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MONTHLY RECORD REPORT

IRRADIATION PROCESSING DEPARTMENT

JUNE, 1958

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IRRADIATION PROCESSING DEPARTMENT
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RESEARCH AND ENGINEERING OPERATION

No I & E fuel failures have been experienced since the four reported last month.

The first three charges of Projection fuel elements were discharged for examination and were found to be in excellent condition. The three tubes have been recharged with the same type elements for a more stringent test.

Advanced reactor fuels being tested in the 1706 KER Facility progressed satisfactorily. One charge of 1.800" OD, 1.6% enriched, wafered, I & E fuel elements was discharged at 400 MWD/T because of a pump failure. The elements had suffered no visual damage but are scheduled for more thorough examination in the Radiometallurgy Laboratory.

Theoretical pressure drop calculations for the riser to top-of-downcomer sections of the effluent piping of DR, C and H Reactors, as a basis for limiting the bulk outlet temperature, have been completed.

Radiation exposure data showed a significant improvement during the last several weeks.

Samples of coal from three proposed vendors for FY '59 were tested using the IPD coal acceptance test procedures, and results reported.

PRODUCTION AND REACTOR OPERATIONS

Record reactor input production was achieved during June, exceeding forecast by 18.1 percent and the previous record, established during January, 1958, by 7.5 percent. This record was made due to exceptionally good operating efficiency resulting from improved rupture and water leak experience and a significant reduction in reactor scrams. Individual reactor production records were made at KE, F and C, exceeding their previous records by 11.9, 5.3 and 0.2 percent, respectively. Output production for June was 75.1 percent of forecast due to a discharge of KW late in May which was scheduled for June and postponing a KE discharge until July which was scheduled for June.

The maximum power level, combined total for all reactors, exceeded the previous maximum by 125 megawatts.

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Eight ruptures were removed from the reactors; three at H, two each at B and D, and one at DR. The three H ruptures were solid "E" metal; the remaining five were solid regular metal.

Significant items of equipment experience were:

1. Fifty-five process tubes were installed; 28 at D, 26 at F and one at H.
2. Two tube leaks and one Van Stone leak were corrected. The tube leaks were at F and H and the Van Stone leak was at H.
3. Borescoping of HCR channel 16 at KW revealed that spaces caused by shifting of graphite blocks permitted 3X balls from the adjacent VSR channel (No. 51) to enter the HCR channel. Except for the broken rod tracks no significant deterioration of the individual blocks was observed.
4. Following an unexplained scram at C Reactor by the regulated voltage alternator of the instrument power supply, the power source was switched to the BPA system. To avoid an undesired trip of the Ball 3X hoppers in the event of a BPA failure, the seismoscope trips were changed from the Ball 3X system to the No. 1 safety circuit.
5. Three front gun barrels have been cut at F Reactor with satisfactory results in connection with the stuck gun barrel problem. The cutting of an additional 17 front gun barrels has been authorized by a production test.
6. The No. 5 pump in 190-DR which was modified at the De Laval factory operated satisfactorily up until June 9 when the unit was removed from service and an inspection was made by a representative of the De Laval Company. Although slight worn spots were in evidence on each impeller blade, it had shown surprisingly little deterioration in 1430 hours of operation.
7. During an outage at H Reactor, water was found spurting through a crack in the far near riser. Several radial cracks were found emanating from a point where a supporting gusset is welded to the riser. Temporary repairs were made pending a complete engineering study of the problem.

No disabling injuries or technical over-exposures to radiation were experienced. One security violation was incurred.

Statistics for the Processing, Power and Radiation Monitoring Operations in individual reactor areas are tabulated on pages Ch-1 through Ch-6 of this report.

FACILITIES ENGINEERING OPERATION

Assistance was given W. E. Johnson in the preparation of his testimony before the JCAE, and supplementary information was subsequently developed for Mr. E. J. Bloch of the AEC and Captain Nels Nelson of the JCAE staff.

Studies were completed and reports were issued on NPR construction schedules, on methods of managing an NPR construction project, and on the economies of replacing various combinations of existing reactors with new facilities.

Information was compiled supporting adoption of a compact area with combined facilities and the elimination of the 105 exclusion area.

Results of the A-E's NPR work for the past quarter have been received and incorporated with current reactor plant design results to indicate reductions in capital cost, relative to the reference concepts presented in the NPR report, of approximately 10 percent for initial construction of a 4000/300 plant and approximately five percent for initial construction of a 4000/700 plant.

Plans were made and work initiated on development of additional information regarding Design B - Alternate of the NPR report which is a 4000/0 reactor plant, capable of conversion to by-product power recovery but having an initial capital cost of \$145,000,000.

Preliminary study indicates the engineering feasibility of converting selected horizontal rods in the older reactors to the production of tritium.

Study of existing reactor plant modifications for confinement of potential airborne contamination was continued during the month. At the request of the AEC, additional details and refined cost estimates were developed for the method of building sealing and exhaust air filtration of greatest current interest.

In regard to the review of existing reactor and water plant capabilities, it appears that Project CG-558 utilized most of the available capacity. Flow increases up to 10 percent may be possible with minor modifications but for a 15 percent increase, appreciable capital investment would be required in electrical distribution equipment, pumps, and piping. Twenty to twenty-five percent increase appears to be the practical limit and would require substantial expenditure.

Fifteen hundred hours of operation on No. 5 DR (the latest modifications by De Laval) on process water pumps show no cavitation damage, thus representing the first substantial improvement made by De Laval.

The first zircaloy-3 process tube was installed in channel 2477 at C Reactor on June 11, 1958.

A capillary device has proven satisfactory in dampening Panellit gage oscillations.

Initial use of a jet eduction system at D Reactor for disposal of chopped splines was satisfactory, potentially reducing radiation dosage by a factor of three and doubling the spline disposal rate.

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Acceptance of methods and equipment was obtained for the transport of dummies to 200 Area for decontamination purposes. A program for improvements in contamination control in reactor buildings was approved by the Processing Operations.

Review of the Plutonium Recycle Test Reactor electrical drawings was completed for HLO.

EMPLOYEE RELATIONS OPERATION

Experienced BS/MS personnel recruitment increased due to Service Reactivates and the need for some highly specialized engineers. Concerted effort continued in placement of personnel on available or ROF status. About 30% of IPD management have participated in PBM-I courses to date. A new course entitled, "Secretarial Proficiency" has been added to the training schedule with the first pilot session to begin July 24.

Communication activities for the month of June included publications of four Management News Bulletins, one "Memo From the General Manager;" a Health Bulletin plus a special leaflet entitled, "Fallout" (prepared by the Hanford Laboratories Operation) were distributed to all employees; the June issue of the "Monogram" was distributed to all exempt employees. Publicity on "Operation Upturn" within IPD included a "Memo From the General Manager" (introducing the program), a Round Table Guide, a letter to all Managers and Supervisors, plus the distribution of two sets of "Operation Upturn" posters and a leaflet entitled, "What's Happening to U. S. Business Today?"

Union representatives of the Chemical Workers' Union were informed of a change in work assignment involving decontamination of "dummy" slugs in CPD. They also informally requested a meeting to discuss manning HLO test reactor with bargaining unit personnel. An arbitration hearing was held the week of June 30 -- arbitrator's decision is expected within a month or six weeks. HOO-AEC Labor Standards Board approved two jobs for assignment to plant forces.

A study of selected engineering positions was completed during the month which resulted in a finalized packaged recommendation for revaluation of three positions. A detailed numerical analysis of all departmental position evaluations was completed this month. Results were reviewed and discussed with Mr. W. R. Jacobson, Consultant, Employee Compensation Services, New York Office, and it was determined that no major overhaul is necessary. Dissolution of the administrative operations in the B-C and D-DR Reactors Operations was accomplished in June. A comprehensive study of the Nonexempt Wage Plan at HAPO continued this month. A letter proposing a revised procedure for issuing purchase certificates was written to the Manager, Employee Sales at Appliance Park. AEC has approved a total allocation of \$40,000 for the HAPO Suggestion System and IPD has requested a total of \$15,000 as originally budgeted. No final determination of this request has been announced to date. The Suggestion backlog has decreased slightly over the last two months.

Industrial Hygiene was requested to make a test of possible gases given off when using Turco solvents in decontamination work -- recommendations were made with respect to handling Turco solvents and protective equipment needed when the solvent is used. Carbon monoxide readings were made during a coal bunker fire in

184-D to establish exposure time limits. An IPD Safety and Fire Prevention Specialist, a State Safety Inspector and a representative from AEC and CPD made an inspection tour of the surrounding areas to ascertain the severity of the present fire hazard conditions of the areas. It was found to be in a highly flammable condition due to the extreme dryness of the cheat grass and it is presently under constant observation. All area personnel have been alerted to this dangerous condition by placement of posters and stickers in strategic locations.

IPD's Fire Department responded to eight fire alarms during the month of June. They consisted of three grass fires (1) 1.1 mi. west of the Boat Shop, (2) Rt. #2 south at mile post #2 and (3) Midway; a private vehicle accident in the vicinity of the Hanford Ferry Landing-no fire; spontaneous ignition of an old coal pile east of the Old White Bluffs Bank Building; an Alarm system line trouble at Riverland-no fire; a transportation vehicle, short circuit in the wiring system; an Auxiliary box at 190 DR activated accidentally-no fire. Fire Department personnel held one class on fire procedure for 11 members of the 105-KE Reactor Operation.

FINANCIAL OPERATION

Approval was received from the Commission to capitalize IPD equipment items carried in the R & U Spare Parts Inventory and to fund the transfer from FY 1958 Equipment Not Included in Construction Projects.

IPD cost plus commitments for Equipment Not Included in Construction Projects - FY 1958 is \$1,346,000 compared to our allocation of \$1,408,000.

Special studies were made and informal reports issued of product unit costs and maintenance for past periods compared with budgets and estimates of costs for future periods for the IPD General Manager.

The personnel information files of Personnel Accounting and Employee Relations have been combined and are located in 1760-H Building.

Economic evaluations were made of the buy vs. rent decision regarding IBM equipment presently leased by the department. It was recommended that such equipment continue to be leased.

Studies were undertaken in conjunction with procedures and property accounting personnel in all departments to improve and streamline the data processing routines for uninstalled cataloged equipment.

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IRRADIATION PROCESSING DEPARTMENT

MONTHLY REPORT OF INVENTIONS OR DISCOVERIES

JUNE, 1958

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.

<u>Name</u>	<u>Title</u>
H. M. Woods	Thread Protector
R. J. Ascherl	Charging Machine Coupler
E. T. Hubbard	

W. K. MacCready
Acting General Manager
IRRADIATION PROCESSING DEPARTMENT

WK MacCready:lbo

RESEARCH & ENGINEERING OPERATION

JUNE 1958

VISITORS AND BUSINESS TRIPS

G. Daly of the SGO-AEC consulted with Radiological Engineering Operation, 6/5/58.

K. W. Newman of Turco Products Inc. visited HAPO to discuss decontamination problems in the 1706 Facility, 6/17/58.

G. W. Pomeroy and R. A. Pugh of the ANPD, Cincinnati, Ohio visited HAPO to discuss an irradiation test facility with the Irradiation Testing Operation, 6/18/58.

H. Cooper of the Superior Tube Company, Norristown, Pa., visited HAPO to discuss zirconium tube fabrication with Process and Reactor Development, 6/23/58.

O. H. Greager, G. C. Fullmer, J. M. Fouts, W. D. Gilbert and T. W. Evans attended the American Nuclear Society meeting at Los Angeles, 6/1-4/58. Mr. Fouts, Gilbert and Evans also visited the Vallecitos Atomic Laboratory at San Jose.

W. P. Howell and R. B. Hall attended the Health Physics Society meeting at Berkeley, 6/8-12/58.

C. W. Allen presented a paper at the ASME meeting at Detroit, Michigan, and visited the Argonne National Laboratory at Chicago, Illinois, 6/13-21/58.

W. E. Niemuth visited ANP at Cincinnati, Ohio, 6/14-17/58.

A. G. Dunbar visited the Westinghouse Corp., Pittsburgh, Pa., KAPL, Schnectady, New York, Savannah River Plant, Aiken, South Carolina, Battelle Memorial Institute, Columbus, Ohio and the Argonne National Laboratory, Chicago, Ill. to discuss reactor instrumentation problems, 6/15-26/58.

W. D. Gilbert visited the NRTS at Idaho Falls, Idaho to discuss reactor problems, 6/16-18/58.

D. H. Curtiss discussed zirconium tube fabrication with the Harvey Aluminum Co. at Torrance, California, 6/19-22/58.

H. G. Spencer and R. L. Turner attended the AIChE meeting in Philadelphia, Pa. and visited the Brookhaven National Laboratory, New York, N.Y. to discuss reactor problems, 6/20-20/58.

O. H. Greager, G. C. Fullmer, R. Nilson and R. E. Trumble made presentations at the GE Reactor Safeguards Council meeting in Denver, 6/22-24/58.

A. G. Blasewitz and F. E. Dearing visited the Westinghouse Corp., Pittsburgh, Pa., KAPL, Schnectady, N.Y., and the Maritime Reactors Branch, AEC, Washington, D.C., to discuss KAPL 120 Loop and DR Recirculating Gas Loop programs, 6/25-30/58.

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ORGANIZATION AND PERSONNEL

	<u>*Permanent</u>		<u>**Rotational</u>	
	May	June	May	June
Management and Administration	5	5	-	-
Process & Reactor Development	37	38	4	7
Process Technology	40	41	1	0
Operational Physics	20	18	2	5
Irradiation Testing	21	21	3	2
Component Testing	18	18	2	0
Coolant Testing	26	26	1	3
	<u>167</u>	<u>167</u>	<u>13</u>	<u>17</u>

* Includes three engineers on loan.

** Includes summer personnel.

Process & Reactor Development: C. F. Richey, Engineer I, transferred from HLO, 6/1/58. Colleen R. Neilan, Secretary, transferred from Employee Relations, IPD, 6/9/58. Marjorie H. Fitch, Secretary, resigned, 6/20/58. Summer employees, J. A. Roberson, W. P. Barnes, M. S. Gillis and M. D. Hannon were added to the roll, June 10, 13, 17 and 13 respectively.

Process Technology: F. A. Snyder, Engineer II, transferred from Facilities Engineering, IPD, 6/16/58.

Operational Physics: J. T. Worthington, Engineer II, transferred to Vallecitos Atomic Laboratory, 6/20/58. S. R. Stamp, Engineer I, resigned, 6/24/58. Summer employees, W. H. Wolf and R. W. Jacobson were added to the roll, June 11 and 16 respectively.

PROCESS AND REACTOR DEVELOPMENT OPERATION

Present Reactor Fuel Technology

I & E Fuel Element Development Program

The status of I & E loadings at C, KW, and KE Reactors is as follows:

	<u>C-Reactor</u> <u>IP-19-A,</u> <u>141-A, 142-A</u>	<u>KW Reactor</u> <u>IP-70-A</u>	<u>KE Reactor</u> <u>IP-70-A</u>
a) Number of I & E charges loaded this month	79	125	0
b) Total tubes charged to date	3159	2511	1987
c) Tubes discharged this month	78	94	0
d) Average exposure level (MWD/T) of tubes discharged this month	794	880	-
e) Number of I & E charges under irradiation at month end	816	1942	1768
f) Number of I & E ruptures to date under these tests	0	0	4
g) Specific power of highest power I & E metal being irradiated under these tests (KW/ft)			
1. Average over tube	47	44	44
2. Maximum*	67	63	63

* Assuming cosine distribution.

C-Reactor Experience

Operating data for the columns containing water mixers in C-Reactor indicate that mixing efficiencies for the columns and observed top annular temperature unbalances ratios (R) for the two currently under test are:

	<u>Efficiency</u>	<u>R*</u>
Mark III	60%	1.25
Mark IV	45%	1.30

* New tube.

K-Reactor Experience

Essentially full central zone loading status was accomplished at the K-Reactors

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during the report period and discharging of fuel exposed to goal exposures (~ 800 MWD/T) was initiated at KW Reactor. No further ruptures were sustained during the report period.

Projection Fuel Elements - IP-84-A

The first three charges of projection fuel elements have been irradiated to exposures up to 248 MWD/T. Post irradiation examination of the first two indicated no observed hot spots or areas of localized corrosion. Support damage was slight. The three tubes have been recharged identically to goals of 400, 500, and 600 MWD/T respectively.

Blunt-nose Tru-line Fuel Elements - IP-81-A

A failure was sustained at 122 MWD/T in a charge of fuel elements with blunt-nose, tru-line end contours charged under IP-81-A. Visual examination indicated that mechanical damage had been the most probable cause of failure. Radiometallurgical examination is scheduled as soon as the element can be shipped.

Advanced Reactor Fuels

Wafered Fuel Elements

Two charges of 1.800" OD, 1.6% enriched, wafered, I & E fuel elements hot-press canned in A-2 aluminum alloy have been irradiated in KER Loops 2 and 4 under PT IP-145-A to determine uranium wafer behavior and A-2 aluminum alloy corrosion at surface temperatures between 240 and 255°C.

The ten fuel elements in KER Loop 2 which had been operating at specific powers up to 175 KW/ft of U were discharged May 15 at an average exposure of about 400 MWD/T because of a pump failure in the loop.

Examination of these fuel elements by the Component Testing Operation showed:

- a) No weight loss occurred on any of the fuel elements.
- b) Diameter changes and warp were negligible.
- c) No surface irregularities attributable to the wafered uranium core were observed.

Some of the fuel elements will be sent to the Radiometallurgy Laboratory to determine length changes, jacket corrosion, and wafer distortion.

Cluster Fuel Elements

The four-rod natural uranium stainless steel jacketed cluster elements charged in KER Loop 3 under PT IP-74-A to determine cluster element distortion during irradiation to high exposure at surface temperatures over 250°C have reached goal. These fuel elements will be discharged about June 30.

TABLE 1

PRODUCTION TESTS - FUEL DEVELOPMENT

<u>Test Number</u>	<u>Type Metal</u>	<u>Tubes</u>	<u>Reactor</u>	<u>Goal Exposure</u>	<u>Current Exposure</u>	<u>Remarks</u>
IP-19-A	Lead Dip Canned 1.474" OD & I & E Natural	123	C	Variable 800 MWD/T		Material being replaced by 1.460" OD Fuel under PF IP-141-A.
IP-56-A	Low Hydrogen Dingot U Elements	205	DR, F	Variable 500		Semi-production scale testing of low hydrogen dingot uranium fuel.
IP-68-A	Solid Natural U Elements with Controlled Void Size	11	DR	500,700	500	Evaluation of void area effect on fuel element performance. Two tubes discharged at 500 MWD/T.
IP-70-A	Lead Dip Canned 1.474" OD I & E Elements	3710	KE, KW	Variable 800		Provides for production scale loadings of I & E at K Plant.
IP-74-A	1/4-Rod Stainless Steel Jacketed Natural U Clusters	16	KE, KW	Variable 800		Control columns for temperature balance determinations.
IP-80-A	M-388 Clad Solid Natural Elements	1	KE	2000 MWD/T	2290	Loaded in KER Loop 3. Will be discharged June 30.
IP-81-A	BWTL Regular Elements in 1245 Alloy	1325	D	Variable 500		Test discontinued pending process modifications.
IP-84-A	Projection Solid Natural Elements	3	B	100 through 700	100	Provides for quantity charging of BWTL elements.
						Preliminary evaluation of self-supported fuel elements. First three charges discharged at 187, 194 and 248 MWD/T. Recharged.

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TABLE 1 (Cont'd)

Test Number	Type Metal	Tubes	Reactor	Goal Exposure	Current Exposure	Remarks
IP-95-A	Lead Dip, 1.445" OD I & E Natural	4	D	500	300	Provides for preliminary charging of prototypic elements.
IP-106-A	Vertically Segmented I & E Natural	1	C	400,600,800	800	Preliminary testing of vertically segmented elements. Two columns discharged at 609 & 764 MWD/T.
IP-109-AC	Enriched 1.474" OD I & E	538	KE, KW	Variable		Production scale testing of I & E at C and K.
IP-123-A	7-Rod Stainless steel jacketed 1.3% enriched clusters	1	KE	2500 MWD/T	895	Charged 5-6-58 in KE front-to-rear test hole. Fuel elements are instrumented to measure uranium temperatures.
IP-124-A	M-388 Clad Nat. Solid Elements	0	B			Test discharged. Some further probe work authorized pending justification.
IP-134-A	1.6% Enriched Wafered Large Diameter I & E Fuel Elements, Hot Press Canned in A-2 Alloy	1	KE	90 days	87 days 725 MWD/T	Fuel Elements in KER Loop 4 will be discharged June 30.
IP-141-A	Nat. I & E 1.460" OD Elements	696	C	Variable 800		Production scale use of I & E fuel in thin cans.
IP-144-A	Same as IP-74-A	1	KE		580	Tube discharged May 15.
IP-146-A	Co-extruded Zr-2 Jacketed, 7-rod Clusters	1	KE	1000	0	Ready for charging in KER Loop 1 when loop modifications are completed.
IP-148-AC	1.454" OD Enriched I & E Fuel	726	C, KE	1200 MWD/Ton E		Production scale usage of I & E enriched fuel of the 1.454" OD size.
IP-172-A	4-rod co-extruded Zircaloy-2 jacketed enriched cluster elements, doe alloy and MINT corrosion pieces.		KE	1000 MWD/T	Awaiting Charging	Will be charged in KER Loop 2.

Reactor Physics

Present Reactor Physics Technology

Spline Testing

A HTR test to develop spline testing methods was performed. An efficient method was demonstrated for testing the reactivity effect of the splines. Sampling and testing procedure has been studied. Out of any lot of splines, the successive testing of 45 randomly chosen splines without any bad ones will be sufficient to assure that at least 90 percent of the splines are suitable (99 percent confidence limits). To allow for the ten percent bad ones (which is a pessimistic expectation) poison calculations with splines should include a ten percent safety factor.

Analytical Studies

Two Group Diffusion Equation

Work has continued on the analog solution to two group diffusion equation. A sample two region case has been solved. The results are shown in Figure 1 and are compared to hand calculations of R. E. Trumble. The discrepancy ($\sim 2\%$) is attributed to electrical noise produced by solving a large number of simultaneous algebraic equations on the computer. The noise level will be reduced for future calculations.

Flux Oscillation

The IBM-650 flux oscillation program has been completed and several demonstration oscillations have been calculated. An example of a run in K Reactor operating with the central banks of horizontal rods in the reactor and a 1600 KW tube power is shown in Figure 2. The oscillation is shown for a point in the upstream fringe and is a result of a one hour disturbance in that region. A diametrically opposite oscillation would appear in the downstream fringe.

It is observed that the flux oscillation converges slowly and the period is ~ 38 hours under the assumed conditions. At higher flux levels it is expected that the oscillations would diverge. The future plans for the program is the examination of the effect of varying the temperature coefficients and flux levels. A special application will be the NPR.

The major drawback of the program is felt to be in the pseudo method employed to represent the control zone. A one-dimensional analysis must assume the reactivity of a slab rather than a point in three dimensional space. The uncorrected program probably assumes a more optimum control than is possible with existing rod systems.

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Advanced Reactor Physics Technology

Seven-Rod Cluster Element - Physics

Three more buckling measurements on 7-rod half inch cluster have been completed by the Reactor Physics Operation, HLO. The complete list of preliminary results to date are as follows:

<u>Lattice</u>	<u>Wet $B^2 \times 10^6$</u>	<u>Dry</u>
5 3/16"	-209	-384
6 3/16"	-57	
7 3/16"	-27	8
10 3/8"	-53	

Tube-Rod Fuel Physics

The calculation of the resonance escape probability in tube and rod type fuel elements requires a knowledge of the effective surface to mass ratio of the fuel element. Following a procedure along the lines of Hellstrand, theoretical expressions have been derived for the effective total surface for a tube and rod fuel element. Simply, for an element of the dimensions below

where the shaded areas are uranium and the unshaded areas are coolant, the expression for the effective surface per unit length assuming a spatially constant resonance flux per unit energy interval is as follows:

$$S_{\text{eff}} = \pi c^2 + \gamma_1 \pi b^2 + \gamma_2 \pi a^2,$$

where

$$\gamma_1 = \frac{2(b-a)}{\lambda_s} P_1 \left[\frac{b-a}{\lambda_s} \right]$$
$$\gamma_2 = \frac{2(b-a)}{\lambda_s} P_2 \left[\frac{b-a}{\lambda_s} \right],$$

where P_1 and P_2 are the probabilities of neutrons scattering in the inside

water region escaping to the inside tube surface and inside rod surface respectively without further collisions in the coolant. The expressions for P_1 and P_2 have been derived and are complex functions involving K_{12} functions. λ_s is the scattering mean free for resonance neutrons in the coolant.

The method of calculating the fast effect in I & E tube and rod, and cluster slugs is also being derived. Similar escape probabilities which have been derived for use in the resonance escape probability calculations discussed above can be employed here. Experimental measurements on cluster geometries are expected to check the theoretical methods.

Other Fuel Elements - Physics

Power generation calculations for several fuel elements in the KER loops have been made. The results are reported as the ratio of power generated per unit length of fuel relative to a natural uranium solid element in the adjacent channel.

- 1) 8% Pu-Al alloy 4 rod cluster (Pu is 95% 49)

$$\frac{P_c}{P_N} = 1.38 \pm .07$$

- 2) 1.15% U-235 enriched UO_2 I & E element

$$\frac{P_O}{P_N} = 1.17 \pm .06$$

- 3) Tube and rod, 1.785" x 1.375" tube and 1" rod, natural uranium.

$$\frac{P_{R+T}}{P_N} = 1.23 \pm .06$$

$$\frac{P_{rod}}{P_N} = .45 \pm .02$$

Reactor Engineering

Present Reactor Engineering Technology

Heat Transfer and Water Plant

Theoretical pressure drop calculations for the riser to top-of-downcomer sections of the effluent piping have been completed for DR, C, and H reactors. These calculations indicate that in the crossover line near the top of the near riser pressures are less than atmospheric due to the siphoning effect of the crossover line lead into the downcomers. The saturation temperature in the crossover line is thus less than 100°C, and a limiting bulk outlet limit must have subtracted a value to prevent boiling in the crossover line. The subtraction amounts to 2°C at C Reactor and 1°C

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at H. Boiling in the crossover line would increase the stresses on the elbow leading to the downcomer and on the top tray of the downcomer.

Fuel Element Design

A preliminary design for a natural uranium I & E fuel element and a companion enriched I & E fuel for the K reactors has been completed. The natural element is designed to have equal uniform-corrosion rates in the hole and the annulus, and it contains about 1% less uranium than the fuel element now used at K reactors. However, the natural fuel element charges will require some sort of flow throttling, i.e., dummy train modifications, to make the hydraulic resistance of the reactor compatible with the coolant water supply system. The enriched element is designed to be used in homogeneous, full-length charges and to have balanced interior and exterior corrosion rates equal to that of adjacent Natural uranium charges. Models of these fuel elements are being obtained for flow lab testing.

Panellit Gage Response, and Damping Techniques

The response of a Panellit gage to a step pressure change can be closely approximated by a second order ordinary differential equation. This equation has three characteristic solutions: undamped, which leads to "overshoot" and continuous oscillation; critically damped, in which the gage indicates the full step change without "overshoot;" and over-damped, in which there is no "overshoot" but the response is excessively slow. The undamped gage will indicate 67% of a step change in about 0.22 sec., the critically damped gage in about 0.42 sec. and an over damped gage may require as long as about 1.3 sec. to indicate 67% of a step change. In order to suppress the oscillations of the Panellit gages a response lying between "undamped" and "critically damped" is desirable. This response is characterized by an "overshoot" followed by a quickly suppressed oscillation, and will be labeled "partially damped."

Laboratory and on-pile tests indicate that this "partially damped" response may be obtained by a coiled capillary tube surge suppressor. Gage oscillations at B and C reactors have been reduced from the order of ± 10 to 15 psi to ± 1 psi by use of this device.

Advanced Reactor Engineering Technology

Zirconium Tube Development

The final report and billing for DDR-32 have been received.

Four NPR tubes have been produced on AT(45-1)1076 contract with Chase Brass and Copper. The tubes meet all specifications except wall thickness. Chase has requested waiver of the dimensional tolerance and their request is being reviewed.

Carbon Steel Studies

Laboratory studies have continued for the development of decontamination methods of stainless and carbon steel. To date the most promising method is the Turco 4501 process.

