognize GE's 75th Anniversary, the scheduled visit by the Board of Directors to Hanford, and point out the significance to the three towns and surrounding area of the almost continuous expansion at Hanford. It will indicate that this almost continuous expansion at the plant has taken place since 1947, and that it was begun only a few months after General Electric assumed responsibility for operation of the plant and the town of Richland as prime contractor to the Atomic Energy Commission on September 1, 1946. Public Relations has cooperated with the Tri-City HERALD in the publication of this special edition by furnishing the huge amount of copy about the Company, the plant, and the town which they will require, as well as arranging for two full-page messages, and the cover art work. Preparation of the required news and feature story material, and photographs has constituted a major project for the News Bureau and Photography Unit this month.

Jerome Luntz, Editor of NUCLEONICS, visited Richland for three days. He talked to various GE Department, Section, and Unit Managers, and others at Hanford to secure background information and to line-up possible articles for his magazine in the future.

ADVENTURES AHEAD will use our sheep farm story in their next issue. The story was revised for them this month to include additional information and pictures.

Vance Orchard, Walla Walla Union-Bulletin writer, visited Richland and discussed future story possibilities with News Bureau representatives.

Arrangements were completed this month for holding two press conferences in Richland on October 15. The first will be a breakfast session in the American Legion Building, with Messers. Cordiner, Reed, Belanger, McCune, and Johnson present to discuss the significance of the Company's 75th Anniversary, and GE's plans for the future. They also are expected to touch upon GE's views about business potential in the West, and opinions concerning the future of atomic energy.

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The second press conference will be held at the Desert Inn during the afternoon, on October 15, to afford visiting newspaper, radio, and press association representatives an opportunity to interview W. E. Johnson and D. F. Shaw about developments in plant and town operation.

Between the 7 to 8:30 a.m. breakfast conference and the session from 2 to 3 p.m., following the luncheon, representatives of the various public information media present will be provided time in which to prepare and file their stories, a highway tour of the plant areas, and luncheon. A tour of Richland is scheduled after 3 p.m. for all representatives who may desire to participate.

An illustration of the 75th Anniversary float appeared in "Candid Camera," which is distributed with the GE NEWS at all plant locations. This brought a request for designs, specifications and photographs from a General Electric representative at Arkansas City, Kansas. This material will be sent to him for use in preparing a similar float for a civic celebration in Kansas.

Ten pages of copy and twelve illustrations that summarize technical accomplishments at Hanford during 1953 have been completed for the January issue of the GE REVIEW. This material has been approved by the departments that furnished the source material, by Legal and by the General Manager. The article and photographs have been sent to Washington, D.C. for AEC approval. They are being reviewed now by local responsible reviewers to determine whether or not it will be necessary to submit them to Oak Ridge for declassification.

Arrangements have been made for the Supervisor, Public Information to represent the Manager of Public Relations at a two-day meeting of the Atomic Energy Commission's Industrial Information Committee at Pittsburgh. As part of the same trip he will contact certain trade magazine editors in New York and discuss signed article activities and Papers and Speakers activities with the Schenectady News Bureau, and other Public Relations Services Division people concerned.

A signed article, containing a brief description of a technique used at Hanford to keep technical people abreast of new developments in their fields, was sent to the editors of MILL AND FACTORY for their consideration.

A brief signed article describing a safe method of stirring hot liquids developed at Hanford was submitted to INDUSTRIAL AND ENGINEERING CHEMISTRY.

A rough draft has been received from the author of a signed article describing the new Radiometallurgy Building. This article has been requested by METAL PROGRESS magazine.

A total of 254 photography assignments were covered during the month of September. This includes 48 photography assignments completed by the Technical Laboratory of the Photography Unit. A total of 21,282 prints were produced, of which 526 were "A" and "B" badge prints.

Six rolls of contraband film were processed for GE Security.

One photography assignment during the month required 300-8x10 prints for the Reactor Process Section.

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Employee and Public Relations

A total of 160-8½x11" prints were produced by copying original prints to retain fine detail for the Engineering Department and 183-5"x7" prints were produced for the Biophysics Section.

A request of 2,500 prints was received from the Police Unit. These are reprints of all the "mug" photos made to date.

Three prints each of 500 glass slides have been requested. The proper method of producing prints from glass slides is being worked out for this, and future uses.

A request was made by Fuel Technology Sub-Section for processing and printing one film 9½" wide and 200 feet long. They advised that, if we could handle such an assignment, we could expect one of these films each day. They were informed that the Photography Unit could do the work, but that it would be necessary to secure the processing equipment on the customer's cost code and that the justification of an employee to accomplish this full-time job would be his as well as Photography's responsibility.

The Community News Letter and News Digest were distributed to community leaders in Pasco, Kennewick and Richland during September.

"Getting the Job Done", the feature-length 16mm motion picture produced for the Project Section was completed and previewed with 40 supervisors of Minor Construction. Favorable comments were received on this film, which is to be used for training new construction personnel whose work will be largely in radiation zones. The head of the group stated: "The picture is all and more than we expected and one of the best things we've seen for training people who work in radiation zones. We enthusiastically accept it as a job well done." The General Manager requested a showing of the film to his Operating Staff on October 1. Following this, further showings of the film will be made.

Manufacturing Department management informed us that over 3795 people have seen the two motion pictures produced for them: "Operation Sample" and "No Comedy in Errors". One hundred thirty-three showings have been made to non-exempt people since March 1953 and 38 showings for exempt people, mainly in the interest of training personnel in the work depicted in the film. They further stated they were most enthusiastic about the results and we are planning additional films to be produced for their extensive training program.

Members of Public Relations conferred with Technical Section people on the production of a motion picture that will convey the entire story of canning processes...past and present. The film is to point up the advantages of a special mechanical canning device recently tested. They want a film that will highlight quality control methods and savings, if the mechanical method of canning is adopted. A request for estimates will be submitted by G. E. McCullough, Manager, Fuel Technology Sub-Section. Six hundred feet of secret film was exposed on the mechanical canning device. A workprint was processed and a preliminary history of the entire process has been compiled.

A preliminary discussion was held with a representative of Plant Engineering Sub-Section on the feasibility of producing four motion pictures, each two-reels in length, and two sound-slide films on training techniques for Separations Section. The Superintendent is submitting a request for estimates of the cost of producing these motion pictures and slidefilms which will be a part of a package training program presently being planned.

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Extensive filming on the 16mm color motion picture being produced by Public Relations for Employee Relations Section was carried out this month. Exterior filming is nearly complete except for retakes and other scenes that are dependent upon better weather conditions. A revised version of the film story and script has been reviewed with the customer sections and revisions are being made in accordance with their wishes. Critical reviews of the film processed so far have been held with the Director, Production Staff and Section Manager present. Plans are nearly complete for the interior filming.

A contract for processing Atomic Energy Commission and Design Section motion picture footage has been completed and invitations to bid have been sent to interested studios. Publicity of bids has been arranged and bid openings will be made on or about October 21. The intricacies of the work to be performed, security measures to be followed, and difficulties of preparing estimates were such that a contract of this sort is written around "crystal ball" methods. Those General Electric people concerned with the contract are of the opinion that time and money would have been saved by adherring to a direct contract with the studio which has been producing HAPO motion pictures.

Photography on the 100-K Design Section film for the week of September 14 was devoted to the filming of special classified fabrication processes at the Puget Sound Naval Shipyards at Bremerton, Washington. Unusually fine cooperation was extended to members of Radio & Special Events Unit and Photography Unit by officials and personnel of the shipyard under conditions that would normally be difficult. About eleven hundred feet of film was exposed on subjects located in mammoth machine shops and special secured areas unlike physical layouts encountered at Hanford. The subject photographed are important increments in a phase of the current construction program that is shaping up to be an interesting progress story. Filming is continuing in various area locations both indoors and outdoors, for both Design Section and the Atomic Energy Commission.

Considerable time was spent this month in procuring a grip, completing final arrangements for purchasing a special motion picture camera, and on discussions regarding the contract to be submitted for bids by the film studios. Also, attention was devoted to other administrative matters concerning the production of the three motion pictures currently being produced by Radio and Special Events Unit for Engineering Department, the Atomic Energy Commission and the Employee Relations Section.

After two years of working under adverse conditions, a location for a sound studio was offered by Radio Maintenance Unit which would have had many advantages for this function. The Administrative Area Maintenance Unit would not approve this location or remodel it to accommodate this important function. The basement of the 703 Building is entirely unsatisfactory for sound recording according to engineers who surveyed the location. It is hoped that facilities for radio studio work will be available to the new replacement for the Publicity Writer who will perform these functions.

Arrangements were made for providing the Manager of Technical Personnel Section with General Electric's film, "A is for Atom," for showing at the American Society of Electrical Engineers' Meeting in San Diego, California, in December.

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Employee and Public Relations

Nine papers were submitted by Hanford Atomic Products Operations authors for clearance. They are as follows:

1. Experiments on the Movement of Tracer p32 in Aquarium Communities," by R. H. Whittaker, for presentation at the American Society of Limnology and Oceanography," University of Wisconsin, Madison, Wisconsin, September 9, 1953.

2. "The Distributional Meaning of Plant and Animal Associations," by R. H. Whittaker, for presentation at the Ecological Society Meeting, University of Wisconsin, September 9, 1953.

3. "The Uptake and Translocation of Yttrium by Higher Plants," by J. H. Rediske and A. A. Selders, for future publication in the "American Journal of Botany."

4. "Phytomoneone and Tomatoene," by J. W. Porter and D. C. Burns, for future publication in the "Archives of Biochemistry and Biophysics."

5. "Metabolism of Hydrogen Isotopes by Rapidly Growing Chlorella Pyreoidosa Cells,"by Daniel Weinberger and John W. Porter, for future publication in "Archives of Biochemistry and Biophysics."

6. "Studies of the Diffusion of Aerosols," by M. L. Barad and Bernard Shorr, for publication in the "Quarterly Journal of the American Industrial Hygiene Association."

7. "The Uptake, Conversion and Distribution of Molecular Tritium in the Rat," by Grant N. Smith, L.A. Temple, R. J. Emerson, and T. W. Galbraith, for publication in "Archives of Biochemistry and Biophysics".

8. "Evaluation of the Shell Molding Process for the Manufacture of Tube Venturi Meters" by A. T. Taylor for submission to the Washington State Professional Engineers' Registration Board in partial fulfillment of licensing requirements.

9. "On the Indefinite Integrals of Functions Satisfying Homogeneious Linear Differential Equations" by G. M. Muller, for presentation.

One abstract was also received for clearance. It was: "The Application of the Polya-Eggenberger Distribution to Some Personnel Problems" by F. H. Tingey and L. G. Waters, for a paper to be presented at the General Electric Company Third Annual Symposium on Statistical Methods at the Hotel Commodore, New York City, November 17, 1953.

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Union Relations

UNION RELATIONS - OPERATIONS PERSONNEL

The Company has agreed to a consent election involving representation for approximately 108 radiation monitoring Inspectors "A" and "B" employed in the Manufacturing and Radiological Sciences Departments. The petition submitted to the NLRB was supported by 46 signatures. The Board has set no date for the election. It appears probable that in the event of a vote favorable to the HAMTC, the employees will be brought into the production and maintenance bargaining unit under the existing contract, at existing rates of pay and under existing job descriptions.