The Dowtherm heat exchanger unit was placed in operation to evaluate scaling and corrosion problems when using Columbia River water as coolant in a carbon steel heat exchanger. The loop was operated for one week, then shut down for a cursory examination, and results are not yet available.

A report on the status of carbon steel corrosion and decontamination work will be issued in August.

Radiological Engineering

Radiation Control Experience

Two technical radiation overexposures which occurred during May were investigated and reported this month. Both occurred at the DR reactor on May 24, 1958. One involved a process operator who received a localized overexposure of about 9.3 rads to his left thigh when contaminated water was splashed on his protective clothing while he was inserting dummies into the rear of a process tube containing a ruptured slug. The other occurred when a maintenance pipefitter received a whole body exposure of 910 mrad including 320 mr in a 7 day period. He received 810 rad including 250 mr in one shift during ruptured slug removal work, partially because of confusion in establishing dose rates. In addition, contamination of his forehead during this work resulted in a localized skin dose estimated to be about 2000 mrad.

The twenty-four week exposure data shows that a definite downward trend took place during the last two weeks of May. Extrapolated year end exposures based on the 22 week experience and 24 week experience are as follows:

<u>Classification</u>	<u>Average Extrapolated Year End Exposure</u>	
	<u>After 22 weeks</u>	<u>After 24 weeks</u>
Radiation Monitors	3420 mr	3330 mr
Processing Operations	2060 mr	2040 mr
Pipefitters	2340 mr	2240 mr
Millwrights	2010 mr	1920 mr
Mechanical Maintenance		
Supervisors	1640 mr	1560 mr

Twenty Reports of Lapse of Radiation Control were issued during the month. There were eleven cases of spread of contamination to the skin or personal clothing of employees of such magnitude as to be judged Lapses of Control. In six of these cases, the employees received significant external exposure from the contamination, and nostril contamination was present in one case. In the case of nostril contamination, the contamination is believed to have been transferred by touching the nose with a contaminated glove.

There was one case in which employees received uncontrolled exposure to radiation. This occurred when an irradiated poison spline was ejected from the front nozzle of a reactor during poison spline insertion.

There were 5 cases during the month in which there was a spread of high level contamination outside radiation zones, or high dose rates existing outside radiation zone boundaries. One involved contamination spread from the -12 room, one involved contaminated equipment in the storage area. One involved

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high level contamination found on an unregulated vehicle during a routine survey. One involved removal of a radiation zone boundary from the horizontal rod rack when an irradiated rod was present, and one involved insufficient shielding of the fly's eye while it was being modified.

There were two Lapses of Control in which grossly contaminated equipment was found on the charge elevator and in the work area of a reactor building. There was one case in which personnel were exposed to air of assault mask levels with no respiratory protection. This was due to an inadequate procedure.

LAPSE OF RADIATION CONTROL
DISTRIBUTION BY REACTOR AND OPERATION

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	<u>IPD Totals</u>
Processing	1	2	1	3	1	1	1	2	
Maintenance	0	1	1	0	1	2	0	0	
Supplemental Crews	0	0	0	0	0	0	0	0	
Research & Engineering	0	0	0	0	0	0	1	0	
Reactor Area	2	0	0	0	0	1	0	0	
Assigned Totals	3	3	2	3	2	4	1	2	20
IPD Unassigned									0

Vertical columns do not necessarily add up to the indicated totals because in some cases a Lapse of Control may be chargeable to more than one component.

Effluent Water Statistics

This data is reported through the cooperation of the Radiation Protection Operation, HLO.

Activity in the River Water at Pasco-Kennewick*

March	< 1.8% MPE**	< 36% off plant limit
April	< 1.4% " GI	< 28% " " "
May	< 1.4% "	< 28% " " "

Activity in Pasco Sanitary Water*

March	< 0.4% MPE	< 8% off plant limit
April	< 0.3% " GI	< 6% " " "
May	< 0.3% "	< 6% " " "

Activity in Kennewick Sanitary Water*

March	< 0.7% MPE	< 14% off plant limit
April	< 0.7% " GI	< 14% " " "
May	< 0.6% "	< 12% " " "

Activity in Raw Water at 100-F Area*

March	< 4.8% MPE	< 48% plant limit
April	< 7.3% " GI	< 73% " "
May	< 5.2% "	< 52% " "

Activity in 100-F Sanitary Water*

March	< 0.7% MPE	< 7% plant limit
April	< 1.1% " GI	< 11% " "
May	< 1.0% "	< 10% " "

Average Reactor Effluent Activity Output

	<u>June 1958</u>	<u>May 1958</u>	<u>June 1957</u>
B	26 x 10 ³ μ c/sec	29 x 10 ³ μ c/sec	23 x 10 ³ μ c/sec
C	34 " "	45 " "	45 " "
KW	49 " "	101 " "	50 " "
KE	43 " "	68 " "	49 " "
D	16 " "	33 " "	17 " "
DR	15 " "	16 " "	12 " "
H	20 " "	15 " "	***
F	22 " "	31 " "	21 " "

* This data includes some values that were below detection limits. The detection limits were substituted for real values which were unknown.

** MPE_{GI}- Maximum permissible exposure to the gastro-intestinal tract from radioactivity in drinking water. These values were calculated on the basis of limits quoted in the Radiation Protection Standards (HW-25457 Rev. 1) for continuous occupational exposure.

***105-H shut down for CG-558 during June 1957.

Radiation Control Standards and Procedures

Drafts of standards and procedures relating to radiological records were prepared. They are intended to optimize the entire system of radiological records in IPD.

Liquid Waste Disposal

Decontamination of Reactor Piping with Turco 4306-B

A decontamination factor of about 2 is the limit of achievement so far attained in discharge area decontamination. Decontamination of the rear crossheaders as demonstrated at 105-H and through reactor decontamination as demonstrated on a few tubes at the 105-KE and 105-DR reactors reached approximately the same end point. On the basis of analytical results obtained from two samples of Turco 4306-B effluent obtained from each of the 100-K reactors it is concluded that the amount of radioactivity in the

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waste will limit disposal to the river more severely than chemical toxicity or the effect on water treatment at downstream reactors. The fact that large amounts of contamination were still apparent in the effluent after 5 minutes of decontamination supported other evidence that decontamination was incomplete in these two tubes. Samples of the clear water flush indicated that very little decontamination occurred after chemical addition was discontinued. This chemical purge (even though incomplete) removed about 50 times as much radioactive material from the reactor as a diatomaceous earth purge. The time period over which the effluent from a full reactor decontamination could safely be released to the river was calculated on the basis of these two samples. Using drinking water limits as applied downstream, a release period of 5 to 15 days was indicated. The difference is the influence of river flow rate. If the appearance of a measurable increase in the phosphorus-32 contamination in whitefish is considered limiting, then a release period of 10 days is the minimum under the most favorable conditions. A period of 2 weeks is indicated under good conditions and a maximum of 6 weeks is indicated under the most adverse conditions of river temperature and flow rate. A study of the feasibility of putting this waste in a trench has been undertaken.

PROCESS TECHNOLOGY OPERATION

REACTOR POWER LEVEL LIMITATIONS

Equilibrium reactor power levels were limited at the end of the report period approximately as follows:

<u>Reactor</u>	<u>Limit</u>	<u>Basis</u>
B	975 kw maximum for the average of the ten highest powered tubes	Fuel element failure control
C	I & E E-metal corrosion limits (equivalent to 1050 kw regular I & E tube power)	Fuel element failure control - prevention of corrosion penetration of I & E E-metal slug jackets
D	985 kw maximum for the average of the ten highest powered tubes	Fuel element failure control
DR	975 kw maximum for the average of the ten highest powered tubes	Fuel element failure control
F	975 kw maximum for the average of the ten highest powered tubes	Fuel element failure control
H	93°C bulk outlet temperature limit (equivalent to 890 kw maximum tube power)	Prevention of damage to effluent system
KE	I & E E-metal corrosion limit (equivalent to 1175 kw natural I & E charge tube power)	Fuel element failure control - prevention of corrosion penetration of I & E E-metal slug jackets
KW	I & E E-metal corrosion limits (equivalent to 1220 kw natural I & E charge tube power)	Fuel element failure control - prevention of corrosion penetration of I & E E-metal slug jackets

The reported tube powers have changed at the K Areas as the result of a change to six pump operation at KW and a change to five pump operation at KE.

At DR Reactor it was recommended that the tubes surrounding graphite stringers be included in determining the rupture control point. This results in a 10 to 15 kw decrease in the effective tube power.

WATER TREATMENT

Aluminum Oxide-Sulfuric Acid Feeder

A half plant test has been run at B Area for the purpose of reducing coagulant costs. Sulfuric acid and aluminum oxide were reacted together in a continuous

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process system and the resultant product was used as a water plant coagulant. The product from the system is a dilute solution of aluminum sulfate and sulfuric acid. Normally, granulated aluminum sulfate is used as a coagulant. Testing of the new process was completed successfully. Coagulant costs for the new process were about one-third less than for the standard process.

Separan Substitute

A substitute for Separan was used throughout the month at F Area with no detectable ill effects. The substitute is approved for use in treating drinking water while Separan is not approved.

Water Quality Study

A plant test is being run at C Area for the purpose of determining if a relationship exists between the turbidity in filtered water and the radioactivity of the reactor effluent water.

Experimental Filter Plant Studies

Experimental studies were continued on filtering materials and water treatment chemicals. Emphasis is being placed on potential methods of increasing the filtration rates.

PROCESS STANDARDS

HW-46000 B, Process Standards - Reactor

One new Standard was issued during the month. This was:

Process Standard F-011 - "Process Material"

This is a new Standard listing slugs, process tubes, lubricants, essential materials and special-purpose chemicals that are authorized for use in the reactor.

HW-46000 D, Process Standards - Reactor

One revised and one new Standard were issued during the month. These were:

Process Standard A-070 - "Thermal and Biological Shield Cooling Water"

The revision clarifies the minimum individual tube flow specification; allows, in an emergency, short periods of operation with less than normal total shield flow; and recommends use of fringe poison to maintain the shield temperatures below the point where rapid masonite deterioration occurs.

Process Standard F-011 - "Process Material"

This new Standard is identical to that issued in HW-46000 B, above.

HW-46000 F, Process Standards - Reactor

Two revised and one new Standard were issued during the month. These were:

Process Standard A-050 - "Panellit System"

The revision provided a single Panellit high trip limit that is compatible with the full range of Panellit trip spans now permitted by Standards. Also, a minimum low trip limit, to be observed in double orifice zones, was included to avoid the possibility that critical flow might prevent a low Panellit trip in event of rupture of a front connector. To minimize the possibility of inadvertent use of heavy oil, the oil used in sensing lines to dampen Panellit gauge fluctuation is now specified by viscosity rather than code number.

Process Standard A-070 - "Thermal and Biological Shield Cooling Water"

The specification on minimum individual tube flow was clarified, and fringe poison was recommended to control shield temperatures below the point where rapid masonite deterioration occurs.

Process Standard F-011 - "Process Material"

This new Standard is identical to that issued in HW-46000 B, above.

HW-46000 K, Process Standards - Reactor

Two revised and one new Standard were issued during the month. These were:

Process Standard A-020 - "Pressure, Flow During Reactor Shutdown"

The revision contains new crossheader valve throttling restrictions and limits on top of riser pressure during shutdown which were designed to protect against boiling in process tubes during outages.

Process Standard A-070 - "Thermal and Biological Shield Cooling Water"

The outlet water temperature limit on the bottom thermal shield and the foundation temperature limit were reduced by this revision. This action was taken, on the basis of a recent study, to reduce thermal stresses in the concrete foundation.

Process Standard F-011 - "Process Material"

This new Standard is identical to that issued in HW-46000 B, above.

HW-27155 Rev1, Process Standards - Water Plant

Three revised Standards were issued during the month. These were:

Process Standard 190-B-060 - "Process Water Sectionalizing Valves"

The revision permits operation with the flow balance valve open for short periods when process water must be supplied from an unbalanced pump configuration. This will minimize Panellit gauge pressure changes and the possibility of Panellit scrams from this source.

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Process Standard 190-B-070 - "Emergency Water Requirements, B, C, D, DR, F and H Water Plants"

Automatic steam pump acceleration upon BPA failure is now required during the first two hours of shutdown in line with the new boiling suppression requirements in Section 70.04. The importance of maintaining appropriate surge suppressor settings to avert export line damage from water hammer is newly affirmed in this revision which requires specific settings and functional checks of the suppressors.

Process Standard 190-B-100 - "Emergency Electrical Requirements - K Reactors"

The Standard was revised so that the emergency generator requirements in Water Plant Standards would correspond with the new, more stringent requirements recently issued in the Reactor Standards.

PROCESS CHANGE AUTHORIZATIONS

Seven Process Change Authorizations were issued during the month to permit temporary relaxation of Process Standards - Reactor, HW-46000. These were:

PCA #8-46 - "KER Loops 3 and 4, KE Reactor"

During a recent KE Reactor outage it was desired to leave KER loops 3 and 4 recirculating while repairs were made on the KER Recirculation Facility effluent system. Since the KER loops dump to the effluent system automatically if flow drops to 10 gpm, the PCA permitted bypassing the automatic dump valve trips on loops 3 and 4 under stipulated conditions while repairs were in progress. This eliminated a potential hazard to personnel working on the effluent system.

PCA #8-47 - "Temperature Monitoring During Start-up - K Reactors"

The K Reactors are experiencing temporary failure of a large number of temperature monitoring circuits due to moisture penetration of lead wires during outages. Most of the circuits recover as lead wires dry out after a few hours of operation. However, the number of inoperable circuits that exist during start-up generally exceeds the number allowed by Process Standards. To avoid considerably extending outages for correction of inoperable circuits, the PCA authorizes reactor start-up with more than the limiting number of inoperable circuits, provided certain restrictions, including restrictive outlet temperature limits (TAI and TOA), are observed.

PCA #8-48 - "Handling of 0.96% or LESS E-Metal - All Reactors"

The PCA was issued to allow improved enriched slug handling methods.

PCA #8-49 - "Temperature Monitoring - KW Reactor"

PCA #8-47 specified conditions under which KW Reactor start-up could be made with a limited number of inoperable tube outlet temperature elements, but due to an increased number of inoperable temperature circuits following the

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May 29 outage, the provisions of PCA #8-47 were inadequate.

PCA #8-49 was issued to supplement PCA #8-47 and to provide the additional restrictions necessary for safe start-up with the increased number of in-operable temperature detectors.

PCA #8-50 - "Rear Connector Failure - F Reactor"

The PCA was issued to permit F Reactor to continue operating with a leaking rear connector. Panellit pressure stipulations were imposed to protect the reactor against excessive temperatures in the tube in event the leak rate increased.

PCA #8-51 - "By-Passing of Seismoscope - C Reactor"

Because of failure of the normal power supply to the seismoscope, C Reactor was authorized to by-pass the seismoscope until the first minimum outage. The PCA specified manual scram of the #1 Safety Circuit on any indication of an earthquake, and a manual Ball 3X trip if the VSR's failed to enter the reactor.

PCA #8-52 - "Temperature Monitor - KW Reactor"

The Standard requires the temperature monitor to be in the safety circuit during all start-ups at the K Reactors. Due to deterioration of temperature monitor wiring, frequent spurious trips have occurred thus delaying or preventing start-up. To eliminate such delays, the PCA permitted by-passing this instrument until the defective wiring is replaced.

PROCESS ASSISTANCE

Graphite Temperature Monitoring

A detailed analysis of the minimum number of thermocouples required for adequate graphite temperature monitoring was completed and forwarded to C Processing Operation.

Removal of Half-Rods from Scram Circuit

A review of the problems associated with the scram of half-rods was completed and a letter issued to all Processing Operation Managers recommending that half-rods be removed from the #2 Safety Circuit. The basis for the recommendation was that insertion of half-rods during certain periods, particularly at turn-around, could cause a reactivity increase rather than a decrease.

Boiler Reliability as a Function of Coal Quality

Boiler performance, using coal acceptance test procedures prepared by Process Standards Operation, was tested in F and H Areas on three types of coal, each having a different speed of ignition. The three coals, Carbon Fuel, Kemmerer and Mountain States were offered on the 3 lowest bids for the FY-1959 coal contracts. The purpose of the tests was to determine (1) the specific coal qualities necessary to ensure that boilers will reliably pick-up the emergency

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steam pump load, and (2) whether Carbon Fuel, a coal new to HAPCO, would permit reliable boiler operation under all load conditions.

Carbon Fuel and Kemmerer coals satisfactorily passed the acceptance tests. Mountain States coal did not meet IPD requirements. As a result of its inherently slow ignition rate and low BTU content, Mountain States coal placed such severe demand on optimum performance of boiler controls, auxiliaries and operating personnel under the conditions that exist during emergencies that the reliability of this coal for IPD use was considered borderline. Since reliable performance under severe conditions is a unique requirement of IPD steam plants, it was recommended that Mountain States coal not be burned in the 100 Areas. Reports were issued on all coal acceptance tests.

Graphics

Graphics services prepared 31 graphs, charts and visual aids for various IPD and HLO components.

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RUPTURE EXPERIENCE

<u>Date Failed</u>	<u>Tube Number</u>	<u>Lot Number</u>	<u>Type Metal</u>	<u>Exposure</u>	<u>Type Failure</u>
6-2-58	0863-H	KE-043-A	6" Solid E-Metal ⁽¹⁾	315	Side H.S.
6-11-58	3184-D	KA-080-A	8" Regular	437	N.A.
6-12-58	1064-B	KA-110-A	8" Regular	251	Unknown
6-12-58	2863-DR	CA-063-A	8" Regular	485	N.A.
6-17-58	1363-D	KA-102-C	8" Regular ⁽²⁾	122	Mechanical Damage
6-22-58	0573-H	KE-052-A	6" Solid E-Metal ⁽¹⁾	264	Side H.S.
6-25-58	2992-H	KE-032-A	6" Solid E-Metal ⁽¹⁾	518	Side H.S.
6-29-58	3465-B	KA-124-A	8" Regular	110	Unknown

(1) 0.94% Enrichment

(2) Clad with 1245 blunt-nose truline components

Legend:

<u>Side H.S.</u>	- Failure probably caused by accelerated corrosion in a localized region of high surface temperature.
<u>Unknown</u>	- Ruptured piece was not located.
<u>Unclassified</u>	- Failure did not fit any particular category.
<u>N.A.</u>	- Information not available.
<u>Mechanical Damage</u>	- Failure probably resulted from mechanical damage to the jacket that occurred during the charging operation.

OPERATIONAL PHYSICS OPERATIONPILE PHYSICS ASSISTANCE

Operation during June was characterized by long operating intervals at several of the piles and relatively good flattening conditions. Each of the piles reported higher Effective Central Tube values than for the average of the twelve preceding months.

Figure I on the following page shows graphically the increases in effective flattening during the past eighteen months. These increases, attributable largely to the installation of "half rods" and PCCF facilities and to the use of modest amounts of enrichment in the older piles, have effectively added nearly half the capacity of one of the older piles.

TABLE I

SUMMARY OF OPERATING DATA OF PHYSICS INTEREST
FOR THE MONTH OF JUNE 1958

<u>File</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>
ECT in June*	1450	1600	1440	1490	1450	1630	2475	2460
12 Mo. Avg. ECT	1413	1590	1415	1475	1415	1544	2420	2410
Equilibrium Scram Time**	25-30	20-25	25-30	25-30	20-25	35-40	20-28	18-23
No. of Scrams and Recoveries#	0/0 2/1	0/0 7/5	3/3 4/0	1/1 5/2	0/0 0/0	1/1 1/0	2/2 2/0	6/6 2/0
No. of Non-Scram Outages##	2/0	2/0	4/2	6/0	1/0	2/0	2/0	3/1

* Effective Central Tubes; this value is defined as the pile power divided by the average of the ten most productive non-enrichment tubes in the pile.

** This is defined as the maximum time available in minutes between scram and the first indication of start-up.

The first pair of numbers shows the number of brief outages from which secondary cold start-ups would be made and the number of successful start-ups. The second pair shows the numbers of brief outages from which hot start-ups would be made and the number of successful recoveries.

The first number shows the number of ordinary outages (including those initiated by scrams followed by unsuccessful recovery attempts), and the second shows the number of additional outages to discharge temporary poison.

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PILE PHYSICS ASSISTANCE (Continued)

Figure 1

B Pile - W. R. Smit and A. D. Vaughn

The only shutdowns experienced during this period were due to (1) improper Panellit bypassing - recovery was successful; (2) a scheduled outage; (3) a natural uranium rupture; and (4) an unexplained Panellit trip - no recovery. During the attempted recovery from the last scram a twenty-second period led to a manual scram and a minimum outage. The observed reactivity indicated errors in the scram recovery curves in current use, although they have been exceptionally accurate on previous scrams. A scram transient test will be run at the first opportunity.

Three recent front-to-rear flux traverses showed displacement of the flux peak to be two feet toward the front with the maximum value 0-5% above a cosine. Another traverse, near enrichment, showed a peak 10% above a cosine and centered in the front-to-rear direction.

C Pile - R. D. Carter and R. A. Chitwood

Pile power has been limited by corrosion limits on the I & E slugs; consistently high power levels were attained, but seven scrams reduced production. A succession of five Panellit scrams in six days caused poor operation until the trouble was located; recovery was successful in each case. Two spurious Beckman scrams resulted in full length outages when other troubles delayed start-up attempts; following the 6-10-58 scram the VSRs failed to come out promptly, whereas after the 6-19 scram the No. 2 HCR hose-reel kinked and caused a loss of rod-water pressure. A recovery was attempted with the rod partly inserted to permit flow, but the pile was manually scrammed when a fast period developed because of malfunction of the proportional counter. Considerable work has been

PILE PHYSICS ASSISTANCE (Continued)

C File (Cont'd)

done on the PC since that time, and sensitivity and saturation tests will be made during the next cold start-up.

Flux peaking downstream of center has caused some concern. In conjunction with the flux traverses described under the Process Physics section of this report, most enrichment tubes in the Pu-240 zone were displaced 16 inches upstream. More traverses are planned to measure the result; however, a reactivity gain of about 40 inhours, increases in the front graphite temperatures, and increased effectiveness of the front rods indicate that the flux was definitely moved toward the front.

D File - D. T. Houser

Seven scrams and three recoveries during the report period led to two minimum outages and two temporary poison type outages. The last was accompanied by a serious water leak (700 gallons) and an unplanned sub-critical period following poison-discharge. There were also three ruptures during the month and a new difficulty with the spline system.

During the June 12 start-up a spline lubricated with oil instead of water-soluble oil shot out of the tube into the work area. With use of the recommended lubricant and of a full length upstream dummy pattern, this situation would not be expected to recur.

Following a 700 gallon water leak, the poison-discharge outage, usually 3-5 hours, was extended to thirteen hours when the pile unexpectedly went sub-critical. Approximately one-fourth of the pile was inactive because of the water; the water caused even the "sub-critical" start-up instrumentation to show a sensitivity of 100 watts, and, of course, altered reactivity values of rods, xenon, and poison columns.

Splines are being used for flattening purposes only until the water-flushing eductor system can be tested. This limited use is caused by the amount of exposure acquired in removing the 20 to 40 splines necessary for turnaround control by the cask system. An eductor will be tested soon to determine whether a reduction in exposure can be gained.

The power rate meter under test by Instrument Development showed a rate of rise approximately 20% conservative. The signal source for the instrument consists of ten RTDs (resistant temperature detectors) located on the downstream end of process tubes. Operations finds the instrument quite helpful for holding a particular power level.

DR File - D. I. Monnie

The pile power level was limited by the ACRS restriction; the rupture control point would have permitted 10-20 MW additional power. Six scrams with three recoveries and a total of six full-length outages plus four ruptures caused very uneven operation from 5-24-58 to 6-18; operation has been continuous since then.

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PILE PHYSICS ASSISTANCE (Continued)

DR Pile (Cont'd)

The 5-26-58 outage was caused by a flux distortion and high temperatures which resulted from failure of the PCCF; poison could not be charged as turnaround was approached. At the present time, PCCF tube 0868 will not flush with full water pressure.

Control rod configuration changes made during May have reduced longitudinal flux peaking and presumably also rupture potentialities.

F Pile - C. E. Bowers and A. D. Vaughn

F Reactor experienced an unprecedented 27-day operating period from 5-18 to 6-14. ECT values were high with a maximum of 1485 and an average of 1455; these high values are attributed largely to significant long-term reactivity gains and steady PCCF operation. There was only one outage (scheduled) and there were no operating problems of physics interest aside from the frequent PCCF changes made to compensate long-term gains.

H Pile - G. R. Gallagher

Maximum power level has been limited by the ACRS restriction; the record 1630 ECT value would have permitted about 30 MW more.

On 6-2-58 the pile was shut down due to a rupture in E tube 0863. Observation of the stuck ruptured slug gave evidence it was of the hot spot type; it occurred upstream of center.

On 6-22-58 a rupture occurred in E tube 0573. The rupture was "quickied" but insufficient reactivity caused the recovery to fail. The column, about one-third to goal exposure, had not been running at highest power. The front-to-rear location of the rupture had not been determined at report time.

H Pile has experienced 15 ruptures so far this year, seven in E metal. As there may be a correlation between the rupture rate and slug power distribution, a program to monitor and improve front-to-rear flux distribution is being carried out. The first step was to change the equilibrium rod configuration. Fifteen flux traverses were taken by discharging numbered dummies from PCCF tubes during operation in the past operating period to monitor the new flux distribution. During the current shutdown the inner ring of near-side enrichment was displaced downstream eight inches. The results will be observed during the next operating period, and, if necessary, more displacement will be done.

KE Pile - F. C. Franklin

As of the end of the report period the pile had operated for 27 days without a shutdown. Operation on essentially a 100% helium atmosphere started on 6-15-58, and the average reactivity gains rate since that time indicated by rod movement was nine inhours per day. The flattening remained good and no serious temperature cycling occurred until two days before the scheduled outage at month end, in spite

PILE PHYSICS ASSISTANCE (Continued)

KE Pile (Cont'd)

of the large increase in the amount of reactivity carried in the control rods (300 as compared to an optimum of 220 ih).

An attempt will be made to "decycle" the charge-discharge pattern in KE Pile in order to avoid large variations in reactivity and thus in enrichment investment. The pile can be "decycled" by discharging some metal slightly above and some slightly below the normal goal exposure.

Plans have been made to obtain flux traverses from twelve natural uranium tube charges during the next shutdown from representative conditions by monitoring individual slugs as they are discharged. These same slugs will also be read with an underwater weasel to evaluate this method of obtaining flux traverse data as the slugs are discharged. Two solid aluminum charges will also be discharged on the next outage and flux traverse data will be obtained from them.

KW Pile - G. R. Parkos

The reactor enrichment inventory was reduced to 296 I & E E charges during the month. Equilibrium hot reactivity was returned to a more satisfactory range by this reduction. Minor additions and adjustments will be required before the optimum enrichment pattern for the I & E load can be determined; however, the transition from solid to I & E fuel elements is essentially complete, and KW is operating with essentially no "spike" enrichment inside the enrichment ring. It is expected that only 20-40 columns of "spike" enrichment will be used in the future, and that elimination of these would not reduce the flattening efficiency significantly.

The half-rods located in the 3 and 18 positions were used as long rods at equilibrium during the month. Since the worst front-to-rear graphite temperature "cycling" has occurred only in vicinity of 3 rod in the top-near, it is quite probable that the "cycling" is the result of the distortion to the rear-near caused by #3 as a half-rod. A poison column displacement cylinder, or a specially designed mint charge, will be installed in the top-near region in an attempt to return the distribution to normal and regain front-to-rear stability. A flux traverse will be taken in the bottom-near to determine whether #18 rod causes a similar distortion.

Two "rods-out" minimum start-ups occurred during the month. In both cases the pile was started up to about 45% of the normal equilibrium power level, and turnaround was unsuccessful. Turnaround was forced by a "cut-back" during one of the start-ups, and by a #1 scram during the other. The heavier enrichment inventory and flatter exposure distribution resulting from the transition from solid to I & E fuel elements have reduced start-up efficiency significantly. Large production gains will result if it is possible to use splines to supplement the HCR system during the start-up reactivity transients.

Over 1000 RTDs were inoperable during the start-up attempt on May 29. The inoperable RTDs were concentrated in the bottom-center, and a PCA was required

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PILE PHYSICS ASSISTANCE (Continued)

KW File (Cont'd)

to permit operation with the temperature information available from the few operable RTDs in this region. Many of the elements dry out and become operable fairly soon after start-up, and almost all of the couples become operable within 24-48 hours after start-up. It may be necessary to install new lead wires and RTDs in a few selected locations before the long replacement outage in order to preserve reactor safety during start-up.