By letter of June 18, 1950, a joint committee comprised of representatives of the Building Trades and Metal Trades Councils concurred in the Company's general distinction between construction and nonconstruction work as it applies to this project. The memorandum also contained a proposal by this committee that a labor-management committee be formed to interpret questions arising from time to time regarding work being performed by GE forces and that the said committee meet with the Company at the end of a 6-month period to review this understanding if found to be necessary. On September 22, 1953, a call was received from the Secretary of the Building Trades Council requesting a meeting of the original committee to again discuss this matter. Apparently, complaints from Minor Construction were instrumental in the renewed interest in this subject. No definite time was established for the meeting and at month end the Building Trades Council has made no further reference to the matter

Discussions are continuing with the Commission regarding language to be included in Appendix "B" and current reimbursement authorizations on the subject of overtime lunches. The Commission is very reluctant to authorize the purchase of lunches for exempt people and nonbargaining unit people outside the barricade. As soon as this matter is resolved, a letter will be sent to all department managers clarifying the procedure.

Grievances continued to be presented in which the Council alleges that technical personnel are doing bargaining unit work. A particular sore spot concerns the availability and use of all types of tools by technical personnel. Further aggravation is caused by the reluctance of some individuals in the Technical Section to recognize the Company's contractual obligations. Further meetings with Technical management are being planned.

The Company has received no word from the Council relative to the draft of a proposed contract which is calculated to supersede the one presently in effect between the Company and the Community Firemen.

A meeting was held on September 8 with the HAMTC to discuss a jurisdictional agreement between the Instrument Guild and the Plumbers-Steamfitters. Little was accomplished at this meeting; however, it was agreed, pending further discussion or agreement, that the work would continue to be assigned in the same manner as it had in the past. The Council has not notified this office of a settlement of jurisdictional differences between the Instrument Craftsmen's Guild and the Electricians. Several meetings are known to have taken place between these groups.

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Employee and Public Relations

Three discharge cases were investigated during the month. Serviceman in the Transportation Section, was discharged for general incompetence. Action was withheld in this case until the Department of Labor and Industries notified the Company that the case, on an alleged back injury, was closed. Discharge papers were executed for Janitor, because of poor job performance. was later permitted to resign. Electrical Lineman, was dropped from the rolls on October 9 because of his physical limitations.

Grievance Statistics:

Three meetings were held during the month for the purpose of processing grievances at the Step II level.

Status of Grievances

	1953 Unit	1953 Nonunit
Received this month	18	4
Received this year	228	27
Settled at Step I this month	6	4
Settled at Step I this year	103	21
Pending settlement at Step I at end of month	4	3
Settled at Step II this month	6	0
Settled at Step II this year	91	5
Pending settlement at Step II at end of month	222*	1
Brought to arbitration during the month	0	0
Pending settlement by arbitration	9**	0
Total number pending settlement	235	4

*Includes 145 bargaining unit grievances brought to Step II by the Union prior to January 1, 1953, but not scheduled for Step II processing by the Union to date.

**Includes 7 grievances brought to the arbitration level by the Union prior to January 1, 1953, but no further action has been taken by the Union to date.

Analysis of Grievances Received this Month

Department	Unit	Nonunit
Manufacturing Department		
Reactor Section	8	2
Separations Section	6	0
Metal Preparations Section	2	0
Total for Department	16	2
Plant Auxiliary Operations Department		
Electrical Distribution & Telephone Section	2	0
Total for Department	2	0

PRIVACY ACT MATERIAL REMOVED

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Employee and Public Relations

Department	Unit	Nonunit
Engineering Department		
Technical Section	0	2
Total for Department	0	2
Community Operations and Real Estate Department	0	0
Radiological Sciences Department	0	0
Employee and Public Relations Department	0	0
Financial Department	0	0
Medical Department	0	0
Legal Department	0	0
GRAND TOTAL	18	4

Subjects Covered by Grievances

Unit		Nonunit	
Jurisdiction	7	Wage Rates	2
Hours of Work	1	Overtime Rates	1
Overtime Rates	2	Hours of Work	1
Sick Leave	1		
Seniority	2		
Wage Rates	2		
Miscellaneous	3		
Total	18	Total	4

CONSTRUCTION LIAISON

A state-wide agreement with the Plumbers has been signed calling for a 25-cent per hour increase (to $3.00) effective January 1, 1954, with an additional 5-cent hourly increase to be granted as an "improvement factor" on the 1st of July in 1954, 1955, and 1956. The Commission assures us that the agreement makes no reference to hazard or onerous pay.

The dispute between Machinists and Millwrights in the 2101 Building flared up on September 10, resulting in a Machinists' work stoppage the following day. The Machinists picketed the North Richland bus lot on September 15. They returned to work in the 2101 Building on September 25 as the result of an injunction issued by the Federal District Court in Spokane restraining the Machinists from "engaging, inducing, or encouraging" employees of Kaiser to

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strike or picket. The injunction orders the Machinists to appear in Federal Court on September 29 for the show cause hearing. Concurrently, and probably as a direct result of this action, a jurisdictional understanding signed by the international presidents of both the Millwrights and Machinists was received on the project. Among other things, the agreement provides an orderly procedure for settling future disagreements and forbids strikes or work stoppages for this reason.

Father Carmody, Seattle University, serving as arbitrator in a wage dispute between Kaiser and the Technical Engineers, recommended acceptance of the following rates:

Jr. Engineer Aide	-	$80 per week
Sr. Engineer Aide (Grade 1)	-	95 " "
Sr. Engineer Aide (Grade 2)	-	100 " "
Jr. Engineer	-	115 " "

This wage structure is considered by the Commission to be excessive and completely out of line with rates prevailing in the Northwest. The Commission has refused to reimburse on this basis in spite of the arbitration award and is resurveying the rates paid by firms submitted by the union to substantiate their claims before the arbitrator. This evidence will be utilized in an attempt to convince Father Carmody that his award should be tempered. There are indications that the Technical Engineers may strike over the issue.

The Sign Painters were awarded a Local charter which caused them to be regarded as a Local separate and distinct from Painters - Brush or Spray. Negotiations were completed and a new contract executed by the Hanford Contractors Negotiating Committee and the Brotherhood of Sign and Pictorial Painters of America, Local 1777. The rate of pay established was $2.90 per hour, with working foremen in the craft to receive $3.15.

On September 14, Office Workers of Blaw-Knox voted 143 to 28 in favor of representation by Office Employees Local 100.

Cisco Construction Company (nonunion) is the apparent low bidder on the contract for erection of a 230 KV substation for "K" Area. The bid is under review by the Commission.

WAGE RATES

Representatives of the Payroll Unit and the Wage Rates Unit have agreed upon a change in working procedure in the flow of work between the two groups. A substantial saving in time will result from the elimination of certain paper work.

In connection with the Community Firemen case, which is still on the calendar awaiting a hearing on the Company's appeal, a comparison report was compiled showing the cost of continuing the Community Firemen on the present two-platoon system as against the cost of re-establishing the three-shift schedule or putting into effect other schedules. The study pointed out definitely the economy of maintaining the existing system.

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As a result of the HAMTC's request for an increase in the rate of pay for the classification of Pile Operator, a special study is being made of changes in the job since the start of the operation.

At the request of the Legal Department, a description of the General Electric Company's nonexempt classification system was prepared for submission to the Atomic Energy Commission in connection with the new contract.

Three meetings were held during the month to continue discussions with various craft groups in the HAMTC on the subject of changes in job descriptions and progression schedules.

Work continued on the study of onerous or unpleasant working conditions, and a series of progress reports were submitted to management.

Several meetings were held during the month with the committee which has been established for the plantwide study of semi-technical jobs. In addition to the committee meetings, the program of writing up all jobs in the engineering and laboratory assistant categories was started.

Reimbursement authorization was received from the AEC covering the June 10, 1953, salary adjustment for the classification of Supervisor-in-Training.

Reimbursement authorization was received from the AEC setting up a procedure for the transfer of Firemen from the community fire department to the area fire department.

Approval was received from the AEC to revise Reimbursement Authorization No. 203 to include the changeover procedure for those employees who choose to remain in the Metal Preparation Section.

A reimbursement authorization request was submitted to the AEC to clarify the lunch provision set out in Reimbursement Authorizations Nos. 204 and 205.

Three hundred twenty-seven (327) automatic increases and four (4) merit increases and four (4) merit increases were processed during September. Requisitions for eighty-two (82) prospective employees and Additions to the Payroll for fifty-nine (59) new employees were approved. Review for proper classification, rate, etc., was made for twenty-five (25) reactivations, one hundred fifty-one (151) reclassifications, one hundred forty-seven (147) temporary reclassifications, ninety-seven (97) transfers and one (1) transfer from the exempt roll.

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Employee and Public Relations

SALARY ADMINISTRATION

1. The following changes in personnel took place on September 1, 1953: W.P. McCue, Manager, Salary Administration, transferred to the Manufacturing Department; he was replaced by W.I. Patnode. G.C. Swanson, Supervisor, Salary Control Records, transferred to the Financial Department; he was replaced by L.C. Stewart.

2. The Request for Reimbursement dated August 17, 1953, to modify the salary schedule for the E.A.&O. Plan was approved by the Commission. The Request for Reimbursement dated July 24, 1953, for funds for the Professional Plan for FY 1954 was approved by the Commission. The Request for Reimbursement dated July 30, 1953, to modify the Professional Plan to include area differential was denied by the Commission.

3. The salary review for employees paid according to the Professional Plan was completed.

4. A meeting was held with two members of the Aircraft Gas Turbine Division in order to compare and evaluate exempt positions at HAPO and AGT. This meeting was part of a series of such meetings for reconciliation of positions between the various components of the Company.

5. The semi-annual review of organization was completed and a new Organization Directory dated September 1, 1953, was issued.

6. A salary brochure entitled "Salary Administration for Exempt Employees" was distributed to all exempt employees in September.

7. The normal administrative work carried on by the Section proceeded according to schedule.

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Employee and Public Relations
Technical Personnel Section

TECHNICAL RECRUITING

During this month off-site interviews were conducted with 37 experienced engineers who were being released by another A.E.C. contractor. In addition, 24 interviews were conducted at Hanford, mostly with people who dropped in to inquire for employment. These efforts were directed at locating a very small number of people of high ability and specialized experience.

Plans are nearly complete for participating to a reasonable extent in the Company-wide recruiting of doctoral candidates at major universities and for participating to a modest degree in the recruiting for MS and BS candidates, principally at the western schools. This year members of the Technical Personnel Staff should be able to do a larger proportion of the total recruiting, and thereby reduce the time and participation required of members of the Engineering and Manufacturing staffs. Since little if any hiring is planned, at least during the fall, these recruiting visits will be primarily to maintain the valuable relationships which have been built up with the universities at great cost and effort over a period of years. Where requirements for technical personnel do develop within the Hanford Operation, every effort is made to propose candidates for transfer rather than hire additional employees.

TECHNICAL PERSONNEL TRANSFERS AND LOSSES

	September	Year to date
Resignations	23	98
Transfers to Other Divisions	3	35
Transfers within HAPO	3	31
Employees counselled to remain in present positions	4	29

Members of the recruiting and training staff within this office are now devoting substantial time and attention to discussions with technical employees who want or may need transfers. In addition to up-to-date data on openings within the Hanford Operation, extensive data is being obtained on technical positions elsewhere in General Electric. Similar data is being sought from other A.E.C. operating sites, for use as needed.

EDUCATION

The School of Nuclear Engineering is in full operation with the program as shown on the attached list. In the attached summary, courses which are new are indicated by *. The enrollment in the graduate-level courses is slightly below last year's but the numbers in college-level courses represent a very large increase.

During the month the writer attended a conference at Berkeley on University Relationships with representatives of other A.E.C. Operations.

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Technical Personnel Section
Employee and Public Relations

REGISTRATION IN THE SCHOOL OF NUCLEAR ENGINEERING

GRADUATE COURSES

MATHEMATICS

- Differential Equations
- Advanced Calculus
- Math. Statistics I

PHYSICS

- Modern Physics I
- Nuclear Physics I
- Theoretical Physics I

CHEMISTRY

- Physical Chemistry I
- Inorganic Chemistry I
- Advanced Quant. Analysis
- Radiochemistry

ENGINEERING

- Fluid Mechanics
- Chemical Engineering Thermodynamics

Total Graduate Course Registrations 167

COLLEGE-LEVEL COURSES

MATHEMATICS

- College Algebra
- Differential Calculus

PHYSICS

- Elementary College Physics *

ENGINEERING

- Survey of Materials and Processes *

BUSINESS ADMINISTRATION

- Elementary Accounting I
- Business Law I
- Cost Accounting

Total College-level Registrations 124

TOTAL REGISTRATION 291

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Employee and Public Relations
Technical Personnel Section

ROTATIONAL TRAINING PROGRAM

With 69 trainees the Rotational Training Program for Technical Graduates is just within the established personnel ceiling. Currently it is very difficult to obtain a good choice of assignments and of placements, and therefore the cooperation of Section Managers is being sought to remedy this situation.

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COMMUNITY OPERATIONS AND
REAL ESTATE DEPARTMENT
MONTHLY REPORT SUMMARY
SEPTEMBER, 1953

ORGANIZATION AND PERSONNEL

Number of employees on rolls:	SUFFIX	BEG. OF MONTH	END OF MONTH
General Administration	310	4	4
Community Operations Section			
Administration	340	2	2
Engineering	341	9	9
Public Works General & Utilities	342	31	30
Public Works Labor Crews	343	53	41
Recreation & Civic Affairs	344	5.5	5.5
Library	345	10	9.5
Fire	346	66	66
Police	347	51	51
Electrical System	348	20	20
Sub Totals		247.5	234
Community Real Estate Section			
Administration	350	3	3
Housing Rental	351	23	23
Maintenance	353	162	153
Commercial Property	357	12	12
Sub Totals		200	191
Civil Defense Program	360	1	1
GRAND TOTALS		452.5	430

Net decrease of 22.5 in the number of employees in the department during the month of September, 1953.

GENERAL

The annual report of the Community Operations Section was released on September 22.

Plans for Fire Prevention Week to be held October 3 through October 10 have been worked out by the Fire Department with the community-wide Fire Prevention Week Committee.

Police Judge Earle W. Brown passed away early in the morning on September 30. Mr. Ray R. King, Sr., has been appointed as his successor by the Benton County Commissioners.

There were 87 new electrical services installed for residences in the Sixth Housing Addition. Consumption of electricity for the month of September was estimated and marked the beginning of the policy to estimate consumption of electricity in residences every other month with any adjustments necessary in consumption being made in the months when the meters will be read.

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Of 6,050 new housing leases to be signed, approximately 5,400 have been executed and returned.

Two ground leases and one license agreement were executed covering a veterinary hospital, an automotive service station, and a television signal distribution system.

Ten supplemental agreements were executed to provide for metering of electricity, extension of lease terms, redefinition of leased premises, construction of building additions, establishment of a beauticians' school, renewal of lease, and the subleasing of space.

Ten sublease enterprises commenced operation.

Custody for the old Railway Express Agency building was relinquished.

The H.A.M.T.C. vacated its former premises and moved into a new Labor Temple erected with private funds under a ground lease with the General Electric Company.

Construction was commenced on one building addition.

Total housing applications pending, 411.

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COMMUNITY OPERATIONS SECTION

SUMMARY

SEPTEMBER 1953

ORGANIZATION & PERSONNEL:

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Non-Exempt	Exempt	Non-Exempt
ELECTRICAL	5	15	5	15
PUBLIC WORKS	12	72	12	59
RECREATION & CIVIC AFFAIRS	3	2 1/2	3	2 1/2
LIBRARY	3	7	3	6 1/2
POLICE	18	33	18	33
FIRE	66	0	66	0
ENGINEERING	6	3	6	3
	113	132 1/2	113	119

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RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
SEPTEMBER 1953

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees beginning of month	5	15
Transfers in	0	2
Transfers out	0	2
Terminations	0	0
Total end of month	5	15

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set and transferred	2
Anchors set and guys installed	0
Street lights repaired and steel mast arms installed	1
Street lights relamped - Mercury Vapor	4
Street lights relamped - 6000L and 4000L, 1100 Area	133
Street lights relamped - 6000L and 4000L, 700 Area	8
Flood lights relamped, 1100 Area	18
Flood lights relamped, 700 Area	0
Stack lights relamped, 700 Area	3
Primary line footage added	0
Primary line footage removed	300'
Transformer KVA added	0
Transformer KVA removed	5
Net transformer KVA installed	0
New services installed - residential - 6th Housing Addition	87
New services installed - commercial	27
Temporary services installed and removed	5
Scheduled outages - primary	3
Scheduled outages - secondary	2
Unscheduled outages - primary	1
Unscheduled outages - secondary	0
Standby and escort	1
High voltage tree trimming	75
Low voltage tree trimming	6

TRAFFIC SIGNALS

Relamping	1
Operational failures	2
Installations	0
Removals	0
Routine maintenance checks	22
Routine check RR signal at Van Giesen	4
Total signals in operation - automatic	16
Total signals in operation - manual	3

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RICHLAND ELECTRICAL UNIT

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	18
Electrical motors checked and serviced - water	46
Electrical motors checked and serviced - sewage	53

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	4
Outside circuit checks	8
Inside faults repaired	5
Outside faults repaired	1
New circuits placed in operation	0
New boxes placed in operation	0
Indicator lights replaced	18

SUBSTATIONS

Main feeder and tie breaker checks - BB1S1	5
" " " " " " - BB1S2	5
Secondary and pad located stations - Checked jumpers, cutouts, grounds and general condition	20

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	1
Meters tested - customers' requests	2
New meters shop tested	4
Faulty meters replaced	2
Damaged meters and covers	2
Residential read-ins	298
Residential read-outs	123
Residential disconnects	1
Residential reconnects	1

Note: Consumption and revenue reports, under IBM operation, are not available until the 18th of following month. The following figures are for August 1953.

Consumption and revenue:

	No. of Meters	KWH	Revenue
Schedule 1 - Residential	6445	3,498,185	$41,309.19
Schedule 2 - Commercial			
Class 1 - (In Lease)	68	784.765	7,056.77
Class 2 - (Metered basis)	182	401,807	4,324.94
Class 3 - (Plant Adm.) Comm. Rate	-		
700 Area		388,800	2,375.40
Kadlec Hospital		73,620	565.86
Public Health		2,980	32.85
1131 Bus Terminal		64,800	509.00
Central Stores		65,760	592.28
Stores Excess & Salv.		30,000	296.00

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RICHLAND ELECTRICAL UNIT

	No. of Meters	KWH	Revenue
.005 Rate			
1125 Whse. Area		10,000	50.00
AEC Airport		15,000	75.00
Army Dike #1 & #2		10,400	52.00
Medical-Dental Bldg.		10,800	54.00
Library		7,280	36.40
Central Fire Station		5,700	28.50
Community Adm.		745,454	3,727.27
Total		6,115,351	$61,085.46

Note: KWH figure and revenue are inaccurate due to misassignment of estimated meter readings.

COMMENTS

Removed 5 Kva transformer and remainder of line on south side of Central Stores.
Replaced broken junction pole, North Richland Well Field.
Replaced broken sectionalizing switch at Torbett and Goethals.
Relocated service drops to N-1 and N-2 Areas to assist contractor in meeting Code Requirements on Work Order from AEC.
Installed flasher unit to signal at Van Giesen and George Washington Way.
Attitude survey was conducted and completed 9-18-53.
Relocated street light pole near Gribble and Gilmore to clear front yard and provide better lighting on street curve. Work was done on AEC work order as a part of the N-1 completion.
Provided service to Cannon-Joseph Building at 1367 George Washington Way.
Replaced existing 100 Ampere cutouts to North Richland Well Field with 200 Ampere cutouts and fused them with 125 Ampere fuses to serve increased load due to new wells and enlargement of existing stations.
Removed superseded and unused telephone cable in Uptown Shopping Area.
Connected temporary service to warehouse contractor on Wellsian Way.
Assisted Telephone Section on making repairs to trunk cable on George Washington Way and Symons where damaged by contractor.
Fire alarm circuit grounds mentioned previously in Chief Joseph School have been mostly cleared by school electrician. Central Fire Station new panel addition was installed and connected, but failed to function completely normal. Panel wiring was suspected, but trouble was traced to faulty bus wiring by our forces - now corrected. Presented no hazard to main circuit.
Semi-annual tree trimming was performed to clear 90 trees from 7200 volt lines. Will continue for a couple more months.
Plans are under way to meter several unmetered locations in 1100 Area.
Circuit breaker #23 was set for automatic reclosure.
Granted clearance to H. P. Foley to install K-1 Area lighting on #900 regulator circuit as provided in contract.
Reviewed joint use of poles as concerns the Telephone Unit and recommendations were mailed to Mr. Hopkins.
Reviewed two television companies' bids for providing service to Richland. Mailed appropriate comments and desired corrections to interested parties.

LDOVERS

September 10, two men spent 2.1 hours each to connect underground line to feed Civil

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Defense Center in west wing of Building 703.

CALL-OUTS

September 19, 8:30 P.M. to 11:15 P.M. to repair open circuit in #200 series circuit.

OUTAGES

Unscheduled - West wing of Building 703, caused by activities of contractor to Civil Defense Center installation 7-17-53. Partially out all night. We were informed and re-fused primary fuse following morning.

Scheduled - North Richland Well Field, 9-17-53 and 9-21-53, for Schultz Electric Company to proceed with their contract.

West wing of Building 703, affecting partial power for contractor to work on panel.

DECLASSIFIED

1253925

COMMUNITY OPERATIONS AND REAL ESTATE
PUBLIC WORKS UNIT
September 30, 1953

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	12	72
Transfers Out	—	9
Transfers In	—	2
New Employees	—	0
Terminations	—	6
Total End of Month	12	59

SANITATION

Total weight of waste material collected and disposed of during September was 1418 tons. All collections were suspended on Labor Day and those residential routes normally scheduled for that day were picked up on the following day by supplementing the collection crews with men from other groups in the unit.

ROADS AND STREETS

All guard posts on George Washington Way, Goethals, Guthrie and Van Giesen have been re-painted in white color which is in conformance with most recent standards.

A drainage problem at the intersection of Haupt and Symons was corrected by installing two catch basins and raising the grade of the street surfacing.

Three catch basins were installed at the intersection of Benham and Atkins to dispose of standing surface water at this location.

Asphalt mix pads were laid in the service drive from Stevens Drive to the W-20 parking lot, and in a 50' section of the W-20 service drive adjacent to Lee Boulevard. It had been planned to apply a double surface treatment to the W-20 parking lot, but this work has been postponed until next spring due to a breakdown of equipment necessary for this work.