Two aluminum dummy flux traverses were obtained during the month. The deviations above a natural cosine were 7 and 10%. One of the traverses revealed a pronounced distortion to the rear. This distortion is probably responsible for the front-to-rear "cycling" noted in the top near.

A scram transient test was run during the shutdown of 5-27-58. The metal coefficient obtained from an analysis of the data was $-.064$ ih/MW. The best value for the metal coefficient obtained at KW with a solid-fuel-element load was $-.09$. This decrease in the metal coefficient is about what was predicted before the I & E loading program began.

PROCESS PHYSICS STUDIES

Safety Control Studies

Continued review of total control calculations indicates that supplementary control methods and procedures will be needed during extended outage conditions at the B, D, F, KE, and KW piles. If exponential pile E metal values are used rather than results of empirical control tests with C metal, it appears necessary to "de-enrich" with properly located poison in order to maintain sub-criticality in event of water loss under cold xenon-free conditions prior to tube melting. Work is now underway on the appropriate process standards.

Incentives to "de-peak" the front-to-rear flux by split enrichment columns are not compatible with maintaining maximum control capacity. It has been recommended that "split" enrichment columns not outnumber "short" ones during the transition to "long" enrichment columns. Three-dimensional control calculations are being started in order to determine the safety effects of "long" and "split" columns more quantitatively in the future.

Front-to-Rear Flux Monitoring

Most of the 300 enrichment columns for the Pu-240 test at C Pile have been moved forward sixteen inches to reduce the rear flux peaking in that reactor. Before and after flux distributions were measured by the rear face Beckman technique as the pieces were displaced one at a time off the tip-off. Conclusions are that the flux peak is still slightly downstream, though reduced an estimated 10% in magnitude.

Because more than one slug may be "seen" at a time in the tip-off monitoring technique, the results are biased slightly toward the rear and are inclined to level out peak values. However, it is felt that a good interpretation of these

PROCESS PHYSICS STUDIES (Continued)

Front-to-Rear Flux Monitoring (Cont'd)

data can be made from comparisons of these readings to weasel readings on the same columns which have been made in some cases. C Pile experience indicated that the standard pile instrumentation gave results equivalent to a special Beckman installation, and it is possible to obtain traverses in this manner on an average of ten minutes each if special pickups are not attempted. This technique will also be used to obtain representative flux mappings at the K Piles when pre-shutdown conditions have been sufficiently steady for results to be meaningful.

E Metal Column Loadings

The R & E task force set up to consider the interdependent E metal utilization problems has decided on a standard enrichment charge for C Pile of 34 E pieces with no natural uranium in the column. This is the maximum number of pieces warranted at this time by flow and corrosion characteristics. Planning for the older pile E column is currently under study; until an optimum column is chosen, near-side H Pile flux de-peakings efforts will consist largely of displacement of E columns and control rod configuration changes.

K Pile E loadings are being changed to 46-piece T² columns as they come up for discharge.

The most restrictive part of the supply picture is the solid E supply which must be counted on initially to support the conversion of the older piles to I & E natural uranium loadings; the solid E supply is considered adequate as long as no major unanticipated changes in throughput occur.

Supplementary Control

The spline program at the D Pile has been slowed considerably lately by the general plant requirement to reduce personnel exposure. The factor of 2 reduction in exposure by the water shield for personnel protection on the elevator was still not sufficient; the water eductor system is now being tested in hopes that it will provide the desired reduction in readings now obtained with the cask discharge system.

There are still strong incentives to displace the PCCF system with splines: to reduce enrichment costs, to reduce the reactivity gain on water loss, and to increase the number of active tubes. Thus the spline system has potential advantages even if start-up efficiency and radiation problems are only comparable with the PCCF.

Reactor Specialist Training

Because of scheduling difficulties due to use of "day" specialists for vacation relief, the Reactor Processing Fundamentals course is being suspended until September.

The final draft of Chapter III covering the pile structure and instrumentation has been submitted for publication. A fourth chapter, "Variations in Pile Reactivity", is now in preparation.

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PROCESS PHYSICS STUDIES (Continued)

Potential Gains

Relatively good operating efficiency was observed during the report period. The K Files show characteristically larger losses due to the reduced turnaround control effectiveness associated with their higher degree of enrichment.

POTENTIAL GAINS - OPERATIONAL PHYSICS ASPECTS
MAY 16 THROUGH JUNE 15, 1958

Reactor	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	<u>Total</u>
Equilibrium % potential with existing limits	.5	2.2	.1	.3	.4	1.8	3.0	2.3	1.3
Non-equilibrium potential:									
Operating	1.8	10.8*	7.5	4.6	.9	2.6	11.8**	11.0	6.4
Temporary poison outages	0.0	0.0	.7	0.0	0.0	0.0	.8	.9	0.3
Total Non-equili- brium	1.8	10.8	8.0	4.6	.9	2.6	12.6	11.9	6.6

*Includes four hot start-ups.

**Five cold start-ups plus three hot start-ups.

Significant Operational Physics Documents Issued During the Month

- HW-56238 - "Reactivity Balance and Associated Reactor Physics Data - May 1958", D. E. Goins.
- HW-56148 - "Physics Techniques F Reactor", C. E. Bowers.
- HW-56365-RD - "Resume of Remarks to the Advisory Committee on Reactor Safe-
guards on June 5, 1958", R. O. Brugge.
- HW-56065 - "Production Test IP-165-C Continuous Monitoring of Front-to-Rear
Flux Balance", W. L. Bunch.

IRRADIATION TESTING OPERATION

KAPL-120

The empty loop was on process water cooling during the report period.

HAPD's conceptual design of the flow tubes and associated equipment for the KAPL-120-8 test is essentially complete. The plans for decontaminating the loop are complete. Decontamination will begin upon approval of the procedure by KAPL and WAPD.

The following feasibility studies (including cost estimates) requested by WAPD are complete:

- 1) New discharge pool
- 2) Supplemental water-to-water heat exchanger
- 3) Installation of flanged valves
- 4) Additional shielding for the operators
- 5) Dual system ion columns
- 6) Delayed neutron monitoring system

DR GAS LOOP

The construction activity at DR reactor is on schedule. The delivery of the in-pile tube assembly is no longer considered to be a problem with respect to the schedule. The delivery of the electrical apparatus may be the limiting factor in meeting the construction schedule.

The shielding of sources of radiation on the X-1 level has been completed satisfactorily. Additional shielding is being installed around the beam spectrometer on X-2 level in order to permit an eight-hour time limit for construction personnel. The painting and decontamination of X-1 level, which was completed during the period, now permits the work to proceed without SWP clothing.

GRAPHITE CO₂ LOOP

A study of the feasibility of providing, in D reactor, a recirculating gas loop to study the graphite CO₂ reaction at high temperature is now complete. The study was undertaken by the Reactor Modification Design Operation of FEO at the request of the Hanford Laboratories Operation. Technical assistance was provided by the Irradiation Testing Operation.

This facility is similar to the DR Gas Loop with the exception that the irradiation of fuel elements is not anticipated. The estimated cost is \$930,000. On the basis of an accelerated schedule the loop could be in operation 18 months after construction is authorized. This price does not include an estimated \$100,000 required for removal of the entire facility at the end of its useful life.

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A study of the compressors (with gas lubricated bearings) and their associated gear was furnished by the General Engineering Laboratory. This component represents \$200,000 of the total estimated cost. The operating costs are estimated at \$178,000 per year when providing 24-hour operator coverage. A re-evaluation of the operator requirement after one year's operating experience is suggested.

HAPO FUEL ELEMENT IRRADIATIONS

The present status of the process tube water stream temperature measurements which are being made in support of the I & E fuel element development program is as follows:

Number of tubes monitored
(I & E charge)

<u>This Month</u>	<u>Last Month</u>	<u>Reactor</u>
6	3	C
2	2	D
6	9	KW
8	10	KE

Number of tubes monitored
(solid charge)

0	0	B
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Number of tubes monitored
(self-supporting solid charge)

1	3	B
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The irradiation of four enriched 7-rod cluster fuel elements in test hole 3674 KW continues as reported last month. As of June 23, the fuel elements had reached 25 per cent of goal exposure.

A three foot long, .570 inch diameter, stainless steel clad, swaged UO₂ fuel element was charged into test hole 3865 KE on June 25 (HAPO-215). As of June 23, the fuel element had reached 14 per cent of goal exposure. After irradiation, the dimensional changes and extent of distortion are to be determined by HLO's Ceramic Fuels Development Operation.

To date ten (one this period) uranium specimens have been irradiated in the Snout facility at KW reactor (HAPO-173). A total of 14 specimens are to be irradiated. This test is being performed to obtain information regarding the damage to the crystal structure and the changes in the tensile strength of uranium as a result of reactor radiations.

OTHER IRRADIATION TESTS AND SERVICES

1. A total of fourteen sets of activation analysis samples were irradiated in the Poison Column Control facilities at D, DR and H piles. These samples are identified as follows:
 - a. Twelve sets of HAPO-184 samples in support of a Washington Designated Program assigned to HLO.
 - b. One sample of UO₃ (HAPO-203) to provide a Np²³⁹ tracer in support of an HLO chemical separations study.

- c. One set of effluent water residue samples (HAPO-172) in support of an HLO study of the radioisotopes in effluent water.
2. A total of nine samples were charged into the Quickie facility (E test hole) at F pile. These samples are identified as follows:
 - a. Two samples of ferro-phosphorous aggregate and two samples of 6061-T6 aluminum (HAPO-205) to determine the decay characteristics of the materials. These materials are being used in the new nose plug proposed for the 36" Shield Plug Facility at C pile.
 - b. One sample of magnesium to calibrate the Beckman amplifier and chamber used to follow the radioactive decay of materials irradiated in the Quickie facility.
 - c. Three samples of effluent water residue (HAPO-172) in support of an HLO study of the radioisotopes in effluent water.
 - d. One sample of Al-Cd spline material and one sample of boron steel spline material to determine the activity build-up of these materials. These data will be used as a basis for cask design and removal procedures associated with the Poison Spline program.
3. Two sets of thorium tensile specimens (HAPO-213) were charged into fringe zone process tubes (one in H pile and one in DR pile) in support of an HLO study of mechanical and physical properties of thorium. The data obtained from this test may provide a better understanding of radiation damage in uranium.
4. One set of graphite samples (HAPO-220) was irradiated in the Snout facility (4C test hole) at KW pile. This activity is in support of studies of irradiation damage to graphite being made by the Non-Metallic Materials Development Operation (HLO).
5. Forty-eight NaK filled slugs containing UO_2 fuel specimens (WAPD-114 A) were discharged from DR pile and 24 pieces were shipped to the General Electric Company's Vallecitos Laboratory, for post irradiation examination. The Vallecitos Laboratory is providing this service to WAPD under a contractual arrangement. The maximum exposure to the fuel pieces was 13,800 MWD/T.
6. Three isotope samples were discharged from the Magazine facility (2D test hole) at KW pile in support of the Radioisotopes Distribution Program. The isotopes produced were calcium 45 and tungsten 185.
7. Efforts to arrive at a mutually acceptable design of a container proposed by the Hanford Irradiation Request WAPD-115 have been continued. The problem of providing an adequate expansion chamber while maintaining the structural integrity of this NaK filled fuel specimen bearing slug has not been resolved.
8. Ten resistance temperature detectors (two sets) being purchased for K plant were irradiated in a Hanford Gamma Facility (KE) as a part of the acceptance test procedure. In addition, eleven candidate detectors for application at the old piles were irradiated as part of a proof-test procedure.

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9. Thirty baskets began exposure and thirty-five baskets completed exposure in the Hanford (KE) Gamma Facilities. The majority of these irradiations are being sponsored by the Non-Metallic Materials Development Operation, HLO.

BORESCOPING

1. Tube 3365-D was borescoped for evidence of chatter marks resulting from a special upstream dummy charge installed to facilitate the use of poison splines. No chatter marks were observed.
2. Poison Column Control facility tube 1171 DR was examined for evidence of chatter marks made by low density slugs (HAPO-184) which are routinely irradiated in the tube. There was no evidence of tube damage.
3. Borescoping assistance was rendered in planning the removal of problem tubes 2775 B and 3666 DR.
4. Vertical Safety Rod channel #22 was borescoped at C pile. The rod was reported to be sticking. The channel was in good condition. The step plug was slightly scored, but not sufficiently to account for the sticking rod. During the next C area outage, a spline light and lead glass window will be used to check the alignment of the channel.
5. Vertical Safety Rod channel #30 at KW pile was borescoped. This rod was also reported to be sticking. The channel appeared to be in good condition, however, scratches were noted in the step plug. Further investigation revealed that the rod had been damaged and straightened prior to the original installation.
6. Horizontal Safety Rod channel #16 at KW pile was found to be full of 3-X balls and as the balls were magnetically removed, more balls would drop into the channel. Several block separations were noted along channel with one filler block separation about 2-1/2 inches wide. Vertical Safety Rod #51 was then borescoped and was found to have gaps in the filler blocks from 31' to 47' from the top of the unit. Balls were in the gaps. Further details of these observations will be found in letters from W. E. Korpi to J. H. M. Miller dated June 9 and June 11, 1958. The general condition of more VSR channels and HSR channels will be investigated during the next KW outage.

VERTICAL BOWING MEASUREMENTS

A summary of the vertical bowing measurements follows. The distances are measured from the front vanstone.

Date	Area	Tube	Results
6-15-58	100-F	4676-F	Down .12" at 9'4" since 3-6-58
			Down .08" at 20' since 3-6-58

COOLANT TESTING OPERATION

Coolant Testing Operation activities during June included the operation of the 1706-KE in-pile and out-of-pile facilities, operation of the KER loops, continuation of the organic program, and planning of additional facilities.

1706-KE SINGLE PASS TUBES (PT-105-550-E)

Operation of the six central zone single pass tubes, with regular I&E production slugs, was continued during June. The tubes were operated in pairs at pH's of 6.0, 6.5, and 7.0. Tube 2943 continued to be operated with a dummy charge during the month. On June 29 the single pass tubes were placed on process water so that maintenance on the 1706 equipment could be accomplished during the next operating period.

MOCK-UP TUBES

The mock-up tubes continued to be operated under established programs for the determination of the corrosion effects of a weekly purge, the addition of sodium dichromate to the coolant, determination of the resistance to corrosion, erosion, and cavitation of aluminum alloys (A-1, A-2, C-1, and C-2) in a venturi type restriction, and for testing of an M-257 process tube.

ELMO LOOPS

ELMO - 1 - ELMO 1 continued to be operated for studies on the rate of scale build-up in recirculation system heat exchangers, cooled with untreated Columbia River Water.

ELMO- 2 - ELMO 2 was shut down during the early part of the month for repairs and revisions. During the latter part of the month it was operated at a 180°C. with a saturated solution of 1-5 dihydroxy-anthraquinone, and a pH of 5.0 for tests on carbon steel and aluminum coupons.

ELMO - 5 - ELMO 5 continued to be operated at a temperature of 290°C and a pH of 10.0, with LIOH addition for tests on stainless steel and carbon steel coupons. Tests on stressed, carbon steel and stainless steel samples were also continued. A carbon steel caustic embrittlement test sample was removed and found to be in good condition after one month of operation.

ELMO - 6 - ELMO 6 was operated at a pH of 4.5 and a temperature of 300°C to evaluate the corrosion of ceramic metal alloys containing aluminum oxide and nickel oxide. Initial results revealed blistering and a loose flaky film on the alloys.

ELMO - 7 - ELMO 7 continued to be operated at a pH of 4.5 with a temperature of 305°C. Tests were made on two types of NPR caps, an NPR connector, a Barco Pigtail, a Mark II - PRTR fuel element and a KER thermocouple slug and cap. The Barco Pigtail failed at one of the flexible joints during the month and was valved out.

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ELMO - 9 - ELMO 9 was operated at a temperature of 250°C with a pH of 7.0 and 50 ppm of sodium dichromate as a corrosion inhibitor. Initial results indicated good corrosion resistance by the carbon steel but only fair corrosion resistance by the aluminum. ELMO 9 was shut down permanently late in June after the heater section was found to be badly warped.

Dowtherm Unit - Carbon Steel Heat Exchanger - Installation of the carbon steel heat exchanger was completed during the month and tests on the effect of raw river water on this equipment were initiated. Inlet temperature of the Dowtherm solution was 585°F and the outlet temperature of the water coolant was 212°F. Small barnacles were found in the low velocity sections at the time of the first inspection.

Organic Coolant Program

ORA-1 - The loop continued to be operated with MIPB at a temperature of 700°F for corrosion studies on M-388 clad AlSi bonded fuel elements, nickel bonded aluminum coated I & E elements and an aluminum coated element with a graphite defusion barrier. Corrosion coupons made from carbon steel zircaloy-2, Magnesium, M-388 aluminum and M-257 were also under test. The coupons were inspected during the month and found to be in good condition. The magnesium coupon showed a slight amount of pitting. Water content of the coolant was approximately 22 ppm.

ORA - 3 - ORA-3 continued to be operated on a thermal cycle between 200°F and 500°F six times a day. The loop was used for tests on a three ball Barco expansion joint and a soft iron gasket.

NRL Contract

Heat transfer and fouling runs with unirradiated tertiary eutectic were completed and studies on the irradiated eutectic were continued. The tertiary eutectic heat transfer coefficients were found to be slightly higher than the valves measured for MIPB.

KER FACILITY

Loop 1 - In-pile recirculation of loop 1 with a dummy charge continued during June. Design of a sediment trap for the loop was completed and materials for the design change were ordered during June.

Loop 2 - Loop 2 remained on single pass until June 29 when it was charged under production test 105-172-A. The fuel element charge consisted of a thermocouple assembly for measuring slug can wall temperature, 4 enriched, zircaloy-2 jacketed, 4 rod cluster elements, 14 doe pieces and 8 mint pieces.

Loop 3 - In-pile recirculation of loop 3 with stainless steel jacketed cluster elements at an outlet temperature of 235°C with demineralized water continued until June 28. On that date the charge was removed and the loop placed on single pass operation until fabrication of the new charge could be completed.

Loop 4 - In-pile recirculation with 10 enriched hot press canned wafer elements with A-2 aluminum alloy jackets and a temperature of 2350C continued until June 28. On that date the charge was removed and the loop was placed on single pass operation until fabrication of the next charge could be completed.

KER PERFORMANCE AND IMPROVEMENTS

There were no unscheduled outages resulting from Coolant Testing Operation activities during June. Ten & 1/2 hours of outage time were used for KER work during the month.

Work was initiated on the installation of differential pressure equipment on Loop 2 during the June 28 outage. Also during this outage, modifications were made to the dump valve pads to allow replacement of dump valve parts without complete disassembly.

Studies on decontamination solutions continued during the month. The TURCO 4501 process was found to cause nonuniform attack on stellite. Tests with numerous other materials gave favorable results.

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COMPONENT TESTING OPERATION

IRRADIATED MATERIAL EXAMINATION

Detailed examination of the following 38 tubes of irradiated metal was completed during the month.

<u>Pt. No.</u>	<u>Tube No.</u>	<u>Pt. No.</u>	<u>Tube No.</u>	<u>Pt. No.</u>	<u>Tube No.</u>	<u>Pt. No.</u>	<u>Tube No.</u>
19A	0973-C	I&E Reg.	4585-KE	I&E Rupt.	4153-KE	124A	3469-B
	1074-C		4386-KE		3849-KE		3567-B
	1464-C		0974-KE	Reg.	2578-C		3667-B
	0971-C		1876-KE		3287-C		3672-B
106A	1777-C	1245	2897-D		3085-C		3673-B
	2266-C		3365-D	124A	3267-B		3778-B
	2289-C		3662-D		3283-B		3784-B
620A	0694-C		3666-D		3382-B		3876-B
134A	2864-KE		3667-D		3383-B		3475-B
95A	1565-D						3580-B

Partial examination of the following 5 tubes was also completed.

<u>Pt. No.</u>	<u>Tube No.</u>
68A	2677-DR
	2265-DR
	3277-DR
	2182-DR
	1470-DR

Distinct wafer marks were observed on the slugs from Production Test IP-106A (Segmented I&E's). They were better defined on the pieces from tube 2266-C exposed to 773 MWD/T than on those from tube 1777-C exposed to 601 MWD/T. These wafer marks were only slight on non-irradiated pieces which were run for comparison.

The Metal Examination Facility was shut down for five days during the month for minor maintenance and general cleanup of all basins. No serious radioactive contamination or high levels of exposure were found. It was found necessary to install air filters on the roof vents from the air weigher and dejacketer to prevent particle contamination of the roof and surrounding areas.

PROCESS TUBE CORROSION MONITORING PROGRAM

In-pile measurements of 216 process tubes were completed this month using the Probolog instrument. Listed below are number of tubes measured in pile per reactor and document numbers of the report.

<u>Pile</u>	<u>Tubes Probed</u>	<u>Report No.</u>
DR	16	29, HW-56194
D	68	30, HW-56208
C	3	31, HW-56209
D	16	32, HW-56370
DR	48	33, HW-56405
F	51	34, HW-56424

(14 tubes from DR not reported)

Three leaker tubes were examined in the Metallurgical Laboratory, two tubes from F, and one from KE. The portions of the tubes where the leaks generally occur on F tubes were not received for examination.

Tube 2576-KE which was only in the pile two months was supposed to have been a leaker. However, observations revealed it was possibly a rear Van Stone leak, due to the amount of rust film on the outside surface of the tube, adjacent to the rear Van Stone flange.

Two front pigtails, 3958 and 3987 KW were examined for any damage due to the high flows and no damage could be found.

PANELLIT PROGRAMS

Process inspection was performed on 550 Panellit gauges and 13 gauges were subjected to failure analysis. These 13 malfunctioning gauges again represents a new low for all areas.

All individual area instrument shops are now processing their own gauges. The Central Panellit Shop, after July 1, 1958, will process only small lots of gauges as fill-in work. This program has reduced the work load of the Central Panellit Shop by 90 per cent with no personnel increased in the various area instrument shops.

Bourdon tube leak examination was performed on 10,388 tubes in the CG-558 areas and 3260 in KE area. Of these numbers, 44 gauges were removed and confirmed as leakers from the 558 areas and one from KE.

New Panellit gauges for rod water pressure monitoring have been installed in all areas. Reliability examination in-board, base and trip checks have been scheduled with 105-F Area completed this month.

In-board reliability examination of 70 Panellit gauges was performed at 105-C Area with 29 being removed and replaced. This high percentage is probably due to the fact that these gauges have been in service for over three years.

Preliminary results of the Development Test IP-175B has resulted in a recommendation that 80 sus viscosity oil be used in place of the present 160 sus viscosity oil.

INVENTIONS

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

Inventor (s)

None

R L Dickman
Acting Manager, Research and Engineering
IRRADIATION PROCESSING DEPARTMENT

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PRODUCTION AND REACTOR OPERATIONS SUMMARY

JUNE, 1958

Record reactor input production was achieved during June, exceeding forecast by 18.1 percent and the previous record, established during January, 1958, by 7.5 percent. This record was made due to exceptionally good operating efficiency resulting from improved rupture and water leak experience and a significant reduction in reactor scrams. Individual reactor production records were made at KE, F and C, exceeding their previous records by 11.9, 5.3 and 0.2 percent, respectively. Output production for June was 75.1 percent of forecast due to a discharge at KW late in May which was scheduled for June and postponing a KE discharge until July which was scheduled for June.

The maximum power level, combined total for all reactors, exceeded the previous maximum by 125 megawatts.

A record overall time operated efficiency, 86.7 percent, exceeded the previous maximum attained during eight-reactor operation by 4.8 percent and exceeded forecast by 6.7 percent. Twenty-seven reactor outages of which 17 were scrams occurred during June.

Eight ruptures were removed from the reactors; three at H, two each at B and D, and one at DR. The three H ruptures were solid "E" metal; the remaining five were solid regular metal.

Significant items of equipment experience were:

1. Fifty-five process tubes were installed; 28 at D, 26 at F and one at H.
2. Two tube leaks and one Van Stone leak were corrected. The tube leaks were at F and H and the Van Stone leak was at H.
3. Borescoping of HCR channel 16 at KW revealed that spaces caused by shifting of graphite blocks permitted 3X balls from the adjacent VSR channel (No. 51) to enter the HCR channel. Except for the broken rod track, no significant deterioration of the individual blocks was observed.
4. Following an unexplained scram at C Reactor by the regulated voltage alternator of the instrument power supply, the power source was switched to the BPA system. To avoid an undesired trip of the Ball 3X hoppers in the event of a BPA failure, the seismoscope trips were changed from the Ball 3X system to the No. 1 safety circuit.
5. Three front gun barrels have been cut at F Reactor with satisfactory results in connection with the stuck gun barrel problem. The cutting of an additional 17 front gun barrels has been authorized by a production test.

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6. The No. 5 pump in 190-DR which was modified at the DeLaval factory operated satisfactorily up until June 9 when the unit was removed from service and an inspection was made by a representative of the DeLaval Company. Although slight worn spots were in evidence on each impeller blade, it had shown surprisingly little deterioration in 1430 hours of operation.
7. During an outage at H Reactor, water was found spurting through a crack in the far rear riser. Several radial cracks were found emanating from a point where a supporting gusset is welded to the riser. Temporary repairs were made pending a complete engineering study of the problem.

No disabling injuries or over-exposures to radiation were experienced. One security violation was incurred.

Statistics for the Processing, Power and Radiation Monitoring Operations in individual reactor areas are tabulated on pages Ch-1 through Ch-6 of this report.

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B-C REACTOR OPERATION
JUNE, 1958

- I. ORGANIZATION AND FUNCTIONS - The B-C Plant Administration Operation was deactivated, effective June 1, 1958; exempt personnel now report directly to the Manager, B-C Reactor Operation.

II. PERSONNEL

A. Force Summary

	<u>May 31</u>			<u>June 30</u>			<u>Net Change</u>
	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>Of Total</u>
General	1	1	2	3	3	6	/ 4
Plant Admin. Operation	3	2	5	0	0	0	- 5
B Processing Operation	16	39	55	16	39	55	0
C Processing Operation	16	36	52	16	34	50	- 2
Power Operation	14	98	112	14	97	111	- 1
Maintenance Operation	22	103	125	24	101	125	0
Total	72	279	351	73	274	347	- 4

- B. Movement of People - Exempt personnel movement consisted of one transfer out (P.H. Zenah, Supervisor, 100 Operations I, B Processing Operation, transferred to A.P.E.D., Vallecitos, California) and one transfer in (J.A. Finn, transferred from the Industrial Engineering Operation to B Processing Operation as Specialist, Reactor Operation). Other exempt personnel changes were confined to intr-B-C movement; I.L. Huffman, Manager, Plant Administration and P.G. McDougal, Specialist, Cost and Personnel Development, Plant Administration were transferred to B-C General as Specialist, Manufacturing Administration and Specialist, Administrative Programs, respectively; G.S. Spencer, Specialist, Measurements and Administrative Procedures, Plant Administration was transferred to C Processing Operation as Supervisor, 100 Operations I, Days and Relief; J.C. McKay, Supervisor, 100 Operations I, C Processing Operation was transferred to the Maintenance Operation as Supervisor, Maintenance Planning and Scheduling Operation, B Plant; L.B. Osowski, Supervisor, Maintenance II (Temporary) was returned to the nonexempt roll; E.W. Heavner and N.J. Joldersma (both nonexempt) were promoted to Supervisor, Maintenance I (Temporary) for vacation relief. Nonexempt personnel movement consisted of four transfers out, two layoffs for lack of work, one resignation, two temporary promotions to the exempt roll, three transfers in, and one reclassification from exempt to nonexempt.

- III. PERSONNEL ACTIVITIES - A.R. Maguire attended the Congress of Applied Mechanics at Brown University, Providence, Rhode Island and, while on the trip, consulted with R.W. Powell at the Brookhaven National Laboratory, with Bill Nave, Less Clover, Jim Dupuy, and F.E. Baker in New York City, with Jack James at the Providence Base Works, and with Messrs. Ingram and Benander of the Monowatt Plant in Providence. J.H. Soehnlein attended the third annual conference of the Health Physics Society at Berkely, California.

- IV. SAFETY AND SECURITY - There were 15 medical treatment injuries reported during June; no security violations or disabling injuries were experienced.