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Community Operations - Public Works Unit

ROADS AND STREETS (Cont.)

On many of the down town streets which are provided with straight concrete curb (as differentiated from concrete combination curb and gutter), the asphaltic surfacing has started to deteriorate in the flow line of the gutter, adjacent to the curb. To prevent further damage from water getting under the pavement at these locations, the effected gutters are being repaired and sealed by an application of asphalt emulsion and pre-mix.

Routine seasonal maintenance of streets, street signs, drainage systems, municipal parking lots and sidewalks was continued.

PARKS AND PUBLIC GROUNDS

Construction of a large fireplace in the shelter on the east side of the Columbia Playfield Fieldhouse was completed, and this facility has been enthusiastically approved by the public.

Operation of the Riverside Park wading pool was discontinued on 9-7-53, and it will remain closed until next spring.

Irrigation and grass mowing frequency has been gradually decreased since 9-15-53, and this work is now being done only on an "as-needed" basis.

All seasonal temporary employees have been terminated and the man power of this group is now down to winter season level.

Routine seasonal maintenance of parks buildings, equipment and grounds; shelterbelt plantings; public areas; and lawn grass areas assigned to the care of this group has been continued.

DOMESTIC WATER

Average daily consumption for September was 17.958 million gallons. Peak consumption during the month occurred on September second when 22.457 million gallons were used.

The Columbia River pump at the Columbia Well Field percolation basin was taken out of service for the season on 9-15-53.

Several leaks were repaired in the water main in the warehouse area east of Wellsian Way. This pipe is located in the general area where electrolysis of steel pipe has caused considerable difficulty, and it may be necessary to replace this main in the foreseeable future.

Minor experimental alterations were made in the altitude valve on the 5 million gallon reservoir, at the request of the valve manufacturer (through the AEC), in an attempt to ascertain whether the valve will

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DOMESTIC WATER (Cont.)

function as intended in its present location, and under system conditions. The changes did not correct the unsatisfactory operation of the valve, and this information has been supplied to the AEC Engineering Unit for appropriate action.

Progress on the Well Equipping and Well Header contract during the month was as follows: - all well house structures are now complete, and the pumps have been set in all new wells; electrical work is progressing but has not yet been completed at any of the new wells; well header installation is still awaiting delivery of material. As part of this same contract the 2000 gpm pump in existing well 1100-D was removed for installation in a new well, and replacement was made with a 1400 gpm pump, the change taking 1100-D out of service from September 8 through September 22. Well 3000-E was taken out of service on September 17 to allow for removal of its 1600 gpm pump (which is to be disposed of), and installation of a 3000 gmp pump is now in process.

DOMESTIC WATER

	Well Production Million Gallons	Average Daily Production	Total Consumption Million Gallons	Average Da. Consumption
Richland	188.6178	6.2873	416.7585	13.8920
North Richland	257.8785	8.5959	68.4788	2.2826
Columbia Field	96.9416	3.2314		
300 Area			53.5202	1.7840
TOTAL	543.4379	18.1146	538.7575	17.9586

SEWERAGE SYSTEM

Normal operations were carried on and approximately 45,000 gallons of sludge were pumped to the drying beds during the month.

Repairs were completed on #2 recirculating pump and #1 underflow pump at #2 Sewage Treatment Plant. Recirculating pump #1 is now being overhauled.

The sludge withdrawal valve on #2 clarifier at #1 Sewage Treatment Plant became inoperative in a closed position and to make repairs it was necessary to empty the clarifier with a portable pump, and excavate to a 16' depth. It was necessary to replace the valve due to excessive wear.

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Community Operations - Public Works Unit

SEWERAGE SYSTEM(Cont.)

Flow meter readings at the Treatment Plant for September are as follows:

SEWAGE

	Total Flow Million Gallons	Average Daily Flow Million Gallons
Plant No. 1.	40.750	1.3583
Plant No. 2.	83.452	2.7817
TOTAL	124.202	4.1400

IRRIGATION SYSTEM

All irrigation pumping stations and distribution systems, and the canal from the Penstock through Richland, were shut down on September 30. The canal through North Richland to the 300 Area recharge basin remains in service.

Annual cleaning and repair of the canals and appurtenances will commence in October.

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RECREATION AND CIVIC AFFAIRS UNIT

MONTHLY REPORT

SEPTEMBER, 1953

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Beginning of Month	3	2-1/2
New Hires	0	0
Terminations	0	0
Transfers - IN	0	0
- OUT	0	0
	3	2-1/2

SCHOOLS

The following is a tabulation of full-time paid School District #400 personnel as of September 30, 1953:-

Administration	7
Principals & Supervisors	14
Clerical	25
Teachers	298
Health Audiometer	0
Cooks	44
Bus Drivers	1
Maintenance	18
Operations	44
	451

CLUBS AND ORGANIZATIONS

As of September 30, 1953, 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

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1253930

(Recreation and Civic Affairs Unit Monthly Report Continued)

The number and types of organizations presently served by the Recreation and Civic Affairs Unit include:

Business and 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	3
	- Dance	5
	- Garden	3
	- Hobby	9
	- Social	11
	- Sports	19
Veteran and Military Organizations		14
Welfare Groups		7
Youth - Boy Scouts		20
- Girl Scouts		49
- Campfire Girls		36
- Miscellaneous		15
		314

RECREATION

The regular monthly meeting of the Parks and Recreation Board was held on September 3, 1953 in the Community House. The Board was informed of the completion of the exterior painting of the Community House which was painted a burgundy color with the commercial Recreation Hall being painted green; thus creating a distinction between the two buildings. Announcement was made to the Board of the construction of a large type fireplace on the Pation at Columbia Playfield. The Board was advised that the Manager of the J.C. Penney Store had offered to donate an electric shuffleboard machine to the Community House and which the Board recommended be accepted. The next regular meeting of the Board is scheduled for October 7.

Instructors for the Fall and Winter Recreation Program have been arranged for and the Program is to start Friday, October 2, with Elementary and Junior Square Dancing, and the Elementary Program. The completed program will also include Ballroom Dancing, Photography, Craft, Dramatics, Fly-Tying, Tumbling, Fencing, Junior Stamp Club, and the Adult Co-Recreation program being held on Monday nights at the Spalding School.

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1253931

(Recreation and Civic Affairs Unit Monthly Report Continued)

Attendance for the Month of September, 1953 was as follows:-

	No. of Sessions	Youth	Adults	Sub-total
I. Sponsored Program				
Games Room Activities	25	2039	410	2449
II. Special Events				
None	-	-	-	-
III. Permit Group				
Hi Spot	9	3094	25	3119
Rec-A-Teers	4		1738	1738
Y Supper Club	3		135	135
International Folk Dancers	8	3	303	306
Richland Light Opera	2		95	95
IV. Other	30	220	1104	1324
Sub-Totals	81	5356	3810	9166

PARKS AND PLAYGROUNDS

RIVERSIDE PARK

I. Sponsored Programs				
None	-	--	--	--
II. Special Events				
Labor Day Picnic (Union)	1	1200	1800	3000
III. Permit Groups				
Model Airplane Club	2	106	18	124
IV. General Recreation Activities	30	3000	2000	5000
Sub-Totals	33	4306	3818	8124

COLUMBIA PLAYFIELD

I. Sponsored Programs				
None	-	--	--	--
II. Special Events				
None	-	--	--	--
III. Permit Groups				
None	-	--	--	--
IV. General Recreation Activities	30	862	1325	2187
Sub-Totals	30	862	1325	2187

OTHER

Wellsian Lake	30	320	56	376

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(Recreation and Civic Affairs Unit Monthly Report Continued)

(OTHER Continued)	No. of Sessions	Youth	Adults	Sub-Total
Neighborhood Playgrounds	300	2000	500	2500
Burlin Camp	5	86	230	316
Softball-Baseball Bookings	2	30	46	76
	337	2436	832	3268

SUMMARY OF STATISTICS

Community House	81	5356	3810	9166
Parks and Playgrounds	400	7694	5975	13669
Total Attendance - September	481	13050	9785	22835

Grand Total For September	22,835
FY Grand Total-To-Date	172,186

1253933

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RICHLAND PUBLIC LIBRARY

SEPTEMBER 1953

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees - Beginning of Month	3	7
Transfers In	0	0
Transfers Out	0	½
New Hires	0	1
Terminations	0	1
End of Month	3	6½

GENERAL

Circulation

Books	15,164	(Adult - 9,667; Juvenile - 5,497)
Magazines	432	
Pamphlets	42	
Records	1,164	
Interlibrary Loan	27	
Grand Total	16,829	

Current Book Stock

Books added this month	226
Books withdrawn this month	1
Grand Total	26,876

Registration

Adult	189
Juvenile	55
Total	244
Total Registered Borrowers	14,026

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Seventy-six children completed their required reading to receive prizes and reading certificates in the World Flight Summer Reading Club. The winners party was held in the North Hall of the Library on Saturday, September 12, 1953. The reading certificates and winners prizes were presented to the children by Mr. F. T. Keenan, Grand Knight, Knights of Columbus, the organization which financially sponsored the summer reading club program. The seventy-six winners represents an increase of nineteen above the number of winners in the 1952 children's summer reading club.

Miss Berniece McCulloch, Reference Librarian, attended the regional conference of the Pacific Northwest Library Association held at Sun Valley, Idaho on September 9 through September 11, 1953.

Twenty-nine meetings were held in North Hall this month.

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RICHLAND POLICE DEPARTMENT

SEPTEMBER 1953

ORGANIZATION

	Exempt	Non-Exempt
Employees - Beginning of Month	18	33
Transfers In	0	0
Transfers Out	0	0
New Hires	0	0
Terminations	0	0
Total - End of Month	18	33

GENERAL

On September 22, four stewards representing the Hanford Guards Union were appointed from members of the Richland Police Department. One steward was appointed for each police company.

On September 21, Chief H. W. Strock was advised by letter from Governor Arthur B. Langlie that he was appointed to serve on the Law Enforcement Section of the Traffic Safety Committee for the coming Governor's Safety Conference to be held in Olympia on October 8 and 9.

"Talk It Over" program discussions were held with each employee in the department and were completed during the month.

Chief H. W. Strock attended the annual convention of the International Association of Chiefs of Police held in Detroit. The convention ran from September 12 through September 18.

Sgt. T. J. McGuire completed two weeks course of instruction at the F.B.I. Training School at Ft. Lewis, Washington, on Friday, September 25. This brings the total Richland Police graduates of this school to fourteen.

Justice of the Peace at Richland, died at approximately 5:23 A.M. on the morning of September 30, 1953, at his home, Death was attributed to a heart attack.

Richland's first murder occurred on the evening of September 4, when Mrs. shot and killed her husband, Trial date is set for October 7.

Requests were made on September 23, 1953, to have mercury vapor lights installed at Newton and George Washington Way, George Washington Way near the American Legion Club, and two lights at Wright and Duportail.

On September 2, pedestrian control was established at George Washington Way near McMurray to assist school children residing in the new housing areas in crossing George Washington Way. The establishment of a crosswalk at this location is under consideration.

On September 10, the flag in the Village Square was lowered to half mast as a result of the death of Chief Justice Vinson. The Presidential edict was for thirty days, from September 9 to October 9.

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PRIVACY ACT MATERIAL REMOVED

1253930

TRAFFIC

	1953 Aug.	1953 Sept.	1952 Aug.	1952 Sept.	1953 Total to Date	1952 Total Same Perio
Reportable accidents	17	13	11	23	175	202
Property damage accidents	12	10	9	20	147	173
Injury accidents	5	3	2	3	27	28
Total persons injured	5	3	2	3	34	35
Fatal accidents	0	0	0	0	1	1
Accidents--Daylight hours	13	10	8	16	123	130
Darkness	4	3	3	7	52	71
Accidents--Business district	6	1	3	6	63	65
Residential "	9	10	7	12	88	110
Other "	2	2	1	5	24	27
Accidents investigated	14	12	9	18	117	145
Criminal complaints filed	9	10	7	15	93	110
Violations contributing to accidents:						
Negligent driving	0	0	3	6	19	34
Fail.to yield r.o.w.	8	8	4	7	67	60
Following too closely	2	0	1	3	27	24
Drunk driving	2	0	0	0	5	2
Pedestrian violation	0	0	0	0	3	0
Inattention to driving	1	2	0	1	4	9
Reckless driving	0	0	0	0	4	7
Speeding	2	0	0	1	3	2
Unsafe speed	0	0	0	0	8	33
Improper backing	0	0	0	2	10	12
Disregard. stop sign	0	0	0	2	5	9
Hit and run	0	0	0	0	1	1
Improper passing	0	0	0	0	3	4
Improper turn	0	0	1	0	3	5
Failure to signal	0	0	0	1	0	2
Wide right turn	0	0	0	0	0	1
Wrong side of road	0	0	0	0	1	1
Asleep at wheel	1	0	0	0	1	0
Bicycle violation	1	0	0	0	1	0
Turning from wrong lane	0	0	2	0	0	2
Defective equipment	0	2	0	0	2	0
Dog in street	0	1	0	0	1	0
Traffic safety meetings	22	18	5	6	93	102
Attendance, traffic films	1550	500	325	200	5970	6050
North Richland:						
Reportable accidents	4	7			73	
Property damage	4	7			61	
Injury accidents	0	0			12	

Richland	1953 Aug.	1953 Sept.	1953 Ave. Per Accident Aug.	1953 Ave. Per Accident Sept.	1952 Ave. Per Accident Aug.	1952 Ave. Per Accident Sept.
Accident property damage	$5,175.00	$3,511.64	$304.41	$270.12	$241.44	$201.31

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TRAINING

There was no range activity during the month of September.

ACTIVITIES AND SERVICES

	August 1953		September 1953	
	Richland	No.Richland	Richland	No.Richland
Bank escorts and details	5	4	7	4
Bicycles impounded	15	8	22	5
Bicycle violations, other	2	3	3	2
Bicycles registered	69	12	63	0
Children lost or found	16	0	17	5
Complaints invest.(no enf.action)	45	5	22	7
Deaths reported	1	0	2	0
Dog,cat,loose stock complaints	3	0	6	2
Dogs,cats,reported lost or found	6	0	18	0
Doors,windows found open in fac.	43	31	19	31
Emergency messages delivered	12	83	10	84
Fires investigated	6	6	6	1
Guns registered	21	0	21	0
Law enforcement agencies assisted	7	0	10	2
Letters of inquiry	66	0	69	0
Miscellaneous escorts	6	3	2	0
Persons injured by dogs	1	0	0	0
Plant departments assisted	21	1	19	1
Prisoners processed through Jail	18	30	14*	10
Private individuals assisted	44	0	13	0
Property lost or found	40	0	15	1
Records inquiries	94	0	88	0
Reports processed through Records	296	154	280	132
Street lights out rep.to Elect.	86	30	155	25
Total	923	370	881	312

*Two prisoners handled for Security Patrol.

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MONTHLY REPORT
RICHLAND POLICE DEPARTMENT
(RICHLAND - NO. RICHLAND)
SEPTEMBER 1953

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER *		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART I								
1. Murder	1	-	-	-	-	-	1	-
2. Rape								
3. Robbery								
4. Aggravated Assault								
5. Burg.-Break. & Entry	-	1	-	1	-	-	-	-
6. Larceny Over $50.00	8	5	-	-	1	1	1	1
Under $50.00	8	4	-	-	1	-	1	-
7. Auto Theft	2	2	2	-	-	-	-	-
TOTAL PART I CASES	19	12	2	1	2	1	2	1
PART II								
8. Other Assaults	1	2	-	-	-	1	1	-
9. Forgery & Counterfeit	4	1	-	-	1	1	2	-
10. Embezzlement & Fraud	-	-	-	-	-	-	-	-
11. Stolen Prop:Buy:Rec.	-	-	-	-	-	-	-	-
12. Weapons: Carry: Poss.	-	-	-	-	-	-	-	-
13. Prostitution	-	-	-	-	-	-	-	-
.. Sex Offenses	-	1	-	-	-	-	-	1
15. Offenses Ag. Fam. & Child	-	-	-	-	-	-	-	-
16. Narcotics - Drug Laws	-	-	-	-	-	-	-	-
17. Liquor Laws	-	-	-	-	-	-	-	-
18. Drunkenness	3	6	-	-	-	-	3	6
19. Disorderly Conduct	-	1	-	-	-	-	-	1
20. Vagrancy	3	1	-	-	1	-	2	1
21. Gambling	-	-	-	-	-	-	-	-
22. Driving While Intoxicated	5	5	-	-	-	-	5	5
23. Viol. Rd. & Dr. Laws								
Fail. to Stop & Identify	2	-	-	-	-	-	1	-
Speeding	41	28	-	-	-	-	41	28
Stop Sign	30	10	-	-	-	-	30	10
Reckless Driving	1	-	-	-	-	-	1	-
Right of Way	8	3	-	-	-	-	8	3
Negligent Driving	19	11	-	-	1	-	18	11
Defective Equipment	7	12	-	-	2	4	5	8
Illegal Passing	2	2	-	-	-	-	2	2
24. Parking	23	8	-	-	1	-	22	8
25. All Other Traffic Viol.	12	9	-	-	-	-	12	9
26. All Other Offenses:								
Malicious Mischief	3	-	-	-	3	-	-	-
Vandalism	13	3	1	-	5	2	-	-
Disturbance	1	1	-	-	1	1	-	-
Bike Violations	25	7	-	-	25	7	-	-
Family Disturbance	-	1	-	-	-	1	-	-
Public Nuisance	1	-	-	-	1	-	-	-
TOTALS	204	112	1	-	41	17	153	93

	OFFENSES	KNOWN Rich.	KNOWN No. Rich.	UNFOUNDED Rich.	UNFOUNDED No. Rich.	CLEARED OTHER * Rich.	CLEARED OTHER * No. Rich.	CLEARED ARREST Rich.	CLEARED ARREST No. Rich.
	Totals brought forward from page LF-4	204	112	1	-	41	17	153	93
26.	All other Offenses:								
	Prowler	-	4	-	-	-	-	-	2
	Illegal Use of Guns	-	1	-	-	-	-	-	1
	Pickup for Outside Agency	1	1	-	-	1	-	-	1
27.	Suspicion	-	-	-	-	-	-	-	-
TOTAL PART II		205	118	1	-	42	17	153	97
PART III									
28.	Missing Persons	2	1	-	1	2	-	-	-
	Lost Persons	17	1	-	-	17	1	-	-
	Lost Animals	11	1	-	-	7	-	-	-
	Lost Property	14	4	-	-	11	1	-	-
29.	Found Persons	2	-	-	-	2	-	-	-
	Found Animals	6	1	-	-	2	-	-	-
	Found Property	17	-	-	-	11	-	-	-
TOTAL PART III		69	8	-	1	52	2	-	-
PART IV									
30.	Fat.M.V.Tr. Acc.								
31.	Pers.Inj.M.V.Tra.Acc.	-	-						
	Prop.Dam.M.V.Acc.	13	7						
33.	Other Traffic Acc.								
34.	Public Accident)								
35.	Home Accidents)	No Accurate Statistics Kept							
36.	Occupational Acc.)								
37.	Firearms Accidents								
38.	Dog Bites								
39.	Suicides								
40.	Suicide Attempts								
41.	Sud.Death.&Bod. Found	2							
42.	Sick Cared For								
43.	Mental Cases								
TOTAL PART IV		15	7	-	-	-	-	-	-
COMPOSITE TOTALS									
PART I,II,III,IV CASES		308	145	3	2	96	20	156	98

*Cases listed under "Cleared Other" are those cleared by various means other than arrest, such as: orders from prosecutor, juvenile probation officer or other situations in which a mutual agreement is obtained. They are definitely "cleared" cases and differ from the arrest column only in that there was no arrest.

Property reported stolen	Richland	$1,004.50
Property reported stolen	No. Rich.	$3,495.45
Property recovered	Richland	$ 294.50
Property recovered	No. Rich.	$ 280.50

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MONTHLY REPORT — RICHLAND POLICE DEPARTMENT — JUVENILES INVOLVED — AUGUST 1953

OFFENSE	NO. CASES	JUVENILES	SEX	5	8	9	10	11	12	13	14	15	16	17
RICHLAND														
Malicious Mischief	2	5	M			1			1		1		2	
Larceny	1	1	M											1
Vandalism	5	16	M	2	1	1	1	1	1	3	4	1	1	
Nuisance	1	2	M										1	1
TOTALS	9	24		2	1	2	1	1	2	3	5	1	4	2
NORTH RICHLAND														
Illegal Shooting	1	3	M										1	2
Vandalism	1	1	M				1							
TOTALS	2	4					1						1	2

E-6

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RICHLAND POLICE DEPARTMENT
(COMMUNITY OF RICHLAND)

Number of offenses known to police per 25,000 inhabitants in cities of 25,000 persons:

	Wash.Ore. & Calif. Six Months (July-Dec. 1952)	One Month Average	1952 July - Dec.	1953 August	1953 Sept.
Murder	.440	.073	-	-	1
Robbery	11.850	1.995	2	-	-
Agg. Assault	10.5	1.75	-	-	-
Burglary	69.95	11.658	8	2	-
Larceny	206.7	34.45	111	14	16
Auto Theft	38.65	6.44	9	1	2

Number of offenses known to police per 25,000 inhabitants regardless of whether offenses occurred incities or rural districts.

	State of Washington Six Months (July-Dec. 1952)	One Month Average	July - Dec.	August	Sept.
Murder	.228	.038	-	-	1
Robbery	8.28	1.38	2	-	-
Agg. Assault	2.68	.447	-	-	-
Burglary	61.4	10.23	8	2	-
Larceny	199.25	33.208	111	14	16
to Theft	35.6	5.933	9	1	2

The percentage of offenses committed by persons under the age of 25 years is shown:

	National Average Percentage of Cases Year of 1952	Richland 1952 July - Dec.	Richland 1953 August	1953 Sept.
Robbery	59.0	-	-	-
Burglary	74.1	8%	50%	-
Larceny	57.4	24%	7%	13%
Auto Theft	80.4	8%	-	-

Note: Statistics of juvenile offenses throughout the United States were taken from the Uniform Crime Report published by the Federal Bureau of Investigation, which states: "It should be remembered that the number of arrests recorded is doubtless incomplete in the lower group because of the practice of some jurisdictions not to fingerprint youthful offenders."

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1253942

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 (July-Dec. 1952)	One Month Average	1952 July - Dec.	1953 August	1953 Sept.
Murder	.176	.029	-	-	-
Robbery	4.74	.790	-	-	-
Agg. Assault	4.20	.700	-	-	-
Burglary	27.98	4.663	2	-	1
Larceny	82.69	13.782	24	5	9
Auto Theft	15.46	2.577	2	3	2

Number of offenses known to police per 10,000 inhabitants regardless of whether offenses occurred in cities or rural districts.