V. NON-ROUTINE REPORTS - None were issued.

VI. INVENTIONS AND DISCOVERIES - 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 therein covered by this report; notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

VII. COMPONENT ACTIVITIES

GENERAL

- A. Administration Activities - The Savings and Improvement Report for FY 1958 was submitted to the Product Cost and Budgets Operation. Scheduling of B-C employees attendance of Third-Quarter classes of the IPD Training Program was completed. Coordination was provided for the reduction of IPD Power Operation forces (Coal Handlers). The Position Guide for the Manager, B-C Reactor Operation, was revised and forwarded to the Department General Manager for approval.
- B. Personnel Development - C.E. Reed and H.R. Tolman of the IPD Financial Operation discussed HAPO budgeting and cost accounting in an information meeting attended by B-C managers and administrative specialists. Fifteen B-C employees attended five IPD Exempt Employee Training Program classes; seven exempt employees completed the PBM-I course. One Tech. Grad. (E.E. Gerrels) completed a three-month rotational assignment with the B Processing Operation and another (R.L. Brown) started a three-month assignment with the B-C Maintenance Engineering Operation.
- C. Cost Control Activities - The B-C nonexempt force was reduced by four during the month (3 Utility Operators and 1 Coal Handler). New procedures and cost codes were established for recording maintenance costs by individual Level V supervisor. A new expense code was established for maintenance cost incurred by the Charge-Discharge facility at 105-C.
- D. Landlord Activities - Maintenance and alterations of landlord-administered facilities included the safety striping on roadways at bus stops and crosswalks, the painting of the interior of Building 1702-B, eight offices in Building 1704-B, and two offices in Building 185-B; conversion of the 1704-B vault to office space was started and includes the addition of a doorway opening into the vault from the building hallway, and the extension of air condition system ductwork into the vault. Weed control spraying was continued within the Area.
- E. Suggestions - Under study at the start of the month, 12; received for evaluation during the month, 45; completed evaluations during the month, 37; under study at the end of the month, 20.

B PROCESSING OPERATION

- A. Production - Input production (Pu) for June was 119.1 percent of forecast, limited by the bulk outlet temperature.

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B. Operating Experience

1. Operating Continuity - There was one scheduled and three unscheduled outages:

<u>Day</u>	<u>Hours</u>	<u>Cause</u>
9	61.9	Scheduled outage
12	18.4	Ruptured Slug - Tube 1064 (stuck-13,000 lbs. max.)
21	29.6	Panellit Scram - Row 18 - Cause undetermined
29	26.0	Ruptured Slug-Tube 3465(stuck-4500 lbs. max.)
Total Hours	135.9	

2. Equipment Experience - Twenty-one tubes above Row 39 were probed and all passed the 10-inch probe. An inboard inspection of the Panellit board revealed 12 leaking gages, which were replaced. Three ribless tubes, previously installed on PT-IP 84-A, "Evaluation of Slugs Having Projections for Use in Ribless Process Tubes", were discharged and recharged. Graphite thermocouple stringer 3484-B was removed and a new stringer installed.

- C. Improvement Experience - The HCR differential pressure gages and alarm systems were installed. The installation of D Elevator pad pans were completed.

D. Radiation Monitoring Experience

1. Radiation Occurrences - Following the work of monitoring a graphite stringer removal, a radiation monitor was found to have a spot of contamination above his left eye of 30,000 c/m; due to the energy of the radio-isotopes involved there was no exposure problem, and decontamination was effected. A routine vehicle survey disclosed a speck on the panel below the glove compartment of a pickup truck of 50,000 c/m or 12 mrads/hr. Previous use of vehicle did not disclose the source of contamination. Personnel exposure was not involved. The vehicle was decontaminated.
2. External Exposure Experience - Personnel dose rates to 5 r/hr were experienced during removal of a thermocouple train from Tube 1881. The maximum dose rates to personnel for discharge operations was 600 mr/hr; also, the PCCF charging caused dose rates to personnel up to 140 mr/hr.
3. Contamination Control - Fifty-nine air samples were taken; none indicated activity densities greater than the permissible limits for respiratory protection worn. Of the 143 vehicles surveyed, one was found contaminated with a 50,000 c/m speck inside and was decontaminated. Building filter changeout continued with the maximum activity noted on filters of 2,000 c/m.

- E. Events Influencing Costs - Thirty-six exempt and 33 nonexempt overtime man-hours were required, plus 22.4 nonexempt radiation monitoring personnel overtime hours. There were no helium startups. The total helium used was 231,950 cubic feet, as compared to 303,900 cubic feet used in May. The total gas usage was 512,950 cubic feet, as compared to 757,800 cubic feet in May. Approximately 4500 dummies were reclaimed.

C PROCESSING OPERATION

A. Production - Input production (Pu) was 112.8 percent of forecast. Power level was limited by slug corrosion limits.

B. Operating Experience

1. Operating Continuity - Two unscheduled outages were experienced.

<u>Day</u>	<u>Hours</u>	<u>Cause</u>
10	49.5	Scram - No. 4 Flux Monitors (Cause undetermined)
19	36.2	Scram - Instrument Power Supply failure (cause undetermined)

Total Hours 85.7

2. Equipment Experience - During the attempted recovery from the scram of June 10, VSR's 30 and 47 could not be withdrawn until the thermal overload reset switches were reset repeatedly; the same difficulty was experienced with VSR 30 during the scram recovery attempt on June 19, 1958. Both incidents prevented recovery. Higher capacity overload relay heaters were installed in the motor circuits of 35 VSR's.

Following the scram on June 10, HCR 14 would not drive in under power; the cause of the trouble, a dirty ISA switch, was found and corrected. During the outage, an unsuccessful attempt was made to clear the obstruction in No. 8 HCR channel. The No. 2 HCR cooling water outlet hose became kinked while the rod was being withdrawn during the scram in a further delay and contributed to the loss of recovery.

A scram occurred on June 19, due to a loss of the instrument power supply, resulting from failure of the regulated voltage alternator. Since investigation during the subsequent outage did not reveal the reason for the failure, the instrument power supply source was switched over to the BPA system for start-up on June 20, 1958. In conjunction with the switch-over of the instrument power supply source to the BPA system, the seismoscope trips were removed from the Ball 3X system and installed in the No. 1 Safety Circuit. The change was made to prevent an undesired trip of the ball hoppers in the event a failure occurred on the BPA system.

Condensate formation from water leaks on the rear crossheader valves and other rear face components has resulted in deterioration of rear face electrical equipment. During the June 19 outage, 71 rear cross-header valves were repacked to reduce the effluent leakage.

C. Improvement Experience

PT-IP-143-A-Supplement A - "Evaluation of In-Reactor Performance of Zircaloy Process Tubes" - A zircaloy tube was installed in Channel 2477 and charged with a rear thermocouple train and 26 weighed and measured pieces.

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PT-IP-132-AC - "Production of High Pu-240 Plutonium at C Reactor" - In an attempt to reduce flux peaking in connection with this production test, 258 enriched metal charges were backseated 16" and eight enriched metal charges were backseated 48". Thirteen tubes of uranium and two tubes of numbered solid aluminum were discharged to obtain additional flux data.

PT-IP-106-A - "Preliminary Evaluation of Vertically Segmented I & E Slugs" - The two remaining tubes were discharged. One of the tubes (1775) was flushed discharged during operation.

Significant changes in Production Test tubes:

	<u>No. Tubes</u> <u>5-31-58</u>	<u>No. Tubes</u> <u>6-30-58</u>	<u>Change</u>
PT-IP-19-A	106	36	- 70
PT-IP-148-AC	303	307	+ 4
PT-IP-141-A	636	713	+ 77
PT-IP-142-AC	88	80	- 8
PT-IP-106-A	2	0	- 2
PT-IP-143-A	0	1	+ 1

CG-651 - 111 Tube Charge-Discharge Facility. On June 30, the front ball valve adapter on Tube 1775 blew out of the ball valve during operation. Since the tube was empty (See PT-IP-106-A under "Improvement Experience") and the Panellit gage jumpered, the continuity of operation was not affected. Front to rear water flow was restored by coupling a hose to the near side strainer on header 24 and attaching it to a special adapter inserted in the front of the ball valve.

CG-705 - Horizontal Rod Cooling Water Instrumentation. New horizontal control rod pressure gages were installed and the indicating and annunciator circuits were connected and placed in service.

Panellit - Instrument Development Operation made a test installation of a capillary suppressor in two gage lines to evaluate the oscillation control effect. Action of the suppressor was registered on a strip recorder for study. Capillary suppressors have since been installed in two gage lines for oscillation control purposes. Use of the suppressor has eliminated the necessity for throttling the gage lines. The installation of improved spool pieces on all toggle valves was completed.

D. Radiation Monitoring Experience

1. Radiation Occurrences - The contamination spread (reported last month) near the Metal Examination Facility resulted from a build-up of pressure and blow-back from a vent line. An employee became contaminated on both wrists to 80 mrad/hr while changing a header screen on the charge face; no over-exposure resulted. A pushpole was found on the charge elevator contaminated to 8 mrad/hr and one tray of dummies stored in the Work Area was contaminated to 3 rad/hr.

2. External Exposure Experience

<u>Location</u>	<u>Type of Work</u>	<u>Personnel Dose Rates</u>	
		<u>Mrem/hr</u>	
		<u>Maximum</u>	<u>Average</u>
Ball 3X Tunnel	Preparation for Ball 3X modification by Cons't Forces.	2,500	300
Discharge Area	Nozzle Replacement	200	125
Inner Rod Room	Inspecting empty channel	1,000	20
Gas Tunnel	Decontamination	1,000	300
Metal Exam Fac.	Decontamination of basins for maintenance work.	200	100
X-1 Level	Remove P.C. chamber from cave	400	20
Front Face	Modify water supply system to ball valve during operation.	2,500	100

3. Contamination Experience - Of 17 vehicles surveyed, none were found contaminated. There were two cases of skin contamination; neither constituted an over-exposure and were readily decontaminated. There were no instances of personal clothing contamination. Fifty-five air samples were taken; none indicated activity densities greater than the permissible limits for respiratory protection worn.

- E. Events Influencing Costs - 190.7 man-hours nonexempt and 31 man-hours of exempt overtime was required during the month. Two unscheduled outages totalling 85.7 hours were incurred.

B-C POWER OPERATION

- A. Operating Experience - The Export Load was supplied by B Area during the month. The pump bearings on No. 2-A process unit in 190-B Annex were damaged on a test start on June 5th; investigation did not disclose the reason for the lubrication failure. The modifications required to redistribute the loads in the 230/13.8 KV transformers at the 151-B Substation was completed on June 27th. The Class A overhaul of the 230 M volt circuit breakers is now 60 percent completed; a Critical Power Condition, Grade "W", exists in both B-C Areas while this work is in progress.

- B. Equipment Experience - at 181 B-C Building, Number 9-C motor was placed in service on June 6th after having the stator rewound; the stator winding failed a second time on June 23rd and is being repaired under warranty. At 183-B Building, the prototype Bauxite test installation was in service only six days during the month due to leaks in the lead reactor chamber. At 190-C Building, the fluid drive scoop travel has been increased to 6.5 inches on all units except 1, 4, and 9. The fluid drive impeller in No. 11 unit was replaced with a newly designed, full circle, lock bar type stabilizing ring.

C. Improvement Experience

1. CG-558 - At 181-B Building, the undervoltage relays were replaced on incoming lines to Nos. 3 and 4 buses. At 183-B Building, the Potential Transformers were relocated on the incoming lines in the 183-B Pump Room. Modified and repaired impellers were installed in No. 2 and No. 6 190-B Annex pumps.

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2. CG-600 - The forgings for the spider bearings for No. 5-C unit at 181-C have been shipped; machining will be done by Minor Construction. A rewelded pump impeller was installed in No. 3 unit at 190-C and the unit was placed in service.
 3. Other - Phase III of Project CG-751 (Steam Pole Replacement) is approximately 15 percent complete. Project A-89053 (Process Water Cross Tie) awaits final approval of the Atomic Energy Commission in Washington, D. C. The removal of excess equipment from 185-B Building is complete except for clean-up. Production Test IP-156-AI to determine the effect of water quality on reactor effluent radiation was completed on June 27th.
- D. Events Influencing Costs - Maintenance costs remained high due to repair work on No. 2 Annex unit, repair work on No. 9-C pump at 181, and work on the fluid drive units at 190-C.

B-C MAINTENANCE OPERATION

A. Equipment Experience

1. Instruments - At 105-B, three panellit gauges were oiled and a crimped impulse line was repaired for gauge 1074. A complete base range check was made and a total of 117 gauges were pre-set for start-up conditions. The inboard inspection for all gauges on rows 1 through 23 was completed.
2. Electrical - The lights and associated wiring on the 105-B,C Elevator, were relocated for the installation of the overhead charging machines.
3. Mechanical - Eighty-four loop header flow indicators were cleaned at 105-B; four cracked sight glasses were found and replaced. Ninety percent of the decontamination piping deflector plates have been welded to the rear elevator structure at 105-B. The rear face pad pans at 105-B were checked for proper operation; the basic function of the pans is to allow easy removal of an irradiated slug from the 0' level rear face pads. The rear face ball valve on Tube 1386 was replaced as a result of its sticking in the open position. Number 8 horizontal control rod was inspected to determine the cause of binding; the rod appeared to be misaligned, but was not aligned as a result of insufficient outage time. The flow regulator on the high pressure flushing system at 105-B was repaired.

Continuous Charge-Discharge Facility - 105-C - An extensive water spray of both clean and contaminated water was experienced on the front face (Tube 1775) as a result of a failure of the front nozzle connector. It appeared the threads on the nozzle adaptor elbow were stripped and the supply water pressure blew the connection (flexible connector to ball valve body) apart. The affected tube was empty, thus allowing the pressure monitor gauge to be jumpered and prevent a reactor scram. Following the failure of the nozzle connector, process water was supplied to the empty process tube from an auxiliary tap on the near side crossheader screen chest. The elbow connection on the body of the ball valve was plugged and the water from the open pigtail was directed down the face of the reactor via a temporary hose.

Rupture - Tube 3465 - 105-B - The metal charge in Tube 3465 was stuck and could not be discharged with normal charging machine force. The metal charge was backseated six inches by a maximum force of 4,500 psi. Following the backseating, the metal charge was moved toward the rear twenty-four inches with a maximum force of 4,500 psi. The backseat and push operation was repeated several times prior to the pushing force dropping to below charging machine force. The metal column was then discharged with the charging machine. The tube was leak tested and returned to normal.

B. Maintenance Engineering

1. Instrument Engineering

Effluent Water Thermocouple Replacement - C Reactor - Specification No. HWS-6355, "Rear Face Thermocouple Leads," was issued to provide a basis for procurement of replacement thermocouple lead wire for C Reactor. The specification has been submitted to vendors to obtain bids for 75,000 feet of wire. Purchase orders have been placed for the procurement of the thermocouple terminal boards and terminal board enclosure and fabrication of the rear face catwalk is in progress.

Oxygen Analyzer - B Reactor - The oxygen analyzer has arrived and is being installed. Obsolete equipment in the outer gas room has been removed. This instrument should allow gas system operation at lower pressures.

Pressure Monitor Surge Suppressor - B Reactor - A development test is being written to authorize installation of coiled capillary surge suppressors on the sensing lines. This type of surge suppressor was developed jointly by Instrument Development Operation and Plant Engineering Operation. Plans call for the surge suppressors to be installed in lots of 150, as long as results are favorable, until all lines are equipped.

2. Mechanical Engineering - The installation of overhead charging machines at B Reactor is 60 percent complete. Difficulties have been encountered at C Reactor in repairing water leaks at the rear nozzle elbows. Considerable time is lost in breaking the pigtail connection because of scale build-up and, in many instances, the nozzle elbows do not seal after the new O-rings are installed. A study is being made to resolve these problems on a priority basis.

3. Electrical Engineering - The instrument supply alternator drive motor at C Reactor tripped out during reactor operation, resulting in a scram of the reactor by the four flux monitor units. Inspection revealed no abnormal conditions in the motor control circuit. The instrument supply alternator was placed on standby and instrument supply power is provided from BPA as a normal source. As a result of placing the instrument supply alternator on standby, and since the Ball 3X recovery time would be abnormally high, a Process Change Authorization was issued permitting the seismoscope trip elements to be removed from the Ball 3X control circuit and placed in the No. 1 Safety Circuit. This change was made on June 20 and a design change prepared for approval.

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4. Planning and Scheduling

Productive Maintenance

During June, 2,468 man-hours of work were scheduled. This included 1,731 man-hours scheduled for June, and 737 man-hours carried over from previous months. The total included 90 Class A overhauls, 210 Class B overhauls, 33 Class C overhauls, and 12 lubrications. Of this total, 2,076 man-hours, or 86 percent, were completed. Reasons for non-completion are: jobs in progress - 7; waiting for parts - 0; shutdown items - 1; equipment not available - 4; insufficient man-power - 2; Total - 14 percent. During this period, equipment condition dictated changing 5 Class A overhauls to Class B, 3 Class B to Class C, and 1 Class C to Class B.

A. R. Maguire

Manager
B-C REACTOR OPERATION

AR Maguire:ILH:mus

D & DR REACTOR OPERATION
JUNE, 1958

I. ORGANIZATION AND FUNCTIONS

There were no changes in the assigned responsibilities during June.

II. PERSONNEL

A. <u>Force Summary</u>	<u>May 31, 1958</u>			<u>June 30, 1958</u>			<u>Net Change</u>
	<u>NE</u>	<u>E</u>	<u>Total</u>	<u>NE</u>	<u>E</u>	<u>Total</u>	
General	2	4	6	3	4	6	+1
D Processing	41	17	58	41	17	58	0
DR Processing	34	16	50	35	16	51	+1
D-DR Power	103	14	117	102	14	116	-1
D-DR Maintenance	<u>128</u>	<u>23</u>	<u>151</u>	<u>129</u>	<u>23</u>	<u>152</u>	<u>+1</u>
Total	308	74	382	310	74	384	+2

B. Movement of People

The following changes were made effective June 1, 1958, in connection with the discontinuance of the Plant Administration Operation:

R. D. Miller, formerly Manager, Plant Administration, was reassigned as Specialist, Manufacturing Administration. W. L. Smalley, formerly Specialist, Measurements and Costs, was reassigned as Specialist, Administrative Programs. W. A. Wright, formerly Specialist, Personnel and Landlord Administration, was reassigned as Specialist, Administrative Programs.

Nonexempt personnel movement during June included five transfers in, three transfers out, one termination and one new hire.

III. PERSONNEL ACTIVITIES

M. M. Cox attended the Third Annual Health Physics Society meeting held in Berkeley, California, June 9, 10 and 11. He also visited the U. S. Naval Radiological Defense Laboratory in San Francisco, on June 12.

E. T. Hubbard attended the annual meeting of the American Nuclear Society in Los Angeles June 2, 3 and 4 and a Work Simplification Seminar at APED on June 5 and 6.

E. C. Wood discussed the HAPO Fuel Element Development Program at a meeting of D-DR Reactor Operation exempt employees on June 18.

IV. SAFETY AND SECURITY

There were 19 medical treatment injuries reported during June. There were no security violations during the month.

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V. NON ROUTINE REPORTS

Savings and Improvement Report, D-DR Reactor Operation, January 1 through June 30, 1958, issued by JH Brown on June 26, 1958. (HW-56543)

HW-56360 - Operational Use of Poison Splines, issued by G. W. Reinmuth during June.

HW-56507 - Investigation Report - Radiation Occurrence, by M. M. Cox.

VI. INVENTIONS AND DISCOVERIES

E. T. Hubbard and R. J. Ascherl filed a joint invention report and application for patent on a Charging Machine Coupler.

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 noted above. 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.

VII. COMPONENT ACTIVITIES

GENERAL

A. Administration Activities

D-DR Reactor Operation manpower ceilings for the period June 30, 1958, to December 31, 1959 were reviewed with Level IV Managers and a revised manpower schedule was submitted to the Financial Operation.

The position guide for the position Manager, D-DR Reactor Operation was reviewed and suggestions were made to bring it up to date. Also work was started toward bringing two other position guides up to date as the D-DR Reactor Operation part in a joint Reactor Operation effort to make all applicable guides current.

The D-DR Reactor Operation, Operation Upturn Program was formulated in support of the IPD Program. Information for the Educational Phase was presented to the Level IV Managers and a D-DR Reactor Operation committee was organized with R. D. Miller as chairman. This committee held a meeting on June 25 to plan the July activities.

Suggestion statistics for the month were:

Unanswered at Beginning of Month	26
Received for Evaluation	41
Suggestion Replies	27
Unanswered at Month End	40

B. Personnel Development

Manufacturing Personnel Inventory Records for 14 exempt employees were submitted during the month in conjunction with bringing these records into line with the current instructions.

One rotational Technical Graduate and one Summer junior began assignments within D-DR Reactor Operation during the month, making a total of three Technical Graduates on assignment to the Operation at month end.

C. Cost Control Activities

During June, the practice was started of preparing an advance monthly detailed irradiations cost forecast for the D-DR Reactor Operation.

The D-DR Reactor Operation semi-annual Savings and Improvement Report for the second half of FY-1958 was prepared during June.

D. Landlord Activities

Work on Project CA-735, Lunch and Locker Room Improvements, 100-B, D and F Areas, started in 100-D Area on June 2, 1958.

Work on Phase I of Project CA-762, Graveled Roof Repairs, 105-B, D, F and H Buildings, was completed in 100-D Area during the month. Phase I comprised Buildings 105-D and 1719-D (First Aid).

Exterior painting of scheduled 100-D Area landlord property was started during the month.

D PROCESSING OPERATIONA. Production

Input production was 101.4 percent of official forecast. Maximum operating levels were limited by tube power limits and bulk outlet watertemperature. Time operated efficiency for June was 82.5 percent, which was 99.4 percent of forecast.

B. Operating Experience1. Operating Continuity

There were six unscheduled outages including four scrams and one poison discharge outage during June:

<u>Date</u>	<u>Hours</u>	<u>Reason</u>
6-10-58	39.3	Rupture 3184-D
6-12-58	..6	Panellit Scram -- Spline inadvertently slipped out of tube 3563-D.
6-17-58	71.5	Rupture 1363-D. Tube replacement.
6-20-58	.6	Panellit scram -- faulty gauge jumper.

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1. Operating Continuity (Continued)

<u>Date</u>	<u>Hours</u>	<u>Reasons</u>
6-27-58	.3	Panellit scram -- unexplained.
6-30-58	13.3	Temporary poison discharge. Startup delayed by insufficient reactivity due to water which had been deposited in graphite during previous outage.
6-30-58	.2	Beckman scram -- No. 3 Beckman -- unexplained.

2. Equipment Experience

a. Poison Splines

A radiation shield to reduce the exposure to personnel on the elevator during the spline removal operation was placed in service during the month. The shield is in the form of a portable tank which is positioned between the operating personnel and the spline removal equipment and then filled with water to provide the shield effect.

The spline removal equipment has been modified to eliminate the use of the spline casks. The chopped spline is transported directly to the tank in "C" elevator pit through a hose.

Use of the new spline removal equipment and the water shield have made it possible to remove splines utilizing about one-third the exposure that was required with the original equipment.

b. Process Water

Prior to the shutdown on 6-10-58, the bulk outlet water limit of 93° was approached. Therefore, following the shutdown, seven 190 process pumps were utilized increasing the reactor flow about 2,500 gpm to approximately 73,000 gpm.

c. Ruptured Fuel Elements

The rupture piece from tube 3184-D was not recovered for examination because of the large amount of metal in the pickup chutes at the time of discharge.

Rupture 1363-D apparently was caused by charge machine damage during charging on 5-24-58.

d. Process Tubes

Twenty-eight process tubes were routinely replaced during the month, including three which were found to have external corrosion.

2. Equipment Experience (Continued)

e. Graphite Stringers

Faulty graphite stringers were removed from channels 2166-D and 3466-D. Removal attempts failed on a third one which is stuck in channel 2662-D. One new stringer was installed in channel 2386-D.

f. Reactor Gas Leak Repair

A leak check of the rear face bellows and boots repaired on 5-28-58 using silicone rubber foam indicated that the loss rate was 60% less than before the repair.

g. Emergency Alternator

The design change, 213-D, Revision to Emergency Alternator Power Supply, 105-D, was completed during the month. The new control circuitry features a time delay of 18 seconds which will prevent the instrument supply circuit from transferring to the emergency alternator until after the turbo-generator has had an opportunity to supply the load.

C. Improvement Experience

1. Production and Process Tests

a. IP-163-K - "Test of Upstream Dummy Charge for Tubes Equipped With Spline Caps"

One tube, 3565-D, which was charged with an upstream dummy pattern during May, was borescoped on 6-12-58. Inspection revealed that no damage had occurred to the process tube as a result of chattering or vibrating.

b. DT-IP-159-F - "Power Rate Meter"

Installation of the power rate meter is complete. Test operation during the month indicated that the reading from the power rate meter is 20% high because the RTD sensing elements are not distributed correctly over the rear face. This problem can be readily corrected by moving the elements on the rear.

2. Projects

a. CG-705 - "Rod Coolant Water Instrumentation Modifications"

The installation was completed during the month and the equipment is now in service. The Acceptance Test Procedures have been completed. Work remaining to be completed on this project consists of removing the old instrumentation and replacing some relays which have been found to be faulty.

DECLASSIFIED**D. Radiation Monitoring Experience****1. Radiation Occurrences**

There were two lapses of radiation control, one of which involved skin contamination on the face and chest of a Maintenance employee. The second lapse of control occurred when a poison spline accidentally slipped out of a process tube during insertion. Radiation dosage did not exceed 60 mrads per person, however, the potential for high level radiation dose rates was great. This occurrence was formally investigated and reported in document HW-56507.

2. External Exposure Control

Some improvement has become evident in control of 105-D Radiation Monitors' exposure. During the period 6-2-58 through 6-16-58 the average gain was 26 mr per Monitor. After 26 weeks the average dose per Monitor is 1529 mr, or extrapolated for 12 months, 3058 mr.

3. Contamination Experience

A graphite stringer assembly was removed from a process tube channel in the discharge area. As a result, radioactive specks were spread about on the elevator giving maximum dose rates up to 4 rads/hr, including 150 mr/hr @ 2 inches. These specks were flushed into the storage basin prior to tube replacement work done later in the outage.

E. Events Influencing Costs

Manufacturing cost is expected to be somewhat lower in June due primarily to an anticipated reduction in power charges.

DR PROCESSING OPERATION**A. Production**

Production was 136.1 percent of the official forecast. Time operated efficiency was 90.3 percent which was 120.9 percent of forecast. The large amount by which the forecast was exceeded was due to cancellation of a planned tube outage. New tubes were not available for replacement.

B. Operating Experience**1. Operating Continuity**

There were three unscheduled outages including two scrams during the month:

<u>Date</u>	<u>Hours</u>	<u>Reason</u>
6-12-58	0.3	Panellit scram - error in removing gauge jumper.
6-12-58	39.3	Rupture 2863-DR. Charge-discharge.
6-18-58	30.4	Scram caused by failure of Number 18 VSR Selector switch. Charge-discharge.

2. Equipment Experience

a. Vertical Safety Rods

VSR's numbers 28 and 34 were replaced with the new heat resistant rods.

b. Ruptured Slugs

2863 Charged 3-6-58, lot CA-063-A, concentration 485, split type, removed with Scott Tube Pushing Machine using 4500 psi.

c. Tube Replacement

Probologged 48 tubes. None of them had residual tube wall thicknesses of less than 28 mils. Tube 2863 was removed because it was damaged by a ruptured slug.

d. Vertical Rods

A loose contact in vertical rod selector switch number 8 caused a short circuit and the rods scrambled into the reactor. Insufficient time was available to locate and repair the trouble in the scram recovery period. Approximately eight hours production were lost because of this switch failure.

e. Building Settlement

The 18-inch cast-iron drain line around the east and south side of the 105 Building is being prepared for a hydrostatic test.

C. Improvement Experience

1. Production and Process Tests

a. PT-IP-160-AE - "Determination of Corrosion Rates and Decontamination Efficiency of a Through-Reactor Application of Turco 4306-B"

This test was run using seven tubes.

b. PT-IP-181-N - "Performance Test of CG-558, 190 Pump With New Design First Stage Impeller"

This test was run on 190-DR process pumps. No flow or pressure changes were detected while the test was in progress.

2. Projects

a. CG-705 - "Rod Coolant Water Instrumentation Modification"

Installation of this project was completed.

b. AEC-600 Army Gas Loop - Work was continued in accordance with the schedule established by Project Engineering.

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3. Other

a. Charge Elevator

Relays for the charge elevator were moved from the "C" Machinery Room and the elevator to the Electrical Equipment Room. Concentration of the relays in this accessible location will reduce outage time required to correct failures.

D. Radiation Monitoring Experience

1. Radiation Occurrences

There were three lapses of radiation control. One lapse involved an exposure of three employees to over-limits airborne contamination during poison decontamination work on the Wash Pad. Another resulted when highly contaminated storage basin equipment was found stored outside the radiation zone portion of the storage area.

The remaining lapse concerned protective clothing contamination of 2970 mrad/hr and skin contamination of 1089 mrad/hr resulting in an estimated dose of 185 mrad received by a Processing Operator. The contamination occurred during rupture removal work in the discharge area. No over-exposure was involved.

2. External Exposure Control

The maximum external whole-body dose rate to which personnel were exposed was 1.5 r/hr. This was encountered during the "quickie" set-up on tube 2863-DR, on which the pigtail read 80 r/hr. During this work a Processing Operator was splashed with process water and the occurrence resulted in the reported lapse of control.

3. Containation Experience

A total of nine cases of skin and hand contamination occurred at the reactor during the month. Of these, four cases involved Minor Construction employees and all except one resulted from effluent vapor contamination during work in Building 1608-DR.

E. Events Influencing Costs

Total operating cost for the month is expected to be normal. Product unit cost should be low due to higher than average production.

D-DR POWER OPERATION

A. Operating Experience

Normal seasonal fluctuations in the raw water quality were experienced. The filter flow test that was started on May 26 at 183-D is still being conducted. (See D-DR Record Report for May)

The average evaporation rate for the month was 8.05 pounds of steam per pound of coal. The steam generating load was 70,700 pounds per hour average, and 146,000 pounds per hour maximum.

B. Equipment Experience

Numbers 6 and 8 filters were removed from service on June 16 to remove the extra fine anthrafilt from the surface of each filter.

Number 2 backwash pump motor was transferred from the normal 2.3 KV bus to the emergency 2.3 KV bus which is supplied from the 184-D 2.3 KV bus, on June 16.

Replacement of the Beckman RX, pH meters with Beckman W-7400 meters was completed on June 20.

185-D Building

Dismantling of the excess equipment by L. A. Hunt of Spokane, Washington, was completed on June 13.

190-D Building

A seven-pump operation was started on June 12. (D Reactor had previously been supplied with six 190 process pumps.)

The primary impeller and wear rings were replaced on the Numbers 1 and 7 pumps during the month.

190-DR Building

Number 7 process pump primary impeller was replaced with a modified impeller on June 24. A Performance and Production Test was conducted on June 25. The pump did not come up to expectations, but as the test was limited by operating requirements, additional tests are planned during the next extended outage.

C. Status of Approved Projects

Project CG-782 - 181-D Building

Preliminary studies to correct the noise level and circulation of air through the building were continued during the month.

D. Events Influencing Costs

Total power costs are expected to be somewhat lower due largely to a reduction in planned maintenance charges.

D-DR MAINTENANCE OPERATION

A. Equipment Experience

I. Instruments

a. Temperature Monitor System

Building 105-DR The Deviation Recorder, of the temperature monitor system, was modified to provide a selection of either four fixed, or four variable points for monitoring purposes.

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a. Temperature Monitor System (Continued)

The four fixed points each have a potentiometer to adjust the temperature pattern up or down scale.

b. Pressure Monitor System

Building 105-D An inboard inspection was made on all 46 rows of gauges and 36 suspected leakers were revealed and replaced. Panellit gauges with 13-87 trip spans were installed in rows 7, 8, 9, 10, 11, 12 and 13.

c. Miscellaneous Instrumentation

Buildings 183 D & DR The filter controllers were adjusted to go wide open during filter washes. They previously closed during washes. The rate at which the filter now comes back on the line is controlled manually by the operator. Once on the line, the controller takes over and regulates filter rate of flow automatically. This revision has decreased the time required to wash a filter by approximately four minutes.

Building 190-D The Cash Controllers on the 190-D tank level controls were all overhauled. These controllers are primarily designed for using oil as the operating medium but in our application, water is used. This requires frequent cleaning of film and corrosion from the components.

2. Mechanical

Buildings 105 D & DR Internal decontamination piping was installed from the purge tank in the valve pit to the rear face. This equipment is ready for use in both buildings.

Building 105-D During the month 23 tubes were removed and 28 tubes were installed at a rate of .962 hours per tube. Sixteen of the tubes installed were on rows two, three and four; and any tubes replaced below row four are difficult and time consuming because the elevator does not go low enough for normal work positions.

Building 190-DR Continuous discharge Yarway steam traps have been installed ahead of each steam turbine to get rid of the wet steam before the steam enters the turbine. It is hoped that this will reduce the present rate of steam cutting inside the turbine cases.

B. Maintenance Shift Activities

The Maintenance Shift crews spent 100 percent of their time in 100-D Area.

C. Maintenance Engineering and Planning and Scheduling

1. Instrument Engineering

DR Crossheader Differential Pressure Gauges

Prefabrication work for the installation in Building 105-DR is well under way. Sensing line tubing bundles are completed and ready for installation on the reactor. The electric annunciator panel is being assembled. All off-site materials are on order and partially received. The Barton gauges are expected at present, to be on site in the week starting July 21.

Some assistance has been given Project Engineering in estimating costs and providing information for specification for their project proposal which provides this equipment in the other seven reactors.

DR Reactor Thermocouple Replacement

All but three of the nine items being purchased off-Plant for this job arrived. The sheet metal work on the terminal cabinets is completed. The target date for the electrical work in the cabinets and the assembling of the thermocouple bundles is July 1, 1958. Rear face work could start within a week or ten days after the material arrive which will permit work on the cabinets and thermocouple bundles. These materials are due now.

There is a possibility that improved silicone covered lead wire may be available before DR thermocouple replacement is complete. Although DR replacement activity will not be held up on this basis, the well size was changed to accommodate a switch to the new wire if it does become available in time to be used for even a part of the DR replacement job.

Foxboro Power Calculator Calibration Equipment

The receipt and installation of flow manometers completed calibration equipment in D and DR Reactors. This equipment, consisting of precision bridges and high pressure manometers serves as valid source information for production accountability.

2. Electrical Engineering

Revision to D Emergency Alternator

Design Change 213-D, which reduces substantially the possibility of scrams from the emergency alternator circuit, was installed at D Reactor.

C Elevator Test and Control Panel DR Reactor

A panel, similar to the one previously installed at D Reactor, was installed at DR Reactor. This will minimize the time to repair elevator difficulties.

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3. Mechanical Engineering

Dummy Sorter

Testing of this equipment was completed. The tractor and hoist are inadequate for routine use. Mechanical Development Operation is purchasing more suitable equipment. The bucket dumping device has been improved. The equipment can be put to beneficial use while waiting delivery of the new tractor hoist.

Compressed Air Supply 105-D and DR

Check prints of the equipment and piping changes have been completed. Inspection of the 115 tunnel revealed about 400 feet of unused piping, a majority of which has been incorporated into the design of the system. This will reduce substantially the attendant piping costs. An equipment transfer has been executed and approved for moving a 650 cfm compressor from the 271-T Building to 115-D.

D. Events Influencing Costs

Maintenance costs are expected to be normal for the month.

Manager,
D & DR REACTOR OPERATION

JH Brown:WLS:af

F REACTOR OPERATION
JUNE - 1958

I. ORGANIZATION AND FUNCTIONS

There were no changes in assigned responsibilities.

II. PERSONNEL

A. Force Summary

	<u>May 31</u>			<u>June 30</u>			<u>Net Change</u>
	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>of Total</u>
General	3	2	5	3	2	5	0
Processing	16	39	55	16	39	55	0
Power	8	55	63	8	57	65	+2
Maintenance	14	74	88	14	73	87	-1
Total	41	170	211	41	171	212	+1

B. Movement of People

There were no changes in exempt personnel assignments.

Nonexempt moves included: one reactivate, one resignation, two transfers in and one transfer out.

H. R. Jacobs, Technical Graduate, was assigned to F Maintenance Operation effective June 11, 1958.

III. PERSONNEL ACTIVITIES

C. N. Gross, Manager, F Reactor Operation, held one Conference Table Meeting with eleven nonexempt persons attending.

A training meeting on the use of Ramset power tools was conducted with 43 craftsmen attending.

W. G. Westover escorted Mr. Boutelle from Brookhaven National Laboratories on a tour of F Plant facilities.

Five exempt personnel completed the PBM-I course.

Seven exempt persons attended IPD training courses.

C. N. Gross and G. B. Jex attended an Operation Upturn meeting as representatives for 100-F Area.

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DECLASSIFIED**IV. SAFETY AND SECURITY**

There were eight medical treatment injuries reported. Year to date experience on medical treatment injuries places F Reactor Operation in second place with a frequency of 2.85 when compared to the other Reactor Plants. There were no disabling injuries and no security violations reported for the month of June.

A program for improved safety poster displays and visual aids was initiated. With the assistance of L. P. Forby, Safety Engineer, arrangements are underway to secure new display boards and posters from the Elliott Display Company for use in all IPD Reactor Plants.

V. NONROUTINE REPORTS ISSUED

None.

VI. INVENTIONS AND DISCOVERIES

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.

II. COMPONENT ACTIVITIES**GENERAL****A. Administrative Activities**

The distribution and return of Security Questionnaires for F Reactor personnel was completed.

The Semi-annual Savings and Improvement Report was completed and submitted to Financial Operation.

Internal arrangements were made for a tour of F Area Biology facilities to accommodate five persons from other departments.

Suggestion Plan activities:

To be evaluated - start of month	17
Received for evaluation	36
Evaluated and returned	41
Unanswered - end of month	12

B. Landlord Activities

Assistance was given Hanford Laboratories Operation in locating a site for new experimental facilities at the Animal Farm. An excavation permit was approved for location of the new facilities.

Modification and remodeling of the lunch room in Building 1717-F (Maintenance Shops) by outside forces was started during June.

A survey and study of janitorial services was initiated to determine personnel requirements for expanded facilities and services.

A meeting was held with Facilities Engineering Operation, Hanford Laboratories Operation personnel to establish procedures and clarification of landlord responsibilities for management of assigned properties in 100-F Area.

F PROCESSING OPERATION

A. Production

F Reactor production was 129.9 per cent of forecast during June and a new maximum in-put production record was thereby established. Time operated efficiency was 86.6 per cent. Production was above forecast due to favorable rupture and scram experience. The reactor operated on nominal 975 KW tube power limits during the month.

B. Operating Experience

1. Operating Continuity

<u>Outage Date</u>	<u>Outage Hours</u>	<u>Reason</u>
6-14-58	96.5	Leak testing, charge-discharge, tube replacement and maintenance.

2. Equipment Experience

Water Leak - The reactor was shut down for leak testing on June 14. Tube 0159-F was confirmed as a tube leak. During extended periods of equilibrium operation before and after the shutdown, collections were 10 to 15 gallons per day (see Production Tests).

Tube Replacement - A total of 26 tubes were replaced during the month, including 24 of 51 probologged for external corrosion. Emphasis is being placed on investigating the condition of the 220 original tubes remaining in the reactor.

Scrams - Performance of the safety circuitry and all associated components continued to be significantly above normal. Excluding one scram caused by a rupture in April, no scrams of any type have been experienced in almost four months of operation.

3. Ruptures

The very low rupture frequency of the past six months (one rupture positively identified and two suspects) is believed due in part to

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the lower specific slug powers associated with the 34-piece loading as was originally theorized (see Production Test IP-98-I, below).

C. Improvement Experience

1. Production Tests

Production Test IP-98-I, "Revised Tube Charge Pattern for Graphite Annealing" - Charging with increased charge lengths below row 38 is 94 per cent complete. Operating experience continues to be favorable. The following results of periodic vertical traverses on tube 4676-F are also of note:

<u>Date</u>	<u>Maximum Deflection</u>	<u>Per cent Loading Completion</u>
9/57	+1.88"	29
12/57	+1.63"	75
3/58	+1.51"	85
6/58	+1.39"	93

Production Test IP-176-I, "In-Pile Gun Barrel Cutting - F Reactor" - The test authorizes the in-pile cutting of 20 front gun barrels at a point 24 inches from the front flange to provide movement for tube expansion. Three gun barrels have been cut to date with satisfactory results.

2. Projects

CG-705, "Improved Rod Water Instrumentation" - The new system was placed in operation with minor exceptions during the month.

Work continued on CG-666, "Zone Temperature Monitoring", and CG-667, "Rear Face Viewing Facilities."

D. Radiation Monitoring Activities

1. Radiation Occurrences

No radiation incidents and two lapses of radiation control were incurred by F Reactor Operation this month.

2. External Exposure Control

Entry to the rear face during reactor start-up on June 18 was made to open a far side sample line valve. Exposure to personnel involved was estimated at less than 200 mrem.

Three additional exposures to personnel above 3 r/hour encountered were: An exposure of 4.6 r/hour while burying two shielding plugs from X level, an exposure of 4 r/hour from irradiated poison retained by the rear ball valve on tube 3685, and an exposure of 5 r/hour on the "C" elevator during discharge of a graphite stringer.

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3. Contamination Control

A loose rear pigtail connection on process tube 0890 sprayed effluent water on the rear shielding wall. Residual contamination of 400 c/m on the storage area wall after approximately one week decay period was successfully cleaned.

Two cases of personal skin contamination were readily cleaned.

F POWER OPERATION

A. Operating Experience

The river elevation varied between 381.8 and 375.5 feet. Turbidity varied between 27.0 and 7.0 ppm. The average chemical feed was 8.8 ppm alum and 5.0 ppm sulphuric acid. Due to seasonable water conditions, the filter operation runs were reduced to five hours minimum.

B. Equipment Experience

183 Building

The false bottom of No. 2 filter was opened for inspection of accumulation of sand and anthrafil, no excess deposits were found.

The 6E filter backwash valve was replaced with a rebuilt valve on June 16.

Flow capacity tests were conducted on the east and west raw water inlet headers from 181 Building on June 16 and June 17 to collect data for line friction loss during the increased test flows. Separate report will be issued by Process Design Operation.

To determine feasibility of increasing flow capacity of filters, individual filter controls were adjusted for increased flows of approximately 1,000 gpm on June 25. Subsequent tests with 10 filters in service were satisfactorily completed on June 27.

No. 9W Palmer Sweep Iowa Valve was replaced on June 16.

184 Building

An evaporation and burning characteristics test using Kemmerer coal was completed on June 3. Test results and other data are covered under separate report.

Boiler acceleration tests on No. 2 and No. 3 boilers were conducted on June 2 and June 6, respectively. Purpose of tests was to determine performance of boilers during load pickup from 10,000 pounds per hour to full load of approximately 100,000 pounds per hour.

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185 Building

Removal of excess piping and equipment by Henry Bacon Company Contractors is approximately 75 per cent complete to date.

190 Building

The six-inch Globe valve to No. 12 turbine condenser was replaced on June 9 with a rebuilt valve.

Relocation of the dichromate pumping system to the 190 Tank Room is approximately 90 per cent complete.

190 Building Annex

Modification of No. 26 relay for stalled motor protection was completed for No. 4A pump motor on June 9 and for No. 8A on June 26.

C. Improvement Experience

Project CG-558

190 Annex Process Pump Interstage Seal and Bushing Modification - Modification and repair of No. 4A pump impeller was completed on June 3. The rotating assembly for No. 8A pump was removed for modification.

Production Test IP-153-I, "Hagan Coagulant Aid as a Substitute for Separan" - Production Test continued satisfactory throughout the period with varying feeds from .055 to .030 ppm.

Development Test Authorization IP-154-AL, "Sulphuric Acid Study" - Chemically pure sulphuric acid was used on west side of filter plant while the regular commercial grade acid was fed on east side starting June 28.

D. Events Influencing Costs

Installation of a 10 hp electrical motor replacing turbine drive for No. 1 cinder return fan in 184 Building and procurement of a cone valve for 183 Building will increase maintenance costs.

Chemical costs were less due to improved raw water qualities.

F MAINTENANCE OPERATION

A. Equipment Experience

1. Instrument

An additional 100 gages with 10-90 trip settings were installed in the No. 1 Panellit board, for a total of 747 installed to date.

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Since May 15, 1958, 21 thermocouples of the Reactor Temperature Monitor System failed; all were repaired using the new method of arc welding the thermocouple tips.

2. Electrical

The No. 1 cinder blower turbine at the 184 Building was removed and replaced with a 10 hp, 440 volt, 3-phase electric motor.

The charge-discharge communication system was expanded to include additional speakers and microphones at the pickup chutes and the 10 and 20 foot levels.

A control station for the "D" elevator was installed on the near stairwell at the 30 foot level.

3. Mechanical

During the reactor outage of June 14, a total of 26 process tubes were replaced at a rate of 0.78 hours per tube.

A 7500 CFM air cooler was installed on the roof of the 105 storage area to provide cooling at the pickup chutes.

Eighteen front face orifices were replaced with venturies.

Installation of the new piping system for the internal decontamination of rear crossheaders is approximately 90 per cent complete.

Modifications of the front face tugger compression bar has been completed. The added improvements will permit one man to handle the compression bar and speed up replacement of process tubes.

B. Shift Maintenance Activities

The Maintenance shift crews devoted 80 per cent of their time to F Area activities. The balance of the time was spent in H and K Areas.

C. Maintenance Engineering

1. Instrument Engineering

The major efforts were devoted to a study of the 115 gas system for handling nitrogen gas, completing a design and estimate for the 190 riser pressure alarm system, studying sensitivity of start-up instrumentation and investigating problems relating to the oxygen analyzer system.

2. Electrical Engineering

Major efforts were devoted to the investigation of the method and equipment required to replace a 300 hp turbine driver pump at 183 with an electric driven pump.

3. Mechanical Engineering

Major efforts were devoted to the investigation of problems relating to increasing the width of the "D" elevator, evaluating the cost of a viewing window for the lead room, continuing work related to the safe-flush discharge of fuel elements, and the stuck gun barrel problem and the rear face decontamination facilities.

4. Planning and Scheduling

Efforts continued to resolve the problems relating to the individual equipment spares. A summary list of uninstalled equipment was prepared and issued to each property custodian to aid in controlling property assigned to F Reactor Operation.

Approximately 23 per cent of the available manpower was assigned to productive maintenance efforts during the month. This activity included the completion of 12 Class A overhauls and 343 Class B overhauls.

C. J. Shaw
MANAGER
F REACTOR OPERATION

CN Gross:GBJ:mc

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H REACTOR OPERATION

June, 1958

I. ORGANIZATION AND FUNCTIONS

No change.

II. PERSONNEL

A. Force Summary

	<u>E</u>	<u>May 31</u>		<u>E</u>	<u>June 30</u>		<u>Net Change</u>
		<u>NE</u>	<u>Total</u>		<u>NE</u>	<u>Total</u>	<u>of Total</u>
General	4	3	7	4	3	7	0
Processing Operation	16	38	54	16	38	54	0
Power Operation	9	57	66	9	57	66	0
Maintenance Operation	15	72	87	16	70	86	-1
Central Maintenance Oper.	19	106	125	19	105	124	-1
	63	276	339	64	273	337	-2

B. Movement of People

G. E. Brandvold, Junior Engineer (Temporary summer graduate student) was assigned to H Maintenance Operation June 16, 1958.

Nonexempt personnel movement during June included four transfers in, five out and two reductions of force. One transfer out involved a Pile Operator who was given a leave of absence to secure employment with APED, Vallecitos Laboratory.

III. PERSONNEL ACTIVITIES

H. C. Smith was named as H Reactor Operation representative on the IPD Operation Upturn Task Force.

All H Reactor Operation exempt employees attended an Operation Upturn meeting conducted by the Manager H Reactor and the Specialist, Manufacturing Administration.

Essentially all nonexempt employees in H Reactor Operation have been contacted individually on Operation Upturn.

Fifteen exempt employees attended four training courses.

IV. SAFETY AND SECURITY

There were no disabling injuries, serious accidents, radiation incidents or security violations during the report period.

Eighteen medical treatment injuries were reported.

V. NONROUTINE REPORTS

None issued.

VI. INVENTIONS AND DISCOVERIES

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.

VII. COMPONENT ACTIVITIES

General

A. Administrative Activities

Revised job descriptions were prepared for the Central Maintenance Operation Shift Field Clerks.

Radiation exposure summaries for Pipefitters, Millwrights, Radiation Monitors and Maintenance Supervisors were issued for 22 and 24 week periods.

A productivity index for H Reactor Operation was developed. The report covering fourth quarter CY 1957 and first quarter CY 1958 will be issued during the first part of July.

B. Cost Control Activities

A revised personnel forecast for FY 1959 and FY 1960 was prepared and submitted to the Financial Operation.

The Savings and Improvement Report for the second half of FY 1958 was prepared and issued.

C. Landlord Activities

Interior and exterior painting program for CY 1958 was completed during the month.

The contract for Project CA-788 "Fire Protection Facilities - 1760 and 1761-H Buildings" was awarded to Automatic Sprinkler Service of Seattle. Initial work on the project was started at month end.

D. Suggestions

Start of month
Received for evaluation
Evaluated and returned
End of month

36
34
24
46

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H Processing Operation

A. Production

Input production exceeded the forecast by 7.2 per cent.

Equilibrium power levels were governed by the administrative limit of 1440 MW.

B. Operating Experience

1. Operating Continuity

The operating continuity of the H Reactor was affected by the events listed below:

<u>Day</u>	<u>Hours</u>	<u>Reason</u>
2	43.5	Solid E rupture stuck in tube 0863-H. Charge-discharge.
4	0.4	Scrammed by a relay fault during a process pump change.
22	55.2	Solid E rupture in tube 0573-H quickied, but insufficient reactivity was available for recovery.
25	16.0	Solid E rupture in tube 2992-H quickied, but the offending slug melted a hole in process tube.

2. Equipment Experience

Ruptured Slugs

Flattening changes and control rod adjustments during the month reduced front-to-rear flux peaking in the enrichment ring from 33 per cent to about 10 per cent. Despite this, there were three E ruptures. Since enriched slugs account for more than half of the H Reactor ruptures, it is obvious that the E slug powers are too high. The failure rate can be reduced by (1) continued efforts to eliminate flux peaking, (2) using an improved enriched slug, (3) using fewer E columns, and (4) cutting pile power level. The last method is the only one that can be accomplished immediately.

Water Leaks

Two water leaks were corrected this month. One was caused by the ruptured slug in tube 2992-H, and the other by a cracked rear flange on original tube 0564-H.

Rear Riser

During an outage this month, water was found spurting through a crack in the far rear riser. Further investigation revealed several radial

cracks emanating from a point where a supporting gusset is welded to the riser. Temporary repairs were made pending a complete engineering study of the problem.

C. Improvement Experience

1. Tubing Burial

A new shielded viewing window in the Transfer Area was used for the first time this month for the burial of process tubing. Exposure to radiation was reduced by a factor of four. Similar exposure savings will be realized whenever irradiated material is raised out of the loading pits.

2. Continuous Air Sampling

A system for continuous monitoring of rear face air samples was completed and placed in service this month. This installation will permit a relaxation in respiratory protection during certain portions of each outage.

D. Radiation Control

1. External Exposure

- a. No dose rate in excess of 5 Rads/hr was received by personnel during the month.
- b. Ten radiation occurrences resulted in four lapses of control.
- c. Exposure control to the monitoring force is improving. The average accumulation rate during the month was 45 mr/week as compared to 64 mr/week for the first 24 weeks of this year.

2. Contamination Control

- a. A water leak from the rear face into -9 and -12 levels resulted in a spread of contamination into the building corridors and lunch room.
- b. The water leak in tube 2992-H carried contamination up into the ball hoppers and onto the VSR's. Forthcoming maintenance work on the reactor top will be affected adversely by this contamination spread.
- c. Ten cases of skin contamination occurred during the month. All were the result of handling contaminated VSR's.

E. Events Influencing Costs

Overtime required for June outage work amounted to 12 hours for processing and 19 hours for radiation monitoring.

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H Power Operation

A. Operating Experience

Process water pressure was reduced three times during the month. Combustion evaluation test of Mountain States coal was completed June 5. The speed of ignition was very slow as compared to Kemmerer coal, however, burning characteristics and efficiency are satisfactory. The completed evaporation test of this coal, indicates an average steam load of 18.2 m lbs/hr, an evaporation rate of 6.59 lb/steam per lb/coal was attained for 70.1 per cent boiler efficiency.

High quality process water was produced throughout the month with an average alum feed of 7.5 ppm. Raw water quality remained very good during the month. Chlorine addition remained on a maximum feed rate to reduce manganese in the process water.

The use of Separan was discontinued June 16.

Analytical Laboratories performed routine control services and special analysis on 71 essential material samples, 56 water samples, 82 process control samples and 6 special samples.

B. Equipment Experience

Nos. 1, 2, 3, 4 quick mixers in the 183-H Building were removed from operating service to determine value in water treatment. No adverse conditions have been noted to date.

Building 184 - J. P. Jones, Travelers Insurance Company representative, inspected No. 3 boiler on June 17.

No. 1 steam generator was placed in service June 5, and No. 3 steam generator was removed from service for annual inspection and repairs.

190-H Building - The scheduled oil circuit breaker tests conducted by Grand Coulee June 18, did not cause any power interruptions.

The installation of facilities to utilize liquid sodium dichromate are approximately 70 per cent completed.

Mr. E. H. Buddie, DeLaval representative, inspected the wear rings and impeller of No. 8-A unit June 27.

H Maintenance Operation

A. Instrument Maintenance

1. Pressure Monitor - Made high and low trip check of all three Panellit panels and a response check for No. 3 panel. No failures were found.

The Panellit repair shop is approximately 35 per cent complete. Repair and testing of gages is proceeding; to date 20 gages have been tested

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and passed by the Component Testing Operation. Training is continuing to provide technicians the opportunity to become proficient in working with these gages.

2. Oxygen Analyzer - This unit was removed from service until additional gas sample lines are installed.
3. Flexowriter - Difficulties with this system were encountered during the month. Subsequent investigation disclosed the trouble consisted of a series of minor component and tuning problems. The Instrument Engineer has prepared a comprehensive program which is designed to minimize the occurrence of this type of difficulty.
4. Thermocouples - During the month, six rear face thermocouples were repaired.

B. Mechanical Maintenance

VSR Replacement - Eight VSR's were replaced at an average time of one and one-half hours per rod.

C. Engineering Activities

1. Instrument Engineering

A graphite thermocouple stringer was installed in channel 2577-H on June 3. All thermocouples are operating satisfactorily.

2. Electrical Engineering

a. 4500-hp Power Loss Relaying - 190-H Building

An extensive study was initiated during the month to determine the reason for scrams occurring when a 190-H Annex motor was started on a bus unparalleled. All relays concerned were tested. In addition, a large majority of the wire was checked for loose connections. Tests on a visi-coder oscillograph indicated that the undervoltage relay contacts were not opening during motor starts. Trouble experienced with motor starts, after the tests were concluded, indicates the trouble is still occurring on a single bus start. No trouble was noted on paralleled bus starts. More extensive tests will be conducted during the next outage.

b. 440-volt Load Study - 1717-H Building

A load study is being conducted on the 1717-H Building 440-volt electrical system. The study showed a total connected load from 450 to 490 horsepower on a transformer bank rated at 300 kva. A diversity factor was computed and the results indicated an 89 per cent demand factor. A recording ammeter has been installed to verify the above calculations.

3. Mechanical Engineering

a. Overhead-Supported Charging Machine

Engineering and drafting work on the proposed overhead-supported charging machines was completed. The rough draft of recommendations for proposed changes is completed, and the final draft will be issued shortly.

b. Helium Unloading Station Piping

The helium unloading station piping was inspected to determine requirements for handling helium at 3600 psi. A recommendation for changes, with cost estimate, was issued.

D. Productive Maintenance

Productive Maintenance activity continued at approximately the normal pace, which is 20 per cent of available hours. Efforts were somewhat hampered due to unscheduled outages.

Central Maintenance Operation

A. Engineering

Major activities included:

1. Completion of design and placing of an order for broach-mandrel assembly.
2. Distribution of a manual "Reactor Tools - Prints and Specifications."
3. Completed redesign of the tube drill (potato drill).

B. Hot Shop

1. The shop completed 88 splitters, 44 broaches, 13 tube trimmers and 100 splitter blades.
2. Other major work consisted of reworking 10 VSR's and machining of an impeller for 1706-KER Building.