State of Washington Six Months (July-Dec. 1952	One Month Average	1952 July - Dec.	1953 August	1953 Sept.
Murder	.091	.015	-	-	-
Robbery	3.31	.552	-	-	-
Agg. Assault	1.07	.178	-	-	-
Burglary	24.56	4.093	2	-	1
Larceny	79.70	13.283	24	5	9
Auto Theft	14.24	2.373	2	3	2

The percentage of offenses committed by persons under the age of 25 years is shown:

National Average Percentage of Cases Year of 1952	No. Richland 1952 Oct. - Dec.	No. Richland 1953 August	1953 Sept.
Robbery	59.0	-	-	-
Burglary	74.1	-	-	-
Larceny	57.4	8%	20%	-
Auto Theft	80.4	33%	-	-

Note: Statistics of juvenile offenses throughout the United States were taken from the Uniform Crime Report published by the Federal Bureau of Investigation, which states: "It should be remembered that the number of arrests recorded is doubtless incomplete in the lower age group because of the practice of some jurisdictions not to fingerprint youthful offenders."

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RICHL/ OLICE DEPARTMENT
RICHLAN JSTICE COURT CASES
SEPTEMBER 1953

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	5	3		2							1	$	$ 25.00	$ 20.00
DESTRUCTION OF TICKET	1				1						1			
DRIVERS LICENSE	27	13	6	5	2	1				5	17	15.00	33.50	22.50
DRUNK DRIVING	7	4		3			1	1	4	2			164.77	
F.T.O. SCHOOL BOY PATROL FLAG	1			1										
F.T.S. A I.	1		1									25.00		
F.T.Y.R.O.W.	7	1	4	2						2		70.00	10.00	
FOUR IN FRONT SEAT	2	1	1								1		7.50	
ILLEGAL PARKING	35	7	21	7						1		73.50	24.50	21.00
ILLEGAL PASSING	3	1	1	1						2	1	7.50		
ILLEGAL BACKING	1		1								1			
ILLEGAL TURNING	3	1	2								2	13.50	5.00	
IMPROPER PLATES	2	2								1			12.50	12.50
NEGLIGENT DRIVING	25	12	3	7	2	1				5		50.00	217.50	25.00
NO REGISTRATION	6	4		2						3	5			
PERMIT UNLIC. OPER. TO DRIVE	1		1							1		10.00		
RECKLESS DRIVING	2	2							2	1			135.00	
SPEEDING	49	18	20	9		2				7		183.00	185.00	
STOP SIGN	40	11	20	7	1	1				6	2	106.00	50.50	
LARCENY BY CHECK	2	2											50.00	50.00
PETIT LARCENY	1		1							1		5.00		
PUBLIC INTOXICATION	2		2									25.00		
PUBLIC NUISANCE	1		1							1		15.00	50.00	
THIRD DEG. ASSAULT	3	2			1					2				
VAGRANCY	2	2					2							
TOTAL	229	86	85	46	7	5	3	1	6	40	31	$598.50	$970.77	$151.00

TWO RECKLESS DRIVING CASES AMENDED TO NEGLIGENT DRIVING.
ONE DRUNKEN DRIVING CASE AMENDED TO RECKLESS DRIVING.

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1253944

RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
SEPTEMBER 1953

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	10	5	2	2	1					1		$ 17.50	$ 43.50	$ 15.00
DRIVERS LICENSE	16	7	6	2	1					4	12	17.50	12.50	
DRUNK DRIVING	8	5		3					5	1			307.50	
DRVG WHILE LIC. REV.	1			1										
EXCESSIVE NOISE	1		1								1			
F.T.Y.R.O.W.	5	1	3	1					1			37.50	15.00	15.00
FOLLOWING TOO CLOSELY	1			1										
ILLEGAL PARKING	19	5	9	5						1		29.50	17.50	14.00
ILLEGAL PASSING	2		2								1	5.00		
ILL. USE OF 1 WAY ST.	1		1							1		7.50		
IMPROPER PLATES	5	3	1		1							7.50	12.00	
NEGLIGENT DRIVING	14	6	4	4						5		100.00	160.00	25.00
NO REGISTRATION	5	5								1	5			
RECKLESS DRIVING	2	1			1				1	2			37.50	37.50
SPEEDING	35	11	21	3						4		240.00	129.50	
STOP SIGN	24	9	12		3					4	3	50.00	40.00	
CONT. TO DEL. OF A MINOR	1	1					1	1						
DISORDERLY CONDUCT	2			2										
PETIT LARCENY	2				2									
PUBLIC INTOXICATION	8	1	4	3								50.00	12.50	
THIRD DEG. ASSAULT	1			1										
VAGRANCY	2	2					1						15.00	15.00
VULGAR LANGUAGE	2			2							2			
TOTAL	167	62	66	30	9		2	1	7	24	24	$562.00	$802.50	$121.50

TWO GRAND LARCENY CASES AMENDED TO PETIT LARCENY.
ONE NEGLIGENT DRIVING CASE REDUCED TO SPEEDING.
ONE RECKLESS DRIVING CASE AMENDED TO NEGLIGENT DRIVING.

LF-10

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POLICE DIVISION - TRAFFIC CONTROL STATISTICS
SEPTEMBER, 1953

MOTOR VEHICLE ACCIDENTS REPORTABLE:

	Total Number		Fatalities		Major Injuries		Minor Injuries	
	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.
Richland	12	13	0	0	3	0	3	3
North Richland	4	7	0	0	0	0	0	0

ACCIDENT CAUSES:

	Negligent Driving		Failure to Yield Right of Way		Reckless & Drunken Driving		Other Cases	
	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.
Richland	0	0	5	8	2	0	5	5
North Richland	1	2	0	1	0	1	2	3

PLANT WARNING TRAFFIC TICKETS ISSUED:

	Speeding		Stop Sign		Parking		Imp. License		Def. Equipment		Other V.		Totals	
	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept
Richland	0	0	0	0	7	1	0	0	0	1	0	0	7	2
No. Richland	0	0	0	0	75	0	2	0	4	3	0	1	81	4

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	
	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.	Aug.	Sept.
Richland	34	42	25	34	5	5	2	1	3	5	10	20	3	43	35	41	117	148
No.Richland	21	31	12	20	6	7	0	1	2	5	9	9	5	18	22	35	77	126

TRAFFIC VOLUME: THERE WAS NO TRAFFIC COUNT TAKEN DURING THE MONTH OF SEPTEMBER

NOTE: TRAFFIC CONTROL STATISTICS SHOW ORIGINAL CHARGES ONLY.

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COMMUNITY OPERATIONS

RICHLAND FIRE DEPARTMENT

SEPTEMBER 1953

Organization and Personnel	Exempt	Non-Exempt
Employees - Beginning of Month	66	0
Transfers In	0	0
Transfers Out	2	0
Terminations (Including Temporary Removal From Roll)	2	0
New Hires	4	0
End of Month	66	0

Fire Protection		Richland	North Richland
Fire Loss (Estimated):	Government	$170.00	$ 0.00
	Personal	120.00	50.00
	September Total	$290.00	$50.00
	1953 Total	$184,787.07*	$3,489.74

* Loss figures not yet available on August 21st Cahoon Motors fire and therefore do not appear in this total.

Response To Fire Alarms	27	14
Investigations of Minor Fires and Incidents	6	1
Ambulance Responses	41	
Inside Schools or Drills	18	22
Outdoor Drills	25	21
Safety Meetings	8	3
Security Meetings	4	2
Fire Alarm Boxes Tested	181	104
AEC Airport Standby	1	

Fire Prevention

Twelve hazard reports were submitted as a result of the 132 Richland and 12 North Richland fire inspections made during the month. One hundred and thirteen fire extinguishers were inspected, 9 installed, 2 removed and 2 refilled.

Numerous Chamber of Commerce general membership and committee meetings were attended during September in preparation for Richland's observance of National Fire Prevention Week October 4-10. A street parade followed by a Fire Department field demonstration on October 3rd is scheduled to officially open the local campaign which will include a variety of events such as contests, demonstrations, radio programs, newspaper publicity, movie trailers in the theatres, Boy Scout mobilization and a "House of Hazards" for juvenile inspection. All Community plans are coordinated with Fire Prevention Month to be held during October in the Hanford Operations forward areas.

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COMMUNITY OPERATIONS AND REAL ESTATE DEPARTMENT
ENGINEERING UNIT

SEPTEMBER 1953

PERSONNEL	Exempt	Non-Exempt*	Total
Employees - Beginning of Month	6	3	9
Employees - End of Month**	6	3	9

* One employee on permanent loan
** Employee on permanent loan transferred out

ENGINEERING UNIT JOBS COMPLETED DURING MONTH OF SEPTEMBER

Project K-825	Community Fireplace at Columbia Playfield.
Project K-848	Fire Protection Line, JJ Newberry Building
ESR 581-RC	"As Built" Plans, Church of Jesus Christ of Latter Day Saints
ESR 663-M	Plan Checking, Richland Development Company
ESR 706-RC	Plans, Specifications, Inspections, Medical-Dental Properties
ESR 765-RC	"As Built" Plans, All Saints Episcopal Church
ESR 785-RC	"As Built" Plans, McVicker Building #4
ESR 803-M	Profile grade, 300 Block on Craighill
ESR 827-RC	Plans, Specifications, Inspections, Paul Lewis Building #1 - ESR cancelled 9-11-53 because lease not executed.
ESR 828-RC	Plans, Specifications, Inspections, Paul Lewis Building #2 - ESR cancelled 9-11-53 because lease not executed.
ESR 837-CA	Cost Estimate, Replace water tank, Recreation Building - ESR closed into Project K-837.
ESR 839-RC	Legal Description, Metal Hutment Warehouses 1125-3 and 1125-4.
ESR 843-RC	Legal Description revised, Masonic Temple
ESR 844-RC	Legal Description, Richland Heights Baptist Church
ESR 847-M	Inspection, McMurray Street Improvement - ESR cancelled. See ESR 855-M.
ESR 851-RC	Revised Legal Description, Kaiser's Market

STATUS OF ENGINEERING UNIT JOBS TO BE COMPLETED

PROJECTS

25.7 Kadlec Hospital Grounds Improvement - Increase of scope of work to include a 65 car parking lot being considered. Bid assembly being held pending decision.

C-488 Additional Erosion Control and Development, Public Areas, FY 1952 - 80% complete. Playground equipment on order.

K-753 Flow Control Valve, Sewage Treatment Wet Well - Awaiting delivery of equipment.

K-756 Installation Traffic Light, Symons and George Washington Way - Awaiting delivery of equipment.

K-837 Replace Water Tank, Recreation Building - Estimate prepared. Awaiting Manager approval.

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ENGINEERING UNIT

Projects (Cont.)

L-728 Installation of Insulated Fire Alarm Wire - To be completed as locations furnished by Fire Unit.

S-808 Replacement 10" water main, 700 Area - Awarded on basis of low bid. Notice to proceed given. Contractor awaiting delivery of materials.

STATUS ENGINEERING SERVICE REQUESTS

571-M Free Methodist Church, Plan Checking - 99% complete. No progress this month.

572-M First Baptist Church, Plan Checking - 82% complete. Progressing slowly.