C. Instrument - Electric Shop

1. Shop tests, including ATP's were completed on six Beckman controllers, in connection with Project CG-786.
2. Panellit gage work for the month included 290 gages for K reactors, 137 for D/DR reactors, and 47 for CEO.
3. The quarterly scale inspection was completed in all areas.

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D. Machine Shop

In addition to routine types of machine shop maintenance work, development work was performed on a gunbarrel cutter and a boot cutter. Special revisions were made to vertical rods purchased for installation in the K Areas.

E. Fabrication Shop

Major accomplishments for the month consisted of: Fabrication of acid tank for 1706-KER Building; ventilation duct for 108-F Building; 2,000 nozzle numbers for C Reactor; well caps for 300 Area; air conditioning duct for D Area; welding and test of 30 bellows assemblies for Spare Parts.

F. Paint Shop

The paint forces completed scheduled painting in 100-H Area and started in 100-D Area.

G. Special Maintenance

1. Project Work

The component's activities continued on assigned projects. Items of general interest were:

- a. Electrical work was started in KE/KW Reactors on Project CG-707.
- b. Work continued on the Charge-Discharge unit for C Reactor.
- c. The toggle valve replacements were completed in C Reactor on Project CG-600.

2. Miscellaneous Activities

- a. Installation of the main duct for the KW Reactor thermohm work was started.
- b. Fifty suppressor coils were fabricated for FEO.
- c. Repairs and revisions were continued on the C Reactor Dewcells.

H. Events Influencing Cost

The VSR's for Project CG-708 require a design change which necessitates additional work by plant forces. The rods were fabricated by an outside vendor.

Manager
H Reactor Operation

RT Jessen:CDS:met

KE-KW REACTOR OPERATION
JUNE, 1958

I. ORGANIZATION AND FUNCTIONS

There were no changes of assigned responsibilities during the month.

II. PERSONNEL

A. Force Summary

	<u>May 31</u>			<u>June 30</u>			<u>Net Change</u>
	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>of</u> <u>Total</u>
General	4	2	6	4	2	6	0
KE Processing Oper.	18	39	57	17	40	57	0
KW Processing Oper.	17	40	57	17	40	57	0
Power Oper.	13	72	85	13	72	85	0
Maintenance Oper.	24	128	152	25	125	150	-2
Supp. Crews Oper.	10	60	70	10	57	67	-3
	<u>86</u>	<u>341</u>	<u>427</u>	<u>86</u>	<u>336</u>	<u>422</u>	<u>-5</u>

B. Movement of People

J. R. Fishbaugher, Supervisor, 100 Operations, KE Processing Operation, was transferred to Hanford Laboratories Operation, Reactor and Fuels Research and Development group, (PRTR), and assumed the duties of an Engineer, effective June 1, 1958.

G. L. Madsen, Specialist, Reactor Operations, KE Processing Operation, assumed the duties of Supervisor, 100 Operations, same Operation, effective June 1, 1958.

J. Long, Jr., Millwright Journeyman, was temporarily assigned as Supervisor, Maintenance Operation, to provide vacation relief for Maintenance supervisors in K Plant, effective June 1, 1958.

Changes during the month included 10 transfers in, 8 transfers out, one retirement and 6 terminations.

III. PERSONNEL ACTIVITIES

R. S. Bell, Plant Manager, attended the annual meeting of the American Institute of Chemical Engineers and the Joint Engineering-Manufacturing "Operation Upturn" Conference at Philadelphia, Pennsylvania.

IV. SAFETY AND SECURITY

No disabling injuries were experienced during the month. Sixteen medical treatment injuries were incurred for a frequency rate of 2.35.

One security violation was incurred.

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V. NON-ROUTINE REPORTS

Savings and Improvement Report, January 1 through June 30, 1958 -- R. S. Bell.

VI. INVENTIONS AND DISCOVERIES

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 follows: A design dated June 18 for a "Thread Protector" was submitted by H. M. Woods, which would protect exposed bolt threads from blows, dirt, moisture, paint and rust. Formal invention papers may be filed after further study of the idea.

VII. COMPONENT ACTIVITIES

GENERAL

A. Administrative Activities

In addition to routine assigned duties, the following were the major administrative activities of the month:

Suggestion Plan statistics:

Start of Month -----	41
Received for Evaluation -----	35
Replies Submitted -----	31
End of Month -----	45

Two IPD Advices were reviewed and comments were submitted to the issuers.

Revised position guides were prepared for the positions of Manager, KE-KW Reactor Operation, and Supervisor - Maintenance (1706-KE-KER).

Activities were coordinated with Supplemental Crews Operation in preparing and publishing a revised IPD Directory of Processing Operators.

An information letter to employees, describing their part in the "Operation Upturn" program, was completed and distributed. A complete program for the Education Phase of "Operation Upturn" was developed.

Arrangements and preparations were made for the K Plant visit of the Advisory Committee on Reactor Safeguards. R. S. Bell gave a discussion on the history of the K Reactors.

The functional charts for the Reactor Operation were revised and submitted to the Employee Compensation Operation.

B. Personnel Development

Twenty-eight K Plant personnel attended an information meeting led by R. R. Bloomstrand of Process Technology Operation. The topic was the slug rupture problem as experienced at K Reactors, plus associated aspects.

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The following exempt personnel completed the PEM-I Course:

RC Theil	EH Kolts
FL Nacke	RM Nelson
AP Vinther	TM Hall
LB Brown	

Attendance to IPD Training Courses was as follows:

You and the Labor Law: GE Greger
Techniques of Interviewing: RJ Bursey, JW Baker

A training class on the proper use of "Flite Check" attachment for the powder-actuated Ramset stud gun was given to 26 craftsmen. Three classes were conducted by personnel of the IPD Standards Engineering Operation.

All electrical craftsmen attended a training program on complex electrical systems of the 100-K Buildings. Emphasis was placed on voltage regulator components of the 5000 KVA generators. The class was conducted by Maintenance Engineering personnel.

Twelve instrument craftsmen attended an eight-hour training session at White Bluffs on zone temperature and moisture monitoring systems.

Twenty-five training meetings for Processing operators were conducted by supervisors and the Reactor Physicist. Films concerning the subjects, "Reactor Control" and "Reactor Moderator and Shielding" were viewed by all shifts.

Two Technical Graduates and one Summer College Junior were assigned to the Operation at month end.

C. Cost Control Activities

The monthly cost meeting was held on June 16.

Savings and Improvement Reports on eleven selected items developed and evaluated during the period January through June were submitted to the Product Cost and Budgets Operation.

D. Landlord Activities

A report outlining a weed control program for K Plant was compiled.

Installation of new louvres in the 1704-K Building ventilation system was completed to improve air distribution and to reduce noise levels of the system.

The magnet truck was scheduled from the Transportation Operation to sweep all traveled areas in the Plant. A considerable amount of metal debris was collected and properly disposed of.

Submission of work orders for the summer exterior painting program was coordinated with Maintenance Planning and Scheduling and Central Maintenance.

KE PROCESSING OPERATION

A. Production

Input production was 124.7 percent of the forecast, and represents a new high in monthly production for K Reactors. Power level was limited by the top-of-annulus corrosion limits on I&E enrichment charges throughout the month.

B. Operating Experience

1. Operating Continuity

One outage occurred during June. The reactor was manually scrammed on June 28 when it became evident that tube temperatures could not be maintained below limits during a heat cycle. The cycle originated when the reactivity gains resulting from the 29-day operating period increased to the point that good temperature distribution could not be maintained. The outage was utilized for metal processing and maintenance work originally scheduled for July 1. The outage extended through month end. Outage hours for the month totaled 56.0.

2. Equipment Experience

- a. Instruments and Circuitry - The Panellit system gages and the process water pressure switches were recalibrated for six-pump operation during the June 29 outage. High and low trip checks were completed. Oil was removed and replaced in 230 gage sensing lines.

A building scram alarm was installed on June 30. The alarm was designed to expedite the assembly of all personnel in the control room to assist in scram recovery.

- b. Process Water System - The bottom thermal shield temperatures were reduced to a maximum of 40° C on June 1 in accordance with the change in Process Standard A-070. Operation at the reduced temperature was maintained with no difficulty.
- c. KER Tubes - On July 11 the venturi pressure began to drop on 1706-KE single pass tube 5063 due to a plugged screen at the control valve station. A Process Change Authorization was obtained to permit by-passing the venturi Panellit gage while the plugged screen was replaced. Screen plugging occurred again on June 24 in tube 5063, and in tube 4963 on June 25. The screens appeared to be plugged with sand. During the June 28 outage the single pass system screens were checked at 105-KE Building. All were partially plugged and were replaced with new screens. All single pass tubes were placed on process water on June 29.

C. Improvement Experience

1. Production and Process Tests

- a. PT-IP-70-A-80-MT - Irradiation of Lead Dip Canned I&E Slugs In K Reactor - Five charges of this PT material were discharged on June 28.

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- b. PT-IP-39-A - Measurement of Slug Corrosion Rates - One charge of the PT material was discharged for examination on June 28.

D. Radiation Experience

1. Radiation Occurrences

One Radiation Occurrence Report was issued during the month. There were no Lapses of Radiation Control.

2. External Exposure Control

Dose rates for rear face metal processing operations ranged from 125 to 150 mr/hr, which is 30 percent higher than the previous month's experience. The channel of VSR Number 51 was borescoped at hand dose rates up to 1500 mr/hr. Whole body exposure was negligible. Shielding surrounding the neutron spectrometer was removed during reactor operation at hand dose rates up to 200 mrem/hr and eye dose rates of 25 mrem/hr. A gas leak, causing radiation levels up to 200 mrad/hr in the vicinity of 4-B test facility, was detected and corrected.

KW PROCESSING OPERATION

A. Production

Input production was 114.7 percent of forecast. Power level was limited by the top-of-annulus corrosion limits for I&E enrichment charges. Power level was increased about ten percent over that of May due to six-pump coolant water flow.

B. Operating Experience

1. Operating Continuity

Reactor outages totaled 81.8 hours. Operating continuity was affected by the following events:

<u>Day</u>	<u>Hours</u>	<u>Remarks</u>
4	33.6	Panellit trip due to a leaking toggle valve. Recovery attempt failed.
6	0.6	Panellit trip. Recovery was made.
6	0.8	Reactor manually scrammed to maintain tube outlet temperatures within specified limits during turnaround.
6	0.6	Spurious Panellit trip on row Number 55. Recovery was made.
8	32.9	Panellit trip. Recovery was unsuccessful.
30	13.3	Spurious Panellit trip. Recovery attempt failed. Outage continued into July for metal processing.

2. Equipment Experience

- a. Instruments and Circuitry - Process Change Authorization Number 8-52, "Temperature Monitor - KW Reactor", was issued on June 6 to permit the permanent by-passing of the temperature monitor from the safety circuit until thermobulb lead wire is replaced. No temperature monitor scrams were experienced in June; however, six high temperature indications were noted. Five of the six trips resulted from wet thermobulb lead wire during startup. The sixth resulted from faulty equipment operation. Relatively small numbers of inoperative circuits were experienced during reactor startup periods.

Octant chambers of the flux monitor system were adjusted to their maximum "out" positions during the June 8 outage. The change increased the range between normal operational level and the trip setting.

- b. Horizontal Rods - Borescoping of HCR channel Number 16 indicated that spaces caused by shifting of graphite blocks permitted 3X Balls from the adjacent VSR channel Number 51 to enter the HCR channel. Except for the broken rod track, no significant deterioration of the individual blocks were observed. A program to reactivate HCR Number 16 was formulated.

C. Improvement Experience

1. Production Test

- a. PT-IP-157-E - Pre-Insertions of Downstream Dummy Charge - An Appropriation Request was written to procure the material handling equipment required for a complete charge-discharge test.

2. Projects

- a. CG-512 - Pressure Monitor - Approximately 3100 new type Panellit gages having the new switch bottle and other modifications have been installed to date.

D. Radiation Experience

1. Radiation Occurrences

Seven Radiation Occurrences were processed during the month, two of which were classified as Lapses of Radiation Control.

2. External Exposure Control

Rear face discharge operations were completed at dose rates of 75 to 100 mr/hr.

During removal of the 3X Balls from HCR channel Number 16, several irradiated balls were dropped to the inner rod room floor. The maximum dose rate from the balls was 700 mr/hr at three feet. The balls

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were placed in a bucket of water and later transferred to the storage basin at an average personnel dose rate of 300 mr/hr. The maximum dose rate for the rod work was 1 r/hr for handling the magnet.

Three thermocouple stringers were removed from the reactor at dose rates up to 5 r/hr.

3. Contamination Control

The electro-magnet used to remove the balls from the horizontal rod channel was contaminated to 12 rads/hr including 100 mr/hr. The equipment was decontaminated with wet swabs to 1.5 rads/hr including 10 mr/hr.

Radioactive pile gas was encountered in the drier room during removal of a silica-bead sample from the drier tower. As a result, personnel were found to have nasal contamination up to 4000 c/m. Decontamination efforts were successful.

KE-KW POWER OPERATION

A. Operating Experience

1. Electrical Peak Control Efforts

Peak control efforts were placed into effect on June 25 to limit the BPA interruptible demand at the approximate 13.0 megawatts peak that had been established earlier during the month. Control efforts of 5 megawatts maximum were required for 52 hours during periods of peak operation on June 25 through 28.

2. Number 3 Generator Malfunction - 165-KW

On June 14 the Number 3 generator was removed from service due to arcing on the main exciter. The spare unit (Number 1) was placed in service without incident. Subsequent investigation revealed the failure was due to a faulty insulator on the collector ring brush holders. Necessary repairs were completed and the unit was again available for service on June 17.

B. Equipment Experience

1. Number 6 Low Lift Pump Motor - 190-KE

The low lift pump unit was satisfactorily tested and made available for service on June 15. The motor had previously failed on May 18, necessitating return of the motor to the vendor service shop for repairs.

2. Liquid Rheostat Cells

Installation of the new type rheostat cells (solid polypropylene) was completed on the Number 2, 190-KE unit on June 30. A similar installation on the Number 4, 190-KW unit was in progress at month end.

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C. Improvement Experience

1. Projects

- a. CG-663 - Steam Driven Auxiliaries - Tests of the revisions to the propane pilot flame assembly on the Number 2, 165-KE boiler, as based on recommendations of the Minneapolis-Honeywell Company and the Wyatt and Kipper Engineering, Incorporated, were completed on June 30. Tests indicated a substantial improvement in ignition of the propane flame under draft conditions and ignition of the main oil flame from the propane source. Further testing was scheduled for July after completion of minor modifications.

KE-KW MAINTENANCE OPERATION

A. Equipment Experience

1. Instruments

- a. Panellits - With the closing of the centralized Panellit shop, repairs to gages are now being made in the 105 Building instrument shops. Range changes and checks were made to 5339 gages, 85 percent of these being completed during outages.
- b. Temperature Monitor System - A device was fabricated and installed to allow the 105-KE Flexowriter to type pre-selected portions of a map. Fifty controller boxes were repaired. Thirty new connectors with fifty-foot leads were fabricated as replacements in 105-KW.
- c. Graphite Stringers - A newly fabricated stringer was installed in channel Number 5 in 105-KE. A spare stringer was completed for each of the 105 Buildings as a replacement when required.

2. Electrical

- a. Emergency Generators - 165-KW - Insulation on the Number 3 generator brush assembly failed causing brush and slip ring arcing. The slip rings were ground down and new insulation sleeves were installed.

3. Mechanical

- a. Tip-Offs - Three hundred tip-offs were reworked in 105-KE to prevent process water from running out the end that fits on the nozzle.
- b. Rear Face Decontamination Test Piping - 105-KW - A three inch Turco solution feed line for Turco decontamination was installed from the solids injection line to the Helium leak detector line and rear relief riser. Sparger lines were installed in the solids mixing tank and three inch lines and necessary valves were installed from the main steam supply to the tank sparger lines.
- c. Gamma Monitoring System - Twenty-four new chambers were installed in the gamma monitor turrets.

- d. 1706-KE-KER - Heat exchanger and associated piping modifications were completed on a new Dowtherm loop. Approximately one-half of the condensate piping on the mockup tube installation, which was failing due to condensate erosion, was replaced. Electrical wiring for the air conditioning units was revised to accommodate new installations in 1706-KE loop room.

B. Engineering, and Planning and Scheduling

1. Instrument Engineering

- a. Temperature Monitor System - A total of 168,115 feet of lead wire was accepted from the Rockbestos Products Corporation. Production of lead wire was delayed by the failure of braider machines at the factory. The AEC initiated negotiations with other wire manufacturers in an effort to obtain additional supplies and thereby speed up delivery of the total order.

Connector molding processes were satisfactorily demonstrated by the Lewis Engineering Company. A production rate of 160 to 200 units per day was quoted, which will complete half of the order in approximately 20 days. Harness assembly production was quoted at two units per day. A total of 2576 resistance temperature detectors have been completed and accepted. The remainder of the order is scheduled for shipment by the third week in July.

Approximately 2000 bellows gas seals have been fabricated to date. The order is scheduled for completion during July. Work proceeded on refinement of bellows replacement tools.

2. Electrical Engineering

- a. Ventilation Fans Interlock - 1706-KER - Specifications and assistance were provided for modifying the ventilation controls. An interlock between the exhaust and supply fans was made to prevent admittance of contaminated air into clean areas.

3. Mechanical Engineering

- a. Mattress Plates - An order was placed to obtain complete mattress plate replacements for both 105 Buildings.
- b. Raw Water Pumps - 181 - Studies conducted by Process Design Operation and the Principal Mechanical Engineer indicate the practicality of fitting the pumps with larger impellers. Plans were made to replace damaged impellers with those of greater capacity in the future. Arrangements were made to incorporate the larger capacity design into the eight impellers now on order.

4. Planning and Scheduling

Class "A" overhauls were completed on 126 items of equipment and Class "B" overhauls on 257 items.

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DECLASSIFIED**C. Events Influencing Costs****1. Overtime Usage**

A total of 286 hours was worked in KE-KW Reactor Operation as compared to 682 hours last month.

Hours worked in KE-KW Reactor Operation by K Plant personnel	243
Hours worked in KE-KW Reactor Operation by other personnel	43
KE-KW Reactor Operation requirements	286

Hours worked in 1706 Buildings by K Personnel	79
---	----

2. Spare Parts

Six stock adjustment requests were processed, setting up approximately \$27,900 worth of new items. Mattress plates accounted for \$26,400 of this amount. One stock adjustment request deleted \$118.00 worth of obsolete items. Store orders were written for \$1,376 worth of miscellaneous parts.

SUPPLEMENTAL CREWS OPERATION**A. Events Influencing Costs****1. Supplemental Crews' Time Distribution**

The non-exempt time distribution was as follows:

<u>Area</u>	<u>Percent</u>	<u>Area</u>	<u>Percent</u>
100-B	14	100-F	13
100-C	11	100-H	20
100-D	11	100-KE	9
100-DR	10	100-KW	12

2. Overtime Usage

Non-exempt overtime worked by Supplemental Crews personnel totaled 105 hours. All overtime was chargeable to the particular area involved.

R. S. Bell
 R. S. Bell
 Manager
 KE-KW Reactor Operation

RS Bell:GEG:prb

PRODUCTION OPERATIONJUNE, 1958I. ORGANIZATION AND FUNCTIONS

No change.

II. PERSONNEL

	As of 5/31/58			As of 6/30/58			Net Change
	Ex.	N-E.	Total	Ex.	N-E.	Total	
General	1	1	2	1	1	2	0
Prod'n Forecast'g & Sched'g	5	4	9	5	4	9	0
Reports & Statistics	2	2	4	2	2	4	0
Essential Materials	1	1	2	1	1	2	0
Production Computing	3	3	6	3	3	6	0
Totals	12	11	23	12	11	23	0

III. PERSONNEL ACTIVITIES

R. M. Micklich received an award of \$2110 for a scheduling improvement suggestion entitled, "Use of 602-A IBM Machine to Calculate Low Goal Discharges".

R. W. Bown completed the FEM-I course during the month.

D. L. DeNeal completed a training course in Reactor Processing Fundamentals - I (Engineering Session).

E. Bailey visited the Yakima, Washington plant of the Cascade Fire Equipment Co. to inspect the equipment they will use in furnishing liquid sodium dichromate to the 100-K Area.

T. W. Hauff talked on the subject "General Electric at Hanford" to HAPO's new exempt personnel on June 13, as part of a Management Orientation program arranged by Relations & Utilities.

The educational phase of the "Operation Upturn" program was begun during the latter half of the month.

IV. SAFETY AND SECURITY

All personnel except one attended safety and security meetings on schedule. There were no injuries or security violations. An employee of the International Business Machine Company sustained severe lacerations to a finger while repairing an IBM machine in the Production Computing Operation on June 30.

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V. NON-ROUTINE REPORTS ISSUED

<u>Doc. No.</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>	<u>Class'f'n</u>
HW-56475	Current Status - 100-F Reactor External Tube Corrosion and Water Leaks	J. R. Young	6/19/58	Conf- Undoc.

VI. INVENTIONS AND DISCOVERIES

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.

VII. FUNCTIONAL ACTIVITIES

A. Production Forecasting, Scheduling and Analysis

1. Production Forecasting

Forecasting efforts were devoted primarily to discussions and compilation of assumptions and information in preparation for the next five-year forecast which is due during July.

The I & E charging schedules and enriched (E) metal status were reviewed from an inventory and feed material standpoint.

2. Production Scheduling

a. Discharge Concentrations

Discharge goal concentrations for regular uranium remained unchanged during June. The following goal changes were effected for I & E enriched slugs based on recommendations from the Process Analysis Operation:

- (1) K Reactor - "Thick skin" components - goal changed from the former multiple slope variable goal line to a normal variable goal expressed by the equation:

$$\text{Tube goal} = 190 - 88 \text{ (tube factor)}$$

This results in a goal increase of approximately 15 percent.

- (2) K Reactor - "Thin skin" components - goal changed from the former constant goal of 1200 MWD/ton of E metal specified by Production Test IP-148-AC to a variable goal expressed by the equation:

$$\text{Tube Goal} = 240 - 111 \text{ (tube factor)}$$

This results in a goal reduction of approximately 35 percent.

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- (3) C Reactor - "Thin skin" components - the goal for material charged into C Reactor has not been affected as yet.

Contrary to the trend of the past few months, very little material was discharged at less than the established goals. These discharges are summarized below:

Reactor	Tons Discharged <u>Regular Uranium</u>	Excess Usage-Tons	Reason
D	1.4	1.1	Process tube replacement.
DR	9.1	2.6	Material canned in M-388 components.
KW	<u>Enriched Uranium</u> 0.9	0.3	Adjustments to the enrichment pattern.

Comparison of June discharge concentrations (in MWD/ton) with those of previous months are:

Month	<u>Regular Uranium</u>		<u>Enriched Uranium</u>	
	<u>Solid & Cored</u>	<u>I&E</u>	<u>Solid & Cored</u>	<u>I&E</u>
April	493	668	658	820
May	516	641	734	778
June	509	744	718	663*

*Less than one ton of I & E enrichment discharged in June.

b. Process Tube Replacements

Tube replacements accomplished during June were:

D	28
F	26
H	<u>1</u>
Total	55

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3. Operations Analysis

Final editing of information for the HAP0 Five-Year Program document was completed. Revisions to the document are in progress at month-end.

Follow-up of the zirconium tube replacement program was continued.

The summary of F Reactor external tube corrosion and water leaks was completed and issued.

With respect to Production Test costs, the remaining data were obtained to permit calculation of the associated production loss for the period December, 1957 through March, 1958. The calculations and tabulated results were transferred to the Analyst, Reports and Statistics (Production Operation) who has assumed responsibility for subsequent reports.

B. Production Computing

Tube-by-tube source data were processed to establish the current production and corrosion status for each tube in all reactors. Routine and emergency production data reports were issued to implement the scheduling, forecasting, and S.S. Accountability functions of the Production Operation. Charge-discharge and tube replacement information for each reactor operation was provided in accordance with production schedules. Production data were supplied to each Pile Physicist for reactivity evaluations and to Process Technology for EDPM processing.

Tube-by-tube source data were supplied to the S. S. Accountability Operation for calculating weights of S.S. materials in discharges and month-end in-reactor inventories.

The C Reactor Processing Operation was supplied with computations of the top-of-annulus water temperatures for individual tubes in the central zone of the reactor. These computed values are used as bases for reactor operating limits.

The 528 Accumulating Reproduser was out of service for four days at month-end. Other machines were programmed as substitutes, but some overtime was necessary due to the breakdown.

C. Reports, Statistics and S. S. Accountability

1. Daily Reporting

Routine processing of the Daily Production Report and Daily Operations Report in both summary and complete forms was continued.

2. Monthly Reporting

The Combined Report of Production and Reactor Operations for May was assembled and issued.

The May Production Summary was prepared for management.

Special monthly report information was assembled for personnel of the AEC-HOO (Process Engineering and Manufacturing Division) summarizing plant operation and related statistics for May.

3. Production Statistics

Production statistics work performed during June included the following:

- (1) A chart book showing reactor outage time, ruptures and scrams was maintained for department management.
- (2) The Product Cost and Budgets Operation was furnished production data, operating efficiencies, outage hours and tube replacement information.
- (3) The Radiation Protection and Analytical Laboratories Operations, HLO, were given weekly reports showing process water flows and related reactor data.
- (4) The Plant and Industrial Engineering, Component Testing, and Supplemental Crews Operations were supplied information each morning showing which reactors were operating.
- (5) The Process Engineering Operation, Fuels Preparation Department, was given power level, water flow and tube replacement data.
- (6) The Project Engineering Operation was given river data for 1956 and 1957.
- (7) Tube replacement data for 1955 and 1956 were given to the Plant and Industrial Engineering Operation.

2. S. S. Accountability

With the continued centralization of S. S. Accountability functions in the Relations & Utilities Operation, arrangements were made to effect the required changes in Production Operation organization and personnel assignments on July 1.

3. Miscellaneous Services

Special communications from C. L. Robinson, AEC-HOO, to the HOO Classification Committee were processed.

Administrative functions performed for the Production Operation included: (1) Consolidation and issuance of the May 1958 Record Report; (2) processing of OPG's and Advices; (3) coordination of the "Operation Upturn" program; and (4) submittal of Savings & Improvement report for the last half of FY 1958.

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Rail and truck shipments received in June were as follows:

Carload shipments for IP Dept.	235
Carload shipments for other Depts.	293
Truck shipments for IP Dept.	<u>49</u>
Total shipments received	577

In addition to the routine duties involved in the procurement and delivery of essential materials, the following items were included in this group's activities during March:

1. All liquid chlorine cars to and from the vendor's plant in Portland were expedited because of the continued high usage at the various water plants.
2. A meeting for the 100-K Power personnel was arranged with Purchasing and the General Chemical Co. An agreement was reached with this vendor to maintain the Al_2O_3 content of their liquid alum shipments as close to an 8% solution ²/₃ as possible. They also were of the opinion that alum now stored in the 100-K Area tanks at a higher Al_2O_3 content could be diluted to 8% by adding water.
3. Work was continued with Purchasing in the development of a lower cost source of sodium dichromate.
4. At the request of the AEC Property Management Section, a complete physical inventory was made of the 220 one-ton chlorine containers owned by HAPO or on a loan basis from other government installations. All containers were found and accounted for by serial number.