574-M Assembly of God Church, Plan Checking - 72% complete. Progressing slowly.

588-M Alteration Permits - An open active file.

634-M Engineer Liaison, Richland Water - Following construction closely by periodic inspections.

715-M Television Antennae - An open active file.

722-M Erosion Control and Development, Public Areas, FY 1953 - Project proposal pending.

726-M Plans, Specs., Inspections, CD Joseph Bldg. #4 - 99% complete. Final inspection to be made. Building now occupied.

729-M Plans, Specs., Inspections, Grace Bacon Building - 30% complete. Work progressing slowly.

730-M Plans, Specs., Inspections, Richland Realty Company (Newberry Store) - 40% complete. Work progressing.

768-M Plans, Specs., Inspections, Carl Peterson Building, Lee & Gillespie - 99% complete. Exceptions to be corrected by letting new contract. Corrections held up by difference between owner and contractor.

770-M Latter Day Saints Storehouse, West Jadwin - 75% complete. Progressing slowly.

779-M Plans, Specs., Inspections, Richland Labor Temple - 99% complete. Cleanup items being done by contractor. Building now occupied.

783-M Plans, Specs., Inspections, American Legion - 99% complete. Construction exceptions being corrected by contractor. Building now occupied.

790-M "As Builts" - General - 80% of allocated funds expended to date.

804-RC Study, Roof Richland Lutheran Church - Assigned to Engineering Department for study. Report pending.

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ENGINEERING UNIT

Engineering Service Requests (Cont.)

805-RC Plans, Specs., Inspections, Cannon-Joseph Bldg., West of Kennell-Ellis - 98% complete. Work progressing.

806-RC Plans, Specs., Inspections, Richland Development Co., Block 2, Uptown - 98% complete. Work progressing. Building partially occupied.

809-RC Plans, Specs., Inspections, Parcell Bldg. (Duportail & Hartford) - Awaiting word on whether plans submitted will be used by owner. No action with regard plans taken by lessee.

811-RC Extend water & sewer - Parcell Site at Duportail and Hartford - Design temporarily withheld pending decision on use of site by lessee.

815-RC Plans, Specs., Inspections, Veterinary Hospital - Building plans not received to date.

816-RC Plans, Specs., Inspections, Richland Transfer and Storage - 20% complete. Work progressing rapidly.

817-RC Plans, Specs., Inspections, Diana Langevin Building - 80% complete. Work progressing slowly.

318-RC Plans, Specs., Inspections, McVicker Bldg. (East of Liquor Store) - No plans received to date.

819-RC Plans, Specs., Inspections, Safeway Store - Plans reviewed. Building permit issued. Work not yet started.

820-M Landscape Design for 300 Area - Scoping presented to AEC for decision and allocation of funds.

822-RC Plans, Specs., Inspections, EH Kidwell Service Station - Plans not received. Fuel tanks delivered to site.

829-M Design plans and specifications, Storm Drain, George Washington Way - 99% complete.

832-M Inspection and Liaison, Spokane Housing - Work continuing. Concrete sidewalks and curbs being laid by contractor. Paving of streets progressing.

833-M Inspection, and Liaison, Bauer-Day Housing - Approximately 95% complete. Streets are paved. Utilities are materially complete. Sewer line of Chief Joseph Apartments accepted after major corrective work.

836-RC Plans, Specs., Inspections, Church of Nazarene Addition - 40% complete. Work progressing slowly.

841-RC Legal Description & Utility Study, Seattle First National Bank Addition - 90% complete.

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ENGINEERING UNIT

Engineering Service Requests (Cont.)

842-RC Plans, Specs., Inspections, Kaiser-Johnson Store Addition - 5% complete. Plans reviewed. Work progressing rapidly.

845-RC Plans, Specs., Inspections, Seattle First National Bank Addition - 2% complete. Work started.

846-M 24" Replacement Sewer - Swift Boulevard and Gribble Street Improvement - Design 95% complete.

852-RC Legal Description - Area between Wordrop, Hoxie, George Washington Way and McMurray - Richland Baptist Church - 95% complete.

853-RC Plans, Specs., Inspections, Richland Heights Baptist Church, Thayer and Duportail - Plans received for checking.

854-M Field Engineering and Inspection, AEC Airport - 99% complete.

855-M Title III INspection, McMurray Road - Scheduled completion date November 16, 1953. Work progressing a little behind schedule because of unexpected need to install well points for pipe work.

856-RC Revised Legal Description, Frank Berry's Sporting Goods Store - 90% complete.

857-RC Revised Legal Description, Church of Nazarene - 90% complete.

858-RC Revised Legal Description, Davis Furniture Store - 90% complete.

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REAL ESTATE SECTION

SUMMARY

September 1953

ORGANIZATION AND PERSONNEL:

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Nonexempt	Exempt	Nonexempt
Real Estate Section				
350	2	1	2	1
Housing & Maintenance Unit				
351	5	18	5	18
353	12	150	12	141
Commercial Property Unit				
357	6	6	6	6
	25	175	25	166

Decrease in number of employees 9

GENERAL

Of 6,050 new housing leases to be signed, approximately 5,400 have been executed and returned, or 89 percent.

Two ground leases and one license agreement were executed covering a veterinary hospital, an automotive service station, and a television signal distribution system.

Ten supplemental agreements were executed to provide for metering of electricity, extension of lease terms, redefinition of leased premises, construction of building additions, establishment of a beauticians' school, renewal of lease, and the subleasing of space.

Ten sublease enterprises commenced operation.

Custody for the old Railway Express Agency building was relinquished.

The H.A.M.T.C. vacated its former premises and moved into a new Labor Temple erected with private funds under a ground lease with the General Electric Company.

Construction was commenced on one building addition.

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HOUSING & MAINTENANCE UNIT

September, 1953

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

Beginning of month:	17 exempt	
	168 nonexempt	
	185	185
End of month:	17 exempt	
	159 nonexempt	
	176	176

The reduction of personnel is due to the completion of work assigned to Painter Helpers.

1253953

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RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING SEPTEMBER 30, 1953

HOUSES OCCUPIED BY FAMILY GROUPS

	Conventional	A&J	T	Precut	Ranch	Prefab	Dorm Apt	A&J Apt	2BR Apt	Fourth Housing	Tract	Total
G.E.Employees	2223	254	10	379	814	1177	10	52	61	195	36	5211
Commercial Facilities	97	15		33	79	50		5	1	9	2	291
AEC	84	28		25	62	18		6	5	16	3	247
Other Government	6	2			4	2					1	15
Post Office	5				2	10				1	3	21
Schools	54			6	10	55		1	1	2		129
Community Activities	9			1	7	5					1	23
Medical Facilities	3	20			3	1				3		30
Charles T. Main	2			2	5	9				2		20
Kaiser Engineer	6	8			6							20
J.A.Jones	2	2			2	1						7
Vitro Corporation	1	2			1							4
Blaw-Knox		2		2								4
P.S. Lord	1				2					1		4
Minor Contractors					1	2						3
Vernita Orchards											5	5
Atkinson Jones					1							1
Commonwealth Inc.						1						1
Total	2493	333	10	448	999	1331	10	64	68	229	51	6036
Houses assigned leases written	1				1	1				1		4
Houses assigned leases not written	6			2		9			2			19
Available for assignment												
Total	2500	333	10	450	1000	1341	10	64	70	230	51	6059

	Begin Month	Moved In	Moved out	End of Month	Diff
Conventional Type	2493	38	38	2493	
A&J Type	331	5	3	333	+2
"T"	8	2		10	+2
Precut	449	3	4	448	-1
Ranch Type	996	13	10	999	+3
Prefab Type	1335	29	33	1331	-4
Dorm Apts	10			10	
A&J Apts	64	6	6	64	
2BR Apts	69	3	4	68	-1
Fourth Housing	228	4	3	229	+1
Tracts	51			51	
Total	6034	103	101	6036	+2

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September 1953

DORMITORY REPORT

Dormitories:

	Beds Available	Vacant Beds	Occupied Beds
Men	616	133	483
Women	431	57	374*
Total	1047	190	857*

*This includes 2 beds used for Dorm Office

Waiting Lists

	Single Rooms	Double Rooms
Men	2	0
Women	23	0

HOUSING
CANCELLATION AND ALLOCATIONS

STRAIGHT CANCELLATIONS	
Voluntary terminations	34
R. O. F.	0
Discharge	2
Transfers	3
Retirement-divorce-misc.	2
Move off project	15
Deaths	3
Wherry housing	4
Total	63

ALLOCATIONS	
Houses allocated to new tenants	57
Exchanged houses	18
Moves	13
Turnovers	7
Total leases signed	95
Total cancellations	101
Houses assigned "As Is"	49
Houses sent to renovation	26
Applications pending	411

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TENANT RELATIONS PROGRESS REPORT

	Orders Incomplete as of August 30	Orders Issued 8-30 to 9-30	TOTAL ORDERS Incomplete as of September 30, 1953
Service orders	434	1789	443
Work orders	613	497	852
Service charges		276	

Principal work order loads	Incomplete as of August 30, 1953	Incomplete as of September 30, 1953
Laundry tub replacement	11	15
Bathroom renovations (tub, tile, linc.)	27	104
Tileboard - bathroom	1	9
Kitchen floor linoleum	81	60
Kitchen cabinet linoleum	11	4
Shower stall	16	21

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132 alteration permits were issued, as compared to 98 permits issued during August.

Install automatic washer	20	Remove broom closet	2
Install automatic dryer	23	Install fence	7
Install garbage disposal	1	Install dish washer	2
Convert to oil	31	Install 110 v outlet	3
Install basement partition	2	Install storage shed	1
Install water softener	4	Install laundry trays	1
Install back door	3	Install door in basement	1
Basement excavation	9	Install fireplace	1
Install 220 v line	3	Install patio	1
Install air conditioner	9	Install TV antenna	4
Install glass in door	1	Remove kitchen counter	1
Sand & refinish floors	1	Install cupboard over range	1

1247 inspections were made, as compared to 1406 made in August.

Alteration permits	3	Sinks	10
Bathtubs	170	Tileboard	3
Drainage	1	Toilet seats	29
Floor boards	1	Topsoil	5
Jack & shim	1	Dorms	112
Leaking basement	2	Walls	2
Linoleum	146	Windows	1
Paint	253	Miscellaneous	239
Porch & steps	36	Cancellations	76
Renovations	83	Shows (new tenants)	61
Shower stalls	6	Sidewalks	7

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MONTHLY PROGRESS REPORT
INTERIOR REDECORATING REPORT
FISCAL YEAR - 1954

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	153	22	23	130
B	364	23	23	341
C	0	0	0	0
D	3	0	0	3
E	40	2	2	38
F	106	10	10	96
G	3	1	1	2
H	79	5	5	74
K	0	0	0	0
L	3	0	0	3
M	1	0	0	1
Q	5	0	0	5
R	1	0	0	1
S	2	0	0	2
T	6	3	3	3
U	5	0	0	5
V	26	1	1	25
Y	191	15	16	175
Z	5	0	0	5
1 BR.	43	4	4	39
2 BR.	146	1	1	145
3 BR.	136	1	2	134
TRACT	9	1	1	8
1 BR. APT.	9	0	0	9
W-13 APT	3	0	0	3
	1339	89	92	1247

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MONTHLY PROGRESS REPORT
EXTERIOR PAINTING PROGRAM
FISCAL YEAR 1954

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	68	0	0	68
B	220	0	0	220
E	21	0	0	21
F	45	0	0	45
H	57	0	0	57
L	4	0	0	4
T	10	10	10	0
Y	950	166	950	0
Z	50	17	50	0
2 BR.	1	1	1	0
1 BR. APT	40	0	40	0
Total:	1466	194	1051	415

Exterior Brush and Spray Painting at Sewage Disposal Plant complete.

Exterior Painting of Commercial Facilities complete:

Thrifty Drug (Downtown)
Pennywise
Richland Shoe Salon
Bus Depot
Diamonds
Style Centre
Elite Shop
Ganzel's Barber Shop
Silers
Micky Shoe Renewal
Richland Theatre
Hurt's Apparel
Richland Jewelry
Western Union
C. C. Anderson
Safeway Store
Carnation Milk
Richland Supply
The Mart
Recreation Hall
Campbell Grocery #1
Campbell Grocery #2
Grocerteria
Village Pharmacy
Village Theatre
Paul's Inc
Klopensteins

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PLUMBING SHOP

JOB DESCRIPTION	NUMBER COMPLETED
Replacements - Major Fixtures:	
Bathtubs	28
Laundry Tubs	5
Electric Water Heaters	13
Plumbing Repairs	12
Plumbing for floor tile replacement	27
Cleared major sewer stoppages caused by tree roots	36
Plumbing for sink top replacement	17
Steam work orders	17

Steam Inspection once a week on Dormitories and Apartments and Government-owned Commercial Buildings

Turned on Steam in all Dormitories and Apartments

Installed new Septic Tank drain field at 2902 Van Giesen

SERVICE ORDER CREW

The following is a status report on Service Orders:

A. On hand at the beginning of the Month	87
B. Received during the Month	1769
C. Completed during the Month	1808
D. On hand at the end of the Month	126

E. A total of 296.3 Hours were spent on Work Orders

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CARPENTRY

JOB DESCRIPTION	NO. COMPLETED
Replace Bathtubs	28
Replace bath wall tile	52
Repair bath wall tile	5
Replace bath floor linoleum	28
Repair bath floor Linoleum	11
Replace kitchen floor linoleum	41
Repair kitchen floor linoleum	5
Replace steps and landings linoleum	8
Repair steps and landings linoleum	2
Repair living room linoleum	2
Repair office floor linoleum - Carnation Milk	1
Install metal stripper	1
Replace kitchen sink top linoleum	47
Repair kitchen sink top linoleum	23
Replace work bench linoleum	3
Replace Kitchen Sinks	5
Repair windows - Shop	9
Repair window screens - Shop	565
Make new window screens - Shop	6
Apply roof coating	46
Repair roof	4
Apply roof coating - Commercial Facilities	33.0 M.H
Repair porches	14
Raise Slab	3
Repair door sill	1
Repair thresholds	8
Repair exterior main doors - Shop	9
Repair laundry trays	1
Repair Sash balances	10
Repair utility & Kitchen wall	2
Repair basement wall	4
Repair basement joist	1
Repair for Painters	47.0 M. H
Repair for Plumbers	2.0 M. H
Repair for Renovations	4.5 M. H
Time spent on Mock-up Work - B-75065 (Complete)	100.5 M. H.
Ditto C-58028 #1 (Complete)	83.0 M. H
Ditto C-58300 (Complete)	14.0 M. H
Ditto C-58274	28.3 M. H
Ditto Dorm Apts.	7.0 M. H
Time spent on Office Equipment	6.5 M. H
Ditto Shop Equipment	50.5 M. H
Ditto Dorm Furniture	11.0 M. H
Cabinet Doors repaired - Shop	26
Cabinet Doors replaced - New from Shop	21
Cabinet Drawers repaired - Shop	69

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CARPENTRY - continued

JOB DESCRIPTION	NO. COMPLETED
Chempoint - Routine	81
Chempoint - Work Orders	108
Paint Touch-ups Completed	117
Paint Touch-ups Completed in Shop	2
Interior Carpentry Repair to All types houses (4 yr. cycle)	173
Exterior Carpentry Repair - Houses	5.0 M. H
Exterior Carpentry Repair - Commercial Facilities	96.5 M. H
Ranch House screen doors repaired	8
Precut screen doors repaired	3

RENOVATION & LABOR CREW

JOB DESCRIPTION	NO. COMPLETED
Housing units renovated	23

Peformed routine service work such as, repairing sidewalks, removing trees, delivering top soil, constructing steps, removing trash, servicing dormitories and assisting plumbing shop in sewer repairs.

MECHANICAL SHOP

A. Millwright Crew:

JOB DESCRIPTION	NO. COMPLETED
Furnace Service Orders	136
Furnace Inspections and Lubrications	860

GENERAL:
All precut house furnaces were lubricated and filters changed as necessary. Service orders are now averaging about 20 per day.

B. Sheetmetal Crew:
This crew is still in the process of inspecting and replacing smoke pipes on furnaces in conventional type houses. This work is about 60-per cent complete, and replacement of smoke pipes is running about 25-per cent of houses inspected.

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COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION
September, 1953

PERSONNEL - COMMERCIAL PROPERTY UNIT:

	September
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
August	1,530	184	121	1	1,651	185
September	1,536	183	121	1	1,657	184
Net Change	+6	-1	0	0	+6	-1

SUMMARY OR ROUTINE ITEMS PROCESSED:

	Commercial		Noncommercial		Total		
	Richland	North Richland	Richland	North Richland	Richland	North Richland	Total
Work Orders	57	17	0	0	57	17	74
Back Charges	4	0	0	0	4	0	4
FY Work Order Total	163	72	0	0	163	72	235
FY Back Charge Total	8	0	0	0	8	0	8

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Leases:

a. Dr. E. W. Moore - a ground lease covering the construction and operation of a building for the operation of a veterinary hospital on west Van Giesen.

b. Tri-City Television Service, Inc. - a license agreement granting the right to construct and operate a community television signal distribution system in Richland, Washington.

c. E. H. Kidwell - a ground lease covering the construction and operation of a service station in the Light Industrial Area.

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2. Supplemental Agreements:

   a. Kennell-Ellis - to redefine the premises to be leased and adjustment of rental payments.

   b. Riverside Stables - to redefine the premises to be leased.

   c. W. T. Vosper and Leo G. Torre - to provide for longer lease term, adjust rental payments, and certain other provisions.

   d. Bedri J. Saad - to provide for payment of electricity on basis of meter readings and establish an allowance to Operator on account of such payment.

   e. Kaiser's Market - to provide for the construction of a building addition.

   f. Auto Supply and Machine, Inc. - to provide for payment of electricity on basis of meter readings and to establish an allowance to Lessee on account of such payment.

   g. Hughes of Richland, Inc. - to provide for payment of electricity on the basis of meter readings and to establish an allowance to Lessee on account of such payment.

   h. Siler's Beauty Salon - to provide for the operation of a beautician school and adjustment of rental payments, and certain other provisions.

   i. Stanley N. Randolph - to provide for lease renewal and modification of rental payments.

   j. Vance Properties, Inc. - to provide for subleasing space to KWIE, INC. and Richland Greater Chamber of Commerce.

3. Assignments:

   a. The Cannon & Joseph Building #I in the Downtown Area was sold to George V. Forsyth and the Commercial Facility Lease was assigned to him.

   b. The Young World, Inc. sublease with E. J. Hanson was assigned to Lydia R. Barnes and Mrs. Alfred Buchannan.

4. Bid Information:

   a. Bid openings were held in answer to our Invitation to grant a non-exclusive license for the installation and operation of a community television system. One proposal was received.

   b. Advertisements for invitation to bid on two government-owned metal storage hutments in the Light Industrial Area were released to local newspapers.

GENERAL:

A. Commercial:

1. Henry W. Weber started construction of his warehouse building in the Heavy Industrial Area.

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2. The Government-owned Building formerly occupied by Railway Express Agency located at 908 Goethals was transferred from the Commercial Property Unit.

3. Mode O'Day dress shop opened in Richland Development Company, Inc.

4. Construction started on an addition to the Seattle-First National Bank.

5. Bolton's Shoes opened for business in Diana Langevin's Building, Downtown Business District.

6. Helen's Millinery and Gift Shop opened for business in space formerly occupied by A & Z Specialty, McVicker Building #1.

7. D. L. Severson opened his photography shop in Richland Development Company Building.

8. Ray Ashcraft, clothing sales, opened for business in Richland Development Company Building.

9. Skidmore & Critchlow, attorneys, opened for business in Richland Development Company Building.

10. R. H. Weiss, accounting service, opened for business in Richland Development Company Building.

11. Village Taxi opened for business in Richland Development Company Building.

12. Roger's Beauty Salon opened for business in Cannon & Joseph Building # II.

13. Campbell's Food Market opened a business office in the W. D. Gray Building.

14. Railway Express Agency commenced business operations in the 1125-2 Building.

15. Buildings for which Final Inspection Reports have been received this month are as follows:

    a. Cannon & Joseph #1
    b. Automatic Laundry Co., Parcel #1
    c. Automatic Laundry Co., Parcel #2
    d. F. R. Rice

B. Noncommercial:

1. The General Services Administration (V.A.) opened a business office in the Richland Development Company Building in the Uptown Business District.

2. The HAMTC vacated the government-owned building, 89X, located on Lee Boulevard.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises:

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COMMERCIAL PROSPECTS

Richland

Barber Shop
Drive-In Restaurant
Plumbing & Heating Shop

North Richland

Barber Shop

NONCOMMERCIAL PROSPECTS

Richland

The Richland Jewish Congregation
Christian Fellowship Center

North Richland

First Baptist Church

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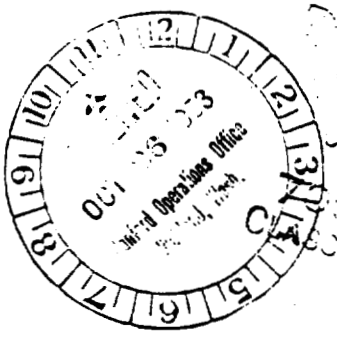
SUMMARY OF OCCUPANCY AND EXPANSION STATUS

	AUGUST			SEPTEMBER		
A. COMMERCIAL	Richland	North Richland	Total	Richland	North Richland	Total
1. Number of Government-owned Buildings	39	8	47	38	8	46
a. Number of Prime Lessee Businesses	39	9	48	39	9	48
b. Number of Sublessee Businesses	17	0	17	18	0	18
c. Total Businesses in Government-owned Buildings	56	9	65	57	9	66
2. Doctors and Dentists in Private Practice	27	0	27	27	0	27
3. Number of Privately-owned Buildings	50	7	57	52	7	59
a. Number of Prime Lessee Businesses	39	6	45	39	6	45
b. Number of Businesses operated by Sublessees	89	2	91	98	2	100
c. Total Businesses in Privately-owned Buildings	128	8	136	137	8	145
4. Privately-owned Buildings under Construction	12	0	12	8	0	8
5. Total number of Businesses in Operation	184	17	201	194	17	211
B. NONCOMMERCIAL						
1. Government-owned Buildings						
a. Churches	4			4		
b. Clubs and Organizations	8			7		
c. Government Agencies	3			2		
Total	15		Total	13		
2. Privately-owned Buildings						
a. Completed and in Use	10	1	11	10	1	11
b. Under Construction	6		6	6		6
Total	16	1	17	16	1	17
3. Pasture Land Permits	102		102	102		102

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