C. A. Priode, Manager
Production Operation

REACTOR OPERATIONS STATISTICS - PROCESSING

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	B		C		D		DR		F		H		KE		KW		TOTAL	
Input Prod.-Pu (% of Forecast)	119.1		112.8		101.4		136.1		129.9		107.2		124.7		114.7		118.1	
Time Oper. Eff. (% Overall)	81.1		88.1		82.5		90.3		86.6		84.0		92.2		88.6		86.7	
No. of Reactor Outages & Hrs.	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs	No.	Hrs
Scheduled	1	103.9	-	-	-	66.7	-	85.4	-	43.0	-	75.5	-	55.0	-	49.7	1	538.7
Unscheduled																		
Scrams	1	5.6	2	0.4	4	1.7	2	0.3	-	-	1	0.4	1	-	6	16.4	17	24.8
Other	2	26.4	-	18.6	2	38.7	1	26.7	1	21.0	3	55.3	-	1.0	-	15.7	9	203.4
Total	4	135.9	2	85.7	6	125.8	3	70.0	1	96.5	4	115.2	1	56.0	6	81.8	27	766.9
Breakdown of Reactor Otge Hrs.																		
Planned																	Total	Times
Charge-Discharge	60.1		13.9		34.5		24.1		25.9		45.2		40.5		24.4		268.6	4.7
Tube Replacement	-		-		38.1		2.5		30.8		-		-		-		71.4	1.2
Project Work	-		1.0		-		-		-		-		-		-		1.0	0.1
Production Test	3.9		22.8		3.2		11.8		2.5		-		11.5		-		55.7	0.9
Maintenance	39.9		29.0		9.6		4.6		16.3		14.3		3.0		25.3		142.0	2.4
Miscellaneous	-		-		-		-		-		-		-		-		-	-
Sub-Total	103.9		66.7		85.4		43.0		75.5		59.5		55.0		49.7		538.7	9.3
Unplanned																		
Rupture Removal	22.1		-		24.5		18.0		-		29.4		-		-		94.0	1.6
Leak Testing	-		-		-		-		18.7		14.7		-		-		33.4	0.5
Maintenance	-		18.1		12.8		8.7		2.3		11.2		1.0		15.7		69.8	1.2
Instru. & Circuitry	5.6		0.4		1.7		0.3		-		0.4		-		15.6		24.0	0.4
Miscellaneous	2.5		0.5		0.6		-		-		-		-		0.8		4.4	0.1
Charge-Discharge	1.8		-		0.8		-		-		-		-		-		0.8	0.1
Production Test	32.0		19.0		40.4		27.0		21.0		55.7		1.0		32.1		228.2	4.0
Sub-Total	135.9		85.7		125.8		70.0		96.5		115.2		56.0		81.8		766.9	13.3
TOTAL																		
No. Slug Rupt.- All Types	2		-		2		1		-		3		-		-		8	
Tubes Installed-Repl. Progr.	-		-		28		-		26		1		-		-		55	
Type of Water Leaks	-		-		-		-		-		-		-		-			
Tube	-		-		-		-		1		1		-		-		2	
Van Stone	-		-		-		-		-		1		-		-		1	

Remarks:

Insert attached

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(Insert, Ch-1)

Effective with this report the basis for the above section "No. of Reactor Outages and Hours" has been revised. The number of outage hours previously shown indicated the total outage time resulting from scheduled and unscheduled outages with no attempt to show how the time was used. These hours now show how the outage time was used (for scheduled or unscheduled work) regardless of the cause of the outage. The tabulation of "number of outages" remains unchanged.

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REACTOR OPERATIONS STATISTICS - SLUG RUPTURES
JUNE 1958

Type Material	Tube No.	Type Rupture	Remov. Hrs.	Charge Date	Rupture Date	Act. Conc.	Lot No.	Removal Method			Remarks
								Quic. Mach	Chg. Mach	Hyd. Jack	
E solid	0863-H	Hot spot	15.4	4-2-58	6-2-58	*315	KE043A			x	
8"Reg.met.	3184-D	Unknown	16.2	3-25-58	6-10-58	437	KA80A		x		
8"Reg.met.	1064-B	Unknown	15.9	4-23-58	6-12-58	251	KA110A				x
8"Reg.met.	2863-DR	Not available	18.0	3-6-58	6-12-58	485	CA063A				x
8"Reg.met.	1363-D	Chg.mach.damage	8.3	5-24-58	6-17-58	122	KA102A		x		
E solid	0573-H	Side Hot Spot	3.0	5-16-58	6-22-58	*264	KE052A		x		
E solid	2992-H	Side Hot Spot	11.0	3-10-58	6-25-58	*518	KE32A		x		
8"Reg.met.	3465-B	Unknown	6.2	6-9-58	6-29-58	110	KA124A			x	

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SHEET 1

REACTOR OPERATIONS STATISTICS - POWER

JUNE 1958

WATER FLOW DATA	100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW	TOTAL
<u>RIVER WATER (BLDG. 181)</u>									
TO RESERVOIR GPM AVG	82329		85283		75667	73756			317035
TO FILTER PLANT GPM AVG	93400		60980				159000	172300	485680
(C, DR and K)									
TOTAL GPM AVG	175729		146263		75667	73756	159000	172000	802715
TOTAL MM GALS	7591.5		6318.6		3268.8	3186.3	6868.8	7443.4	34677.3
<u>RESERVOIR WATER (BLDG. 182)</u>									
TO FILTER PLANT GPM AVG	69100		80720		72220	71100			
TO COND SYSTEM GPM AVG	3000		4563		3447	2254			
TO EXPORT SYSTEM GPM AVG	10229		-		-	-			
TO EXPORT SYSTEM GPM NOR	-		-		-	-			
TO EXPORT SYSTEM MM GALS	441.9		-		-	-			441.9
<u>FILTERED WATER (BLDG. 183)</u>									
TO POWER HOUSE GPM AVG	166		128		107	151	34	17	
TO PROCESS GPM AVG	64900	86300	65116	68706	68321	64300	146600	163000	
TO DR GPM AVG			6231		352	122		50	
TO F & S SYSTEM GPM AVG	123		314						
<u>PROCESS WATER (BLDG. 190)</u>									
TO REACTOR GPM AVG	64500	85900	64716	68306	67921	63800	146200	162600	723943
GPM NOR									
MM GALS									
TOTAL	2786.4	3710.9	2795.7	2950.8	2934.2	2756.2	6315.8	7024.3	31274.3
<u>RIVER DATA</u>									
ELEVATION(MSL-FT.) (MAX)	406.2		395.0		381.8	387.7	-	401.0	
(MIN)	400.1		388.9		375.3	381.2	-	393.6	
(AVG)	403.3		392.2		378.6	384.4	-	397.8	
TEMPERATURE AVG °F	61.8		61.0		60.4	60.9	-	60.1	

SHEET 2

REACTOR OPERATIONS STATISTICS - POWER

JUNE 1958

WATER TREATMENT DATA		100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW	TOTAL
AT BLDG. 182	MM GALS	-		-		148.9	-			148.9
BLDG. 183	MM GALS	2985.1	4034.8	3487.1	2634.3	3119.9	3071.5	6868.8	7443.4	33644.9
CHEMICAL CONSUMPTION										
CHLORINE (BLDG. 182)	LBS	-		-		84	-			84
(BLDG. 183)	LBS	30621	42575	33750	26860	20067	28054	59700	88600	330227
	AVG PPM	1.2	1.2	1.2	1.2	0.7	1.1	1.0	1.4	1.2
Hydrated alumina	LBS	8889	-	-	-	-	-			8889
	AVG PPM	1.3	-	-	-	-	-			1.3
LUM										
	LBS	209587	293818	211460	160350	228988	185530	449500	440700	2179933
	AVG PPM	8.4	8.7	7.3	7.3	8.8	7.3	7.9	7.1	7.8
SEPARAN										
	LBS	350	130	366	319	970	85	960	840	4020
	AVG PPM	.014	.003	.013	.015	.037	.003	.017	.014	.014
SULPHURIC ACID (AS 100%)										
	LBS	144763	163920	63194	78600	130260	135400	308500	370900	1392537
	AVG PPM	7.0	4.8	2.2	3.6	5.0	5.3	5.4	6.0	5.0
DICHROMATE										
	LBS	42000	56000	42000	44600	43778	41585	96500	102600	469063
PURGE MATERIAL CONSUMPTION										
SOLIDS	LBS	-	350	-	-	-	-	-	-	350

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REACTOR OPERATIONS STATISTICS - POWER

SHEET 3

ANALYTICAL DATA		100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW
RAW WATER									
PH	PH AVG	7.8	7.8	8.17	8.21	8.18	8.12	7.88	7.84
TURBIDITY									
	PPM AVG	14.4	11.4	9.0	8.0	15.1	11.0	13.0	13.0
FINISHED WATER									
PH	PH AVG	7.0	7.0	7.1	7.0	7.0	7.1	7.0	7.0
TURBIDITY									
	PPM AVG	.008	.007	.007	.004	.007	.008	.007	.007
C12 RESIDUAL	PPM AVG	.05	.05	-	-	.05	.16	.14	.19
DICHROMATE	PPM AVG	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
STEAM DATA		100-B	100-D	100-F	100-H	B-D-H-TOTAL	KE	KW	KE-KW TOTAL
GENERATED(MAX)	LBS/HR	82000	146000	148000	54000	430000	66000	66000	132000
(NOR)	LBS/HR	72000	66000	35000	31509	204509	-	-	-
(AVG)	LBS/HR	71500	68823	37524	31203	209050	35983	34133	70116
TOTAL	M LBS	51449	49553	27017	22466	150485	25908	24576	50484
TO PLANT	M LBS	43628	42020	23775	19051	128474	23317	22118	45435
COAL RECEIVED	TONS	5032	4866	2702	2351	14951	-	-	-
CONSUMED	TONS	3047	3070	1645	1496	9258	-	-	-
IN STORAGE	TONS	39073	48870	34602	32998	155543	-	-	-
GEN. STEAM/LB. OF COAL		8.44	8.07	8.21	7.51	6.94	-	-	-
OIL RECEIVED	GALLONS						0	0	0
CONSUMED	GALLONS						243264	222012	465276
IN STORAGE	GALLONS						584724	494004	1078728
GEN. STEAM/GAL. OF OIL							106.5	110.7	108.5
ELECTRICAL DATA									
TOTAL GENERATED KW HRS.							1545600	1551200	3096800

REACTOR OPERATIONS STATISTICS - RADIATION MONITORING

JUNE 19 58

	B	C	D	DR	F	H	KE	KW	IPD Total
Special Work Permits Issued	14	49	15	18	12	20	10	10	148
Routine and Special Surveys	491	526	631	502	403	330	280	140	3303
Air Samples Taken	59	55	44	53	55	24	73	49	412
Hand Contamination Cases	0	1	2	1	1	4	0	0	9
Skin Contamination Cases	3	1	5	8	1	10	0	5	33
Contaminated Injuries	0	0	0	0	0	0	0	0	0
Vehicles Contaminated	1	0	2	1	0	1	0	0	5
No. of Cases of Personal Clothing Contamination									
No. of Cases Contamination Spread Outside of Radiation Zones	2	0	2	12	0	14	0	0	30
No. of Employees for whom Dose Rates ≥ 6 Rads/hr. Were Established	6	3	4	1	0	2	0	2	18
Lapses of Control (Reactor Operation)	2	0	2	0	6	0	0	1	11
No. of Hours Training Others	3	3	2	3	2	4	0	2	19
Attendance at Mtgs for Training Others	6	0	6	10	0	0	0	0	22
	12	0	0	40	0	0	0	0	52
REACTOR EFFLUENT DATA									
No. of Effluent Calculations	51	90	90	98	78	108	84	84	75
Ave. Beta Dose Rate (mrads/hr.)	9.4	14.7	7.0	7.9	10.8	12.5	18.1	12.6	12.6
Ave. Gamma Dose Rate (mrads/hr.)	15.6	20.4	13.2	15.7	21.5	23.5	25.5	32.8	32.8
Ave. Total Dose Rate (mrads/hr.)	25.0	35.1	20.2	23.6	32.3	36.0	43.6	45.4	45.4
Ave. Total Dose Rate (mrads/hr.)									
Ave. Integrated Dose in 24 hrs.	600.0	842.4	485.0	566.0	735.2	813.9	1046.0	1090.0	1090.0
Max. Integrated Dose in 24 Hrs in 19	857	1930	1242	1394	2061	1516	1576	3305	3305

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FACILITIES ENGINEERING OPERATION
MONTHLY RECORD REPORT

JUNE, 1958

I. ORGANIZATION AND PERSONNEL

A. Responsibility

There were no changes of assigned responsibilities during the month.

B. Personnel Statistics

	<u>May 31,</u> <u>1958</u>	<u>June 30,</u> <u>1958</u>	<u>Net</u> <u>Change</u>
Employees on Payroll	192	192	0
Technical Graduates (Rotational)	7	7	0
Summer Professors	0	3	+3

	<u>FEO</u>	<u>Technical Graduates</u> <u>Rotational</u>
Transferred into Operation	3	1
Transferred Out of Operation	4	1
Payroll Removals	0	0
Reactivation	1	0

C. Personnel Changes

W. G. Ruff, a Technical Graduate - Rotational, was placed on permanent assignment on June 1, 1958.

J. A. Finn, Engineer II, transferred to B Reactor Operation on June 1, 1958.

D. G. Perkins, Secretary, transferred to Employee Relations Operation on June 9, 1958.

P. L. Clark, Stenographer, transferred to Financial Operation on June 23, 1958.

F. A. Snyder, a reactivate, transferred to Research and Engineering Operation on June 16, 1958.

B. S. Merrill, Secretary, was placed on the roll on June 9, 1958.

H. C. Copeland, Senior Engineer, transferred from Chemical Processing Department on June 1, 1958.

Professors L. N. Johanson, W. F. Engesser, and E. D. Ayres were placed on the roll during June on summer assignments.

D. Personnel Development

<u>Title of Course</u>	<u>Personnel Attending</u>
Reactor Processing Fundamentals	12
General Electric Salary Plan	5
Suggestion Plan	1
Management Orientation	2
Process Orientation	1
You and Labor Law	1
Radiation Protection Program	10

E. Safety and Security Experience

Five medical treatment injuries were reported.

No security violations were reported.

II. MONTHLY REPORT OF INVENTIONS OR DISCOVERIES

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

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DECLASSIFIED**III. ACHIEVEMENT****A. Process Design****1. Research and Development****a. Category I - Existing Reactor Support**

A study was made of the feasibility of modifying selected horizontal control rods in the older reactors so that they could be utilized for the production of tritium. The estimated total project costs assumed replacement of the existing rod tip sections with a new tip of identical external configuration. The tentative conclusion was that such conversion was technologically feasible; however, no attempt was made at this time to establish economic feasibility.

Preliminary data have been obtained from the study of existing reactor and water plant capabilities. Hydraulic system curves have been developed for F and DR Reactors for the future condition of central zone zirconium tubes and I&E fuel elements. An investigation is now being made of the possible effects of high flows and increased rear face temperatures on the rear face piping. Test data indicate that with 125°C tube outlet temperatures at B, D, and F Reactors, critical flow and cavitation will occur in all rear crossheader fittings except for certain fringe tubes. No conclusions have been reached as to the possible effects of having essentially complete rear face critical flow conditions. Preliminary calculations indicate that rear face piping flexure stresses from thermal expansion will exceed the maximum set by the ASA code for pressure piping. However, more detailed analyses must be completed to establish need for piping reinforcement or other corrective action.

Initial results of the water plant capability study indicate that the CG-558 modifications utilized most of the capabilities of the existing systems. Additional increases to 115 percent of post-CG-558 flows would require appreciable capital investment in electrical distribution equipment, pumps and replacement piping. A flow increase of 25 percent or more would require new 181 pumps, filter plant additions, process pump replacement and effluent modifications. The practical limit for these older areas appears to be the peak capacity of the 190 Building pumps which is a 20 to 25 percent flow increase over present conditions.

At C Reactor, to increase the raw water capacity at the 181 Building, it is planned to rebowl the eight original

pumps to their design capacity of 10,000 gpm at 150 feet head and to install two 13,800 gpm at 180 feet head pumps in the empty pump stalls at 181-C. This would increase the total 181 Building capacity to about 128,000 gpm which is the presently anticipated maximum. To handle the increased flow in the filter plant, separate effluent piping and flow controllers would be required for both halves of the filter. An additional 22,000 gpm at 55 feet head process pump must also be added in the 183-C pump room.

A request was received from the AEC to continue study of the particular method for confinement of airborne contamination referred to as Scheme 1 in the recent report HW-55732, "Containment Studies for HAPD Reactors", by H. S. Davis, dated April 29, 1958. The specific request was for further details on the particular methods by which it is proposed to filter all the exhaust air from the 105 Buildings which is normally discharged from the stack, including a description and sketches of the various building sealing provisions, air barriers, fog-spray system, new booster fans, and filter installation. In addition, specific request was made for evaluation of methods for normally bypassing the filters and only routing the reactor building air stream through the filters in the event of a hazardous incident. Drawings and refined cost estimates are now being prepared in accordance with these requests with an over-all completion goal of July 9.

b. Category II (and NPR) - New Reactor Studies

Results were obtained from the Architect-Engineer regarding their study of minimum capital cost by-product power plants for 4000 MW thermal with 300 eMW and for 4000 MW thermal with 700 eMW conditions. Considerable economies have been effected relative to the Case II (Design C) system previously studied. This was accomplished by redesign of buildings and system lay-out as well as re-optimizing system process parameters for the low thermal efficiency involved. Combined with latest reactor plant cost data these study results indicated total reactor plant capital costs for initial construction of the 4000/300 case to be \$188,000,000 and that of the 4000/700 case to be \$241,000,000. In line with the current interest in Design B - Alternate, which is the minimum capital cost convertible reactor plant concept, plans are currently under way to determine the initial cost and cost of conversion for the 4000/300 reactor plant design.

Further studies have been made of the possibility of utilizing in-reactor boiling with or without power production. Preliminary conclusions from the study include (1) there is no incentive to produce bulk steam at the outlet of a plutonium-only, 4000 MW reactor. The

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optimum condition for such a non-power producer is one where some modest amount of steam production is permitted in a maximum power tube but bulk temperature is maintained slightly below the saturation point; (2) even with power production, generation of bulk steam may not be justified since introduction of a two-phase exit stream tends to complicate the heat dissipation system. Desirability of in-reactor boiling then must be determined for each particular case considered and may be strongly affected by the relationship between allowable heat flux and steam quality which is not definitely known for cluster type horizontal fuel elements; (3) no single optimum method of recovering power from a boiling NPR appears to exist. Up to about 300 eMW could be recovered directly from the steam produced in the primary loop of a 4000 MW reactor. Greater amounts of electric power would require a dual cycle (or dual admission pressure) type system somewhat similar to the Dresden design. The optimum arrangement would depend on the particular bases and operating objectives.

Considerable effort was spent in programming activities for the first quarter of FY-1959. Areas of major interest are those where information is required before detailed design can be initiated and, also, where it is required for initiation of procurement on long delivery items. It does not appear that sufficient funds will be available to accomplish all the work falling in these critical categories unless project authorization is actually received.

c. Category III - Gas Cooled Reactor Studies

Final report on the reoptimization of certain gas cooled power reactor process parameters was completed and issued as HW-56009. No further work on this study program is anticipated.

2. Design Projects

a. CG-704 - 100-K Outfall Study

It now appears that adequate outage time will be available for inspection of the K outfall lines during the extended shutdowns for KE and KW gas seal and thermohm replacement currently expected in September or October.

b. CG-709 - Improved VSR's, All Areas

The boron steel VSR design previously considered for possible application on this project has been tested and found unsatisfactory due to lack of ductility as well as higher cost. Final report on this test has been issued as HW-56319.

c. CG-775 - 100-K Area Water Plant Expansion

Due to the excessively high bid for the design and development of modifications to the 190 process water pumps by the original vendor, it was decided to purchase replacement components with which to achieve the desired increase in capacity. Drawings and specifications have been completed for the purchase of the replacement components and Purchasing will proceed on a competitive bid basis from a list of selected vendors. It is planned to purchase components for one pump set with the option to purchase 11 additional sets after satisfactory performance has been demonstrated.

As an alternate method of increasing the capacity of the K Plant 190 Building pumps, the addition of a seventh pumping unit is being considered. The primary advantage is that this gives a balanced system, thereby eliminating the need for a flow balancing valve between the two sets of risers. The main difficulty encountered in this alternate is routing the additional piping through the 165 valve pit.

3. Visitors

G. T. Lewis, Principal Mechanical Engineer for Burns and Roe, Inc., visited Process Design June 26-27 to discuss the NPR project.

F. H. Trones of Byron Jackson Company visited HAPO on June 12 for the purpose of inspecting the impeller damage to one of the CG-600 process pumps.

4. Trips

E. R. Astley made a trip to Los Angeles and San Diego, California May 30 to June 6 to present a paper at the ANS meeting and to attend business meetings with M. V. Davis of North American and G. W. Stuart of General Atomic.

C. A. Mansius visited Los Angeles to attend an ANS meeting and to present a paper, and also to discuss lattice physics calculations with J. W. Wetch of North American.

H. S. Davis made a trip to Los Angeles June 2-4 to attend the ANS convention and to participate as a panel member at two shielding sessions. San Jose was visited to discuss containment problems and methods used in the Dresden design. On June 6, the University of California at Berkeley was contacted in regard to possible work assignments on an "ad hoc" subcommittee of ASTM-9 investigating heavy aggregates and shielding concrete.

J. R. Carrell attended a meeting of Project ANS-7 Reactor Component Committee in Los Angeles on June 2 and also ANS

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annual meeting June 2-5. APED at San Jose was contacted on June 6 regarding possible APED assistance to HAPO on NPR development and testing.

G. A. Newell witnessed equipment tests at the Rucker Company plant in Oakland on June 23-24.

H. W. Heacock made the following visits:

- a. Oregon State College on June 6 for the purpose of discussing the testing program for the 190 process pump suction piping.
- b. Byron Jackson Company, Los Angeles, California, on June 10-11 to discuss the proposed modifications to the 190-K process pumps.
- c. Ingersoll-Rand Corporation, Phillipsburg, New Jersey, on June 23 to discuss the 190 process pump problem.
- d. DeLaval Corporation, Trenton, New Jersey on June 24 for similar discussions;
- e. AEC Division of Reactor Development, Washington, D.C., on June 24-26 to participate in a review of the development program for the gas cooled reactor concept.
- f. General Electric Company, General Engineering Laboratory, Schenectady, New York, on June 27 to discuss the work they are performing in regard to the 190-K pump shaft problems and the CG-558 pump shaft torsional analysis.

G. E. Wade visited the General Engineering Laboratory in Schenectady on June 17 and 18 to discuss the compressors for the proposed graphite-CO₂ test loop.

5. Significant Reports Issued

- HW-56009 - "A Reoptimization of Several Process Parameters for the Gas Cooled Reactor Concept", R. C. Walker, G. E. Wade, E. R. Rudock, W. A. Massena, and E. R. Astley, June 1, 1958.
- HW-56168 - "Development Test IP-166-M - Test of CG-709 VSR Surface Finish", F. J. Kempf, May 23, 1958.
- HW-56191 - "A Simplified Method of Fuel Element Heat Transfer Analysis", F. J. Mollerus Jr., June 2, 1958.
- HW-56192 - "Derivation of Equations and Graphs used in HW-56191", F. J. Mollerus, Jr., June 2, 1958.

- HW-56201 - "NPR Primary Loop Pressure Transients Following a Scram", D. L. Condotta, June 2, 1958.
- HW-56304 - "Design Test Request - DT-1032 - Process Tube and Cut Gunbarrell Deflection Test", E. R. Rudock, June 9, 1958.
- HW-56319 - "Design Test No. 1029 - Boron Steel VSR Sample Test - Project CG-709", F. J. Kempf, June 4, 1958.
- HW-56383 - "High Density Concrete for the FRTR Shields", H. S. Davis, June 13, 1958.
- HW-56398 RD - "Bi-Company Operation and Control of a Dual Purpose Plant", G. R. Hosack, June 16, 1958.
- HW-56472 - "Study Bases, New Production Reactor, Heat Dissipation Systems, Design B - Alternate", M. H. Russ, June 18, 1958.
- HW-56489 - "High Density Concrete Made with Hydrous-Iron Aggregates", H. S. Davis, June 20, 1958.
- HW-56502 - "Production Test IP-181-M - Performance Test of CG-558, 190 Building Pump with New Design First Stage Impeller", M. H. Schack and S. S. Jones, June 23, 1958.
- HWS-6413 - "Specification for the Modification to the 190-K Process Water Pumps for Increased Capacity", M. H. Schack, June 16, 1958.

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B. Equipment Development

The first zircalloy-3 process tube was installed in channel 2477 at C Reactor on June 11, 1958. Insertion and Van Stoning operations were accomplished in approximately 45 minutes. Prior to insertion, the tube was cut to length, both ends annealed in a helium atmosphere at 750°C, and one end Van Stoned. Insertion was accomplished manually requiring six men for the final six feet. Van Stoning on the rear face was accomplished in approximately five minutes. The tube length was one-fourth inch shorter than desired, resulting in potential for expansion of one-and-one-half inches and potential for contraction of one-sixteenth inch. This low potential for contraction is undesirable but tolerable since the tube was inserted 26 hours after shutdown when the graphite was cool. Shortness of the tube was due to either a measuring error, measurement in an adjacent tube, or shield or channel distortion, all of which are being investigated. This shortness emphasizes the problems of exact measurements, precutting, and out-of-pile annealing. Two other zircalloy-3 tubes are ready for insertion.

Laboratory and reactor tests show that Panellit gage oscillation can be stopped by insertion of capillary dampening devices. The capillary device consists of approximately 6-3/4 feet of 0.031-inch (nominal) diameter copper tubing coiled in a 4-inch roll and inserted upstream of the toggle valve in the line from the front-face venturi. Bore area of the capillary is 60-70 per cent greater than bore area of the Panellit gage capillary. Use of the capillary adds 0.1 second to the time response of the Panellit gage which normally ranges from 0.15 to 0.25 seconds. Using the capillary, 10-psi oscillations are reduced to one psi, and very rapid pressure changes will not show on the Panellit gage unless the pressure change persists for approximately one-tenth of a second. Importance of this capillary lies in elimination of scrams which are not required to protect the reactor. Test data on fluctuating Panellits also reveal finite pressure and flow changes in the process tubes which are being closely studied and momentum factors in the Panellit gages causing them to overshoot. Three capillaries exist on-plant and are being used on critically oscillating gages. Fifty capillaries are being fabricated by Central Maintenance.

All electrical and mechanical construction work and painting required for the installation and routine operation of the prototype charging machine on the C Elevator at C Reactor have been completed. Electrical circuit checking and performance of Acceptance Test Procedures are under way. The Production Test for use of the charging machine while operating is circulating for approvals.

In the poison spline program, an upstream perf pattern was installed on 24 tubes under a Development Test Authorization to restrain splines on the bottom of tubes and to reduce the potential for cracking and swelling. Several short "hot" splines were chopped and flushed into the storage tank in the elevator pit using the jet

eductor system developed for the K Reactors. These preliminary tests indicate speed of removal should be more than doubled (30-minute to 15-minute time cycle) and radiation exposure should be cut by at least a factor of three (54 mr per spline to 18 mr per spline of which the background contribution in each case was 10 mr per spline). Negotiations continued with the Metallurgical Products Department to supply test lots of boron-430 steel for splines in the program to develop a solid spline.

Both prototype power-rate-of-rise meters continue to operate satisfactorily at C and D Reactors. The C Reactor prototype is powered by the summation electrical signal from the octant monitoring system and the D Reactor prototype is powered by the summation electrical signal from ten resistance temperature detectors in the effluent water. The recorder of the D Reactor prototype and the indicating meter of the C Reactor prototype were moved to the operator's console to obtain reactions from operating personnel. Favorable comments have been received from operators on the power-rate-of-rise meters on the several start-ups since relocation of these instruments. In a program to train operating forces, time sequence pictures were taken during a C Reactor startup so that power-rate-of-rise readings can be correlated with control rod position and movement. A dual pen recorder was purchased from Westronics Incorporated for evaluation on the power-rate-of-rise prototypes; pen one can follow power-rate-of-rise with a fifteen second time constant so that widely fluctuating readings will not confuse operators; pen two, without ink, can have a two second time constant to give early indication of movement and direction of movement of pen one; alternately, the second pen could be used to record the second channel of a power-rate-of-rise system or power itself.

In the program to reduce rear-face contamination, four additional tubes (total now 46) at the K Reactors have been through-pile flushed with Turco 4306-B. To effect a 50-60 per cent decontamination, tests have pinpointed conditions at 5/2 gpm, 6/4 ounces of Turco 4306-B per gallon, 30-50°C, and 20 minutes. Six tubes at DR Reactor were through-pile flushed with Turco 4306-B on June 19, 1958, to determine decontamination factors and corrosion effects on weighed metal and tubular dummies. Results are being documented. A production test is circulating for approvals which would permit a ten-row and a full K Reactor decontamination of crossheaders, pigtails, nozzles, and caps without through-pile flushing. A development test is circulating for approval which would evaluate the use of Turco 4306-B to reduce radiation levels in empty tubes prior to tube replacement. Two production tests are in preparation for through-pile decontamination with Turco 4306-B on a calculated risk basis, one for H Reactor and the second for a step-wise increase in the number of tubes for a K Reactor.

Specification HWS-6406, Specification for a One-Piece Machined Resistance Temperature Detector, dated June 3, 1958, was issued. Edison, Lewis Engineering, and Charles Engelhard have submitted prototypes but only the Edison and Lewis prototypes have qualified to date.

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Visitors

D. K. Miner of Metallurgical Products Department, General Electric Company, Detroit, Michigan, visited the 189-D Mechanical Development Laboratory on June 12, 1958, to study the spline chopper for which Metallurgical Products is developing advanced-type hard chopper blades. On June 12 and 13, 1958, he visited Materials Development Operation to consult on stainless steel for general use.

G. McFarland of the Silicone Division, Dow-Corning Corporation, visited Materials Development on June 19, 1958, to discuss new silicone products and various applications of silicone rubber compounds.

Mr. K. Newman of Turco Products, Inc., Los Angeles, California, visited Materials Development on June 16, 17, 18, 1958, to consult on problems of chemical decontamination.

Peter Dietz, West Coast Sales Representative of Radiation Inc., Melbourne, Florida, visited Instrument Development on June 11, 1958, to discuss Passive Scanning.

Trips

M. R. Wood made a trip on May 17-30, 1958, to consult on reactor instrumentation at KAPL in Schenectady, New York, Stromberg-Carlson in Rochester, New York, and GE-ANP in Cincinnati, Ohio; to attend symposium on semi-conductors at Schenectady, New York; to consult with Victoreen and Reuter-Stokes in Cleveland, Ohio, on fabrication of the electronic chassis, mechanical positioner, and FC chambers for Project CG-707.

R. L. Loundagin visited Rockbestos Products Corporation in New Haven, Connecticut, on June 1-15, 1958, to discuss problems associated with production of cable according to Specification HWS-6244, Revision 1.

R. D. Schilling visited General Mills, Inc., Minneapolis, Minnesota, on June 4-6, 1958, for consultation regarding the electrical scope of the remote manipulator design contract.

C. W. Botsford on June 4-11, 1958, visited General Mills, Inc., Minneapolis, Minnesota, for consultation regarding the remote manipulator design contract, and visited Carboloy Company, Incorporated in Detroit, Michigan, to discuss gunbarrel boring.

R. R. Henderson visited Renton Coil Spring Company in Renton, Washington, on June 6, 1958, to discuss engineering problems associated with development of a clamp for gunbarrel gas seals.

J. W. Dodds on June 11-20, 1958, visited the Vaille Engineering Company, Waterbury, Connecticut, to witness operational tests of commercial Van Stone flanging equipment, and attended the ASME Semi-Annual Meeting in Detroit, Michigan.

J. D. Maguire visited the Naval Supply Depot in Spokane, Washington, on June 10, 1958, to inspect Government surplus equipment for possible use in the 189-D Mechanical Development Laboratory.

J. W. Green and J. D. McCullough visited the ISA Pacific Northwest Instrument Show on June 12-13, 1958, to discuss NPR instrumentation problems with factory engineers.

J. R. Spink on June 16-22, 1958, visited Consolidated Western Steel Company in Oakland, California, Byron-Jackson Pump Company, Leonard Precision Products Company and HYGE Engineering Project of Convair in the Los Angeles Area, to discuss final test requirements of pressure vessels, witness pump performance tests, and investigate commercial tube flaring tools and techniques for Zr-3 tubes for NPR procurement.

J. H. Fastabend on June 18-21, 1958, visited Leonard Precision Products in Santa Ana, California, HYGE Engineering Project of Convair and On Mark Engineering Company in the Los Angeles Area, to witness NPR Zr-3 tube flaring tests, discuss tube flaring procedures and tools, and investigate commercial high-temperature high-pressure closures and seals.

C. H. Gydesen visited Lewis Engineering Company in Naugatuck, Connecticut, on June 22-27, 1958, to discuss engineering details of resistance temperature detector lead cable harness fabrication.

R. K. Smith visited Crawford-Doherty Foundry in Portland, Oregon, on June 23, 1958, to observe pouring of special castings.

D. F. Bolender visited the Westinghouse Electric Corporation in Pittsburgh, Pennsylvania, on June 23-30, 1958, for engineering consultation on a WAPD special irradiation.

J. W. Green on June 15-28, 1958, visited Bettis Plant of Westinghouse Electric Corporation in Pittsburgh, Pennsylvania, KAPL in Schenectady, New York, AEC Savannah River Plant in Augusta, Georgia, Battelle Memorial Institute in Columbus, Ohio, Anton Electronics Laboratory in Brooklyn, New York, Victoreen and Reuter-Stokes in Cleveland, Ohio, to discuss fuel rupture and in-core flux monitoring. In addition, design clarification on Project CG-707 was discussed with Victoreen and Reuter-Stokes.

Significant Reports Issued

Undocumented - "The Synthesis of Symmetric Interlocking Circuits,"
R. L. Richardson, May 22, 1958.

Undocumented - "Procedure - Charging Machine Transfer Operation,"
J. E. Robb, June 19, 1958.

Undocumented - "Specification HWS-6406, Specification for a One Piece Machined ETD," R. Sherrard, June 3, 1958.

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- HW-55789 - "Final Report on Production Test No. 105-634A, In-Pile Cooled Slug Tests," P. B. McCarthy and F. W. Van Wormer, June 2, 1958.
- HW-55818A - "Supplement Authorization for Modifications of Production Test Authorization IP-160-AE," H. F. Jensen, May 21, 1958.
- HW-55947 - "K VSR Mock-up Tests Exhaust System Revisions," C. D. Emmons and G. E. Wade, May 28, 1958.
- HW-56098 - "Development of Rib Height Reduction Equipment - C Reactor," J. W. Dodds, May 16, 1958.
- HW-56280 - "Trip Report Covering Period of 5/11-24/58," R. Sherrard, June 13, 1958.
- HW-56552 - "Evaluation of Benefits Desirable from the Installation of Remotely Controlled Tools in the Reactor Discharge Area," C. E. Frantz, June 30, 1958.

C. Plant and Industrial Engineering

1. Drafting Operation

Summary of Drafting Operation services provided is:

Revised or New Drawings, Graphs and As-Builts	257
Drawings and BPF's Added, Refiled or Retired	378
Blueprint File Customers Serviced	222
Catalogs Added to File or Refiled	156
Catalog Customers Serviced	59

The service requirements on the Drafting Operation continue to increase. The increase appears to be due to the relocation of draftsmen more closely to the work assignment which permits greater assistance to be given to the engineers. All service requirements have been met to date through the use of CEO Contract draftsmen. The Contract men are of high quality but do have one major disadvantage. It requires eight to nine weeks to obtain an "L" clearance for these men and for this time they are of questionable value to the using Operation.

2. Industrial Engineering Operation

Suggestion Evaluation

Activity on evaluation of the backlog of suggestions has continued. As of June 23, 1958, the backlog had been reduced to 69. The work will continue until the backlog has been eliminated.

River Data Reporting

The routine work of monitoring the river activity was increased. For the current critical period, reports, predictions and forecasts of river flow, temperature and turbidity are being made daily to management. In conjunction with Utilities Operation, studies of the effects on HAPO of a dam at river mile 348 and a review of construction activity at the Priest Rapids Dam were made.

Installation of Rear Face Improvements, 105-KW

The Industrial Engineering study of the rear face work methods at 105-KW resulted in recommendations that a system of carts and trays be used for the handling of nozzle caps and tipoffs. Fabrication of one each of two types of carts and the related number of trays was obtained and preparation was made to have these performance tested by KW Processing Operation.

Reactor Outage Analysis

The internal report of Reactor Outage analysis, 105-B, Phase II, was published May 29, 1958. There were 22 recommendations made for improvements in method, equipment or performance. Each recommendation has been assigned as an Industrial Engineering Study.

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Radiation Dose Rate Study

The study on improved dummy decontamination has led to adoption of methods and equipment to use by the Processing Operation for the transport of dummy slugs to 200 area for decontamination.

Contamination Control

A program of activity, consisting of a listing of specific tasks to be accomplished to effect the confinement, control, removal and disposition of contamination, has been devised, reviewed with representatives of the Processing Operations and approved by the Reactor Operations. The work on the separate tasks of the program are presently coordinated within the IPD Engineering organizations.

3. Plant Engineering Operation

Reactor Gas Moisture Monitors, 100-B, C, D, DR, F and H

A system synopsis of the gas moisture monitors including operating guides, has been prepared and distributed to Processing Operations. A periodic service outline for instrument maintenance on this system was prepared and furnished to the Maintenance Planning & Scheduling Operations in the six areas. The technical and service manual for instrument maintenance has been completed.

Process Water Pressure Fluctuation Studies

Development Test No. IP-135-E was expanded to cover the six older reactor areas. On pile testing of the coiled capillary Panellit gage surge suppressor at 105-B and C has demonstrated effective damping of excessive gage oscillation. Fifty test models of this suppressor were fabricated for performance evaluation at locations of excessive Panellit gage oscillations.

Ventilation Studies - 105-H

An evaluation for the installation of an additional water-air heat exchanger for KAPL-120 facilities at 105-H was completed. The evaluation showed that the heat exchanger should be isolated to prevent increased cooling load on the building ventilation system.

Vibration Studies - 165-KW

Vibration has caused malfunction of some of the flow recorders in 165-KW. Trial installation of flexible hose recommended by Plant Engineering in one set of sensing lines appears to be a satisfactory solution to the problem.

Reduction of Cost of Chemicals - 100 Areas

An Appropriation Request for funds to fabricate and install two aluminum oxide-sulfuric acid feeders at 183-B for operational test purposes has been written and approvals are being obtained.

Coal Utilization Standards

The coal size was determined on plant by screen analysis of a 300 ton shipment of coal for test purposes. The screen analysis was made in accordance with ASTM Designation: 431-44. The successful low bidder on coal for FY-1959, the Carbon Fuel Company, has agreed to incorporate into their contract the size of coal that will be furnished.

Container for Ruptured Fuel Pieces

Design of an improved model container for ruptured fuel pieces was completed and forwarded to the Research and Engineering Operation. Formal drawings have been requested for use in offsite vendor contact for the purchase of these units in quantity.

Stuck Gun-Barrel Studies 105-F

Design Test No. 1032 was issued by Process Design and is being conducted by Mechanical Development B. The purpose of this test is: 1) To determine the maximum graphite deflection which would limit damage free insertion of new process tubes through the cut gun barrel. 2) To determine the effects of simulated charge machine and "C" elevator side loading on cut gun barrels. 3) To check shear strength of the vanstone flange.

105-KE, KW Material Handling System

Development test (DTA-LP-157-E) was run at 105-KW with a regular outage crew while the rear face was being set up for charge-discharge. The average rate for charging 82 tubes was 4.5 tubes per minute. The test was considered successful.

Heat Treatment Facilities, 1717-H

The funds requested in AR-58-IP-37 have been recieved by the Central Maintenance Operation. Purchase specifications have been prepared and reviewed by the Principal Metallurgical and Electrical Engineers.

Ball 3X Electrical Modifications - 105-B, D, DR, F and H

Scope and past history information is being turned over to the Project Engineering and Construction Engineering Operations for management and final design consideration.

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4. Utilities Engineering Operation

Engineering in Support of Power Forecasting

Estimates were made for the increased pumping load for the purpose of forecasting peak demand during the month of July. Arrangements were made through Utilities Operation for 20 megawatts interruptible power beginning July 1. A proposed division of electric power demand between the various 100 Areas was furnished to Product Cost and Budget Operation. This proposal has been used for cost purposes to apportion the electric demand for the month of May.

190-C Power Loss Relays

A budget reason sheet and appropriation request for the necessary funds to complete this job were processed and approved. Material requisitions were completed and forwarded to Purchasing. Detail design drawings were issued for comment.

Assistance to Hanford Laboratories Operation

At the request of Hanford Laboratories Operation a third-party review of the electrical design drawings for the Plutonium Recycle Test Reactor was made. This review included the consideration of the BPA electric power supply, the bus arrangements, the emergency diesel generator, and associated circuits as they affect the various coolant flow systems and reactor operation. Several recommendations were made for safety and operational improvements which could be incorporated prior to construction.

105-H Downcomer Room Ventilation

A letter report was forwarded to H Reactor Maintenance Operation recommending the installation of a ceiling fan in the downcomer room roof slabs, with cartridge filters in the doors to provide an adequate flow of air. The letter included cost estimate and working print for construction.

Avoidance of Bulk Temperature Limits - 105-D, DR and F

A report (HW-56363) was issued pointing out the probable production losses which will be incurred this summer at D and F reactors if current river temperature predictions are fulfilled, as well as the probability of being able to minimize these losses by replacing a number of fringe zone tube orifices with venturis. The latest prediction indicates the highest river temperatures will be reached since Hanford operations began, with 105 inlet temperatures averaging about 22°C at 105-D and 23°C at 105-F for the period July-September. The cost of the work involved is such as to justify it on the basis of the additional production. Assumptions made included only minimal I&E loading and no hydraulic problem with the F downcomer. Flow analysis was performed by Process Design and Development Operation.

Reactor Effluent Activity Reduction

A review of plant activities concerned with effluent activity reduction was initiated, with the purpose of providing integration of effort and initiating further action when and where necessary. The necessity of reducing rear-face exposures to radiation monitors and possible other crafts, if exposure working limits are not to be exceeded this year, calls for immediate action. Various groups involved have been contacted, the urgency reviewed, and current programs correlated. Initial steps have been taken to expedite the planned Chemical Effluent Technology investigation of water treatment chemicals.

105-DR Downcomer

During the recent outage, locations of the proposed vibration pickups and pressure taps have been marked in the near downcomer. Maintenance personnel can now install these pickups and taps during the next scheduled extended outage.

Metal Storage Unloading Facilities

The scope and justification for the metal storage unloading facilities was prepared by Construction Engineering Operation for Utilities Engineering Operation. The scope document (HW-55248) was issued and the justification contained therein is being reviewed.

Columbia River Dam

The study requested by the AEC of the effects of the proposed dam at mile 348 was completed and the report (HW-55943) transmitted on schedule. The revised dam proposal considered would have a nominal pool elevation of 385 feet MSL, with provision for dumping the pool at river flows above 300,000 cfs in order to prevent flood levels at the reactor areas significantly above normal.

Effects expected at this time for the revised proposal would differ quantitatively but not qualitatively from those outlined in the report on the effects of the original dam proposal. Reactor operations would probably be little affected, but F and H Areas would require major construction to eliminate the effects of groundwater backup. Potential effects on 200 Areas waste disposal practices would be much the same. An estimated capital cost of \$15-25 million would be required for protective measures, with additional operating costs of \$150,000 - 250,000 annually, not including the value of any change in production.

Columbia River Navigation Channel

The study requested by the AEC of the effect on Hanford Works of a navigation channel in the Columbia River was completed and the

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Columbia River Navigation Channel (continued)

report (HW-55950) was transmitted on June 6, 1958. This proposed channel, 250 feet wide and a minimum of 12 feet deep at a flow of 36,000 cfs, will apparently not affect the basic objectives of Hanford Works.

The navigation channel, however, would probably make necessary the initial expenditure of from \$500,000 to \$1,200,000 for protective works, such as jetties, and groins, to minimize silting and other disturbances which may induce undesirable river currents. Also, the annual expenditure for additional security and radiation monitoring could be expected to range between \$200,000 and \$300,000. The effects of sabotage or a navigation disaster of certain types of cargo could endanger the safety or operability of the plants and could be reason for restrictive regulations governing traffic. Unusual fog conditions in the winter months are expected to contribute to navigation hazards.

5. Standards Engineering Operation

Productive Maintenance

The inspector for Travelers Indemnity Company visited IPD plants on June 17, 18, and 19. His work involved the inspection of boilers, pressure vessels, and elevators.

The level of PM activity in IPD has been remaining fairly constant for the first five months of 1958, the average being about 22 per cent of available manhours in the specified crafts being spent on PM work. The individual areas have varied from a low average of 15 per cent for one area to a high of 26 per cent in another area for the same five-month period.

Spare Parts

Stock Adjustment Requests processed	34
Maximum authorized dollar value of new items added by SAR's	\$67,136
Maximum authorized dollar value of spare parts requested by letter to Project Engineering	5,500
Maximum authorized dollar value of spare parts requested for projects by SAR's	3,236
Number of engineered spare parts items reviewed	34
Actual dollar value of items deleted from spare parts stock	118
Maximum authorized dollar value of items deleted from spare parts stock	1,000

The development contract with the Harvey Aluminum Company which resulted from Standards Engineering Operation negotiations in January, 1957, is progressing very satisfactorily. The twenty tube samples received from Harvey indicate they should be considered as potential suppliers of process tubes.

Engineering Standards

HOO-AEC approval for contract award to Darby Products, Inc., Kansas City, Missouri, has been forwarded to their Washington office for six (6) each helium tank cars at a price of \$104,630. per car. These cars will be procured with Commission FY-1958 funds. These cars should increase Irradiation Processing Department helium storage capacity from approximately 1,000,000 cf to 2,800,000 cf. Standards Engineering Operation has been furnishing HOO-AEC data in connection with the procurement of this equipment.

Craft Training

Craft training meetings were conducted on Charging Machines and Zone Temperature Monitoring Systems. Training was conducted in the use of the new flight check attachment for the ramset powder-actuated tools for approximately 133 craftsmen in all reactor areas. Drill grinding classes for 8 Maintenance craftsmen was conducted in 100-B Area.

6. Visitors

J. P. Jones, Inspector, Travelers Indemnity Company, June 17, 18, and 19, 1958.

7. Trips

C. C. Schock visited Hancrest, Inc. in Seattle, Washington, regarding the procurement of 3,000 connectors which are being fabricated by Hancrest.

8. Significant Reports

Zone Temperature Monitor System, N. V. Hobbs, June 1958.

"E" Metal Discharge (Interim Report), HW-56260, J. A. Finn, dated June 4, 1958.

Mathematics of Work Sampling, E. C. Arbuckle, dated June 5, 1958.

HW-56363 (Secret) Avoidance of Bulk Temperature Limits - 105-D and F, J. P. Corley, June 13, 1958.

HW-55950 (Confidential) The Effects on Hanford Works of a Navigation Channel in the Columbia River, R.T. Jaske, et al, June 6, 1958.

HW-56358 (Unclassified) Engineering Appraisal of the Electrical Power System for Plutonium Recycle Test Reactor, V. G. Blanchette, dated June 11, 1958.

HW-55248 (Unclassified), Scope of Work and Justification for the Improvement of the Metal Storage Unloading Facilities for 105-B, D, DR, and F Buildings, G. U. Udine, June 16, 1958.

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D. Project Engineering

1. Projects

<u>Number of Jobs</u>	<u>Activity</u>	<u>Financial Responsibility</u>
11	Engineering Studies, Scoping, and Project Proposal Preparation	\$ 356,280
4	Projects in Design Phase	455,910
15	Projects in Construction Phase	3,850,550
5	Projects in Close-out Phase or Accrued Work on Closed Projects	40,289,550
5	Field Management of Non-project Work and MJA's	808,600
<u>40</u>		<u>\$45,760,890</u>

AEC-160 - Recirculating Gas Cooled Test Loop

The X-1 level floor, walls and ceiling have been painted, removing the requirement of SWP clothing. Construction Operation's work is 10 per cent complete versus 8 per cent schedule.

Project CG-558 - Reactor Plant Modifications for Increased Production

Sixty-seven first stage impellers have been changed on the 190 DeLaval process pumps to date. The first impeller of the 1418 type has been received from DeLaval for testing and they have indicated they are making a new pump case for testing in 190-DR.

A contract has been negotiated with Ingersoll-Rand for supply of a prototype pump as replacement for the DeLaval 190 process water pumps. Delivery schedule is 12 to 15 months starting June 1, 1958.

Negotiations were discontinued with Bingham Pump Company for supply of a prototype replacement pump due to excessive costs coupled with lack of cavitation damage on the latest efforts of DeLaval in Unit No. 5, 190-DR after 1500 hours of operation.

Project CG-600 - Modifications for Increased Production - 100-C

One of the original type impellers has been returned to Byron-Jackson Company for examination after approximately six months of operation. This impeller was damaged beyond further usage.

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Project CG-674 - Water Plant Component Test Loop - Building 1706-KE

The canned rotor pump has been tested by Byron-Jackson to the specified test conditions.

Project CG-706 - Installation of Improved Reactor Gas Instrumentation in 100-B, C, D, DR, F & H

Directive HW-402, Modification No. 1 was issued on June 4, 1958 for \$300,000. The Design Work Release was issued to Construction Engineering Operation on June 17, 1958.

Project CG-708 - Additional VSR's - K Area

Six VSR cylinders have been installed in KW Area.

Project CA-735 - Lunch and Locker Room Improvements, 100-B, D, & F

Construction work was started by the contractor in 1707-D on June 2, 1958. Similar work was started at 1717-F on June 18, 1958.

Project CG-738 - Increased Electrical Service - 189-D Building

Beneficial use of the facility was achieved on June 13, 1958. The contractor has completed all but touch up painting, clean-up and final inspection.

Project CA-788 - Fire Protection Facilities, 1760-H and 1761-H Buildings

Bid packages were mailed for invitation to bid on June 4, 1958 and opened on June 18, 1958. The low bid of \$14,963 was compared with fair cost estimate of \$15,200. Contract award was made to Automatic Sprinkler Service, Incorporated of Seattle, Washington.

2. Project Proposals

Project Proposals Approved

CG-706	Rev. 1	Improved Reactor Gas Instrumentation, All Reactors
CG-715	Rev. 1	Automatic Synchronizers, 165-KE and KW
CG-780		Improved Ventilation, Buildings 105 and 115-B, D, and F

Project Proposals Awaiting AEC Approval

CG-741	Rev. 1	Renovation of the Ball 3X, 105-C
CG-781	Rev. 1	Service Building Additions, 1706-KE Building
CGI-793		Filtered Water Cross-Tie, 183-B and 183-C
CGI-802		Process Safety Monitoring System, High Speed Scanning Type for Temperature Monitoring

CGI-806 Nuclear Instrumentation for Reactor Safety
and Control
CGI-807 Modifications to 1713-D Building

Project Proposals Submitted

CGI-806 Nuclear Instrumentation for Reactor Safety
and Control
CGI-807 Modifications to the 1713-D Building

Requests Received for Project Preparation, Revisions and Changes

R-89063 Relocate Richland Dormitory, 100-D Area

3. Visitors

Mr. Edward H. Budde of the DeLaval Steam Turbine Company arrived on plant site June 7, 1958 for purposes of witnessing paint tests and making other observations regarding DeLaval pumps. He is here as of this date.

4. Trips

Mr. W. Seeburger attended the AIChE Convention in Philadelphia, Pennsylvania on June 22 through June 27th. He also visited DeLaval Company in Trenton, New Jersey on June 26, 1958.

M. G. Patrick visited the Instrument Laboratory, Incorporated at Seattle on June 25, 1958 for purposes of engineering discussions on procurement items.

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An overall NPR project schedule for case II-B was completed and forwarded to Process Design for reconciliation with detail design schedule plans of the Architect-Engineer and Construction Engineering Operation Design Engineering. An expenditure pattern was developed for this case based on detail cost estimates and the proposed schedule.

A cost code system for NPR construction was developed with Irradiation Processing Department Finance. This has been forwarded to Construction Engineering Operation for comment.

Collaboration with Process Design continued on the subjects of general area layout and 105 building arrangement.

A study of construction and operating cost penalties attributable to a 105 exclusion area was completed and forwarded to Process Design.

Requirements for NPR maintenance craftsman selection and training were forwarded to Employee Relations for information and guidance in Union negotiations.

2. Significant Reports

Replacement Reactor Study, HW55268 was issued June 5, 1958. New Production Reactor Schedule Summary, HW56287 was issued June 6, 1958.

A report describing alternative methods of providing NPR construction management was issued June 19, 1958.

F. Principal Engineers

Principal Engineer

1. Activities

Assistance was given W. E. Johnson in the preparation of the testimony he presented before the legislative subcommittee of the JCAE on June 9, 1958.

At the request of E. J. Bloch, travelled to Washington on June 19 with A. B. Carson and representatives of the Hanford Operations Office to provide information regarding NPR Design B Alternate and supplementary information relative to Mr. Johnson's testimony on maintenance costs and physical changes in the three oldest reactors.

On June 23 met with Captain Nels Nelson of the JCAE staff to discuss the design of the convertible reactor plant and to answer questions raised by Mr. Ramey regarding the choice of this design over certain others.

2. Trips

W. J. Dowis made the following trips:

- a. To Washington, D. C., on June 5 to assist W. E. Johnson with testimony.
- b. To Washington, D. C., on June 19 to meet with E. J. Bloch and Captain Nels Nelson.
- c. To Buffalo, New York, on June 24 and 25 to attend Summer General Meeting of the AIEE.

3. Significant Reports Issued

HW-54610 - "Basis for Table of Data Presented in W. E. Johnson Testimony Before JCAE on June 9, 1958," by W. J. Dowis, June 16, 1958

MANAGER
FACILITIES ENGINEERING

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EMPLOYEE RELATIONS OPERATION
JUNE 1958

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PERSONNEL DEVELOPMENT & PLACEMENT OPERATION

Organization and Personnel

No change in organization structure nor assigned responsibilities of the Operation occurred during the month. The number of people on roll at the beginning of the month and at month end was as follows:

	<u>Beginning of Month</u>	<u>End of Month</u>
Exempt	5	5
Nonexempt	<u>16</u>	<u>16</u>
Total	21	21

One medical treatment injury and no security violations occurred during the month. Sixty-four hours of overtime were worked in the Duplicating Operation. One information meeting was held with nonexempt people in the Operation. Assistance was provided in coordinating the major office and telephone moves in 1760-H and 1761-H Buildings, completed on June 20.

Personnel Development

To date twenty-four nominations have been made to the revised Supervisor Selection Program. Reduction of force activity is still reflected in the fact that the program's records have not been utilized.

Ninety-six Exempt Self-Development Review forms have been completed, discussed and returned to Personnel Development and Placement for assessment and filing since the inception of the program. This figure represents approximately twenty-eight percent of the exempt employees who have had their performance appraisals discussed with them since the beginning of the year.

There were seven consulting contacts made this month by the staff psychologist. Problems included ways of dealing with the accident prone individual, ways of dealing with difficult intergroup rivalries and methods of strengthening support for Operation Upturn.

In the individual counseling area, four contacts were made this month. Three of the four were termination interviews and one was an initial interview, bringing the total number of employees counseled to date to ten.

Three personnel testing assessments were made for the Department, bringing the total number of assessments this FY to fifteen.

In education and training activities, the third series of PBM-I was completed on June 11. This brings the total number of IPD management personnel who have completed this course to 198.

The IPD Training Schedule for the third quarter, 1958, was prepared and distributed to all exempt employees on June 13th. One new course, "Secretarial Proficiency" was added to the schedule, and will be presented during July and August.

As the result of a request from Construction Engineering Operation, arrangements have been made to permit a presentation of "Reactor Processing Fundamentals - I" for CEO employees (exempt) in August of this year. IPD has requested and R&U has agreed to a September 12th presentation of "Management Orientation", in order to accommodate several Specialists, Reactor Operations, recently promoted to the exempt roll.

In compliance with a request received through Relations and Utilities from the HOO-AEC, an estimate of the Department's expenditures on training activities during CY-1957 was prepared and submitted.

The following information reflects the attendance in the various training classes presented in the Department:

	<u>This Month</u>	<u>Last Month</u>	<u>Year to Date</u>
A.E.C. Survey Information Meeting	0	0	20
Communications Training Course for First Line Supervisors	0	0	15
Data Processing	0	1	11
Effective Business Writing	0	0	14
Financial Operation Orientation	0	11	21
First Aid	0	0	13
G.E. Employee Benefit Plans	0	0	11
G.E. Salary Plan & Its Admin. in IPD	10	0	18
G.E. Wage Plan & Its Admin. in IPD	7	9	28
Interviewing Techniques	6	6	6
IPD Radiation Protection Program	9	17	25
Labor-Management Relations	0	19	31
Management Orientation	10	0	21
PMS & Leadership	0	0	10
Process Orientation	8	14	22
Reactor Processing Fundamentals	27	14	159

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	<u>This Month</u>	<u>Last Month</u>	<u>Year to Date</u>
Suggestion Plan Philosophy & Investigation Procedure	0	27	27
Supervisor's Industrial Safety	0	0	7
Top Secret Workshop	0	0	156
Understanding Human Nature	0	0	9

Progress of self-development discussion with nonexempt people within the Department is indicated by the following tabulation:

	<u>This Month</u>	<u>Last Month</u>	<u>Year to Date</u>
Number of Forms Distributed	135	89	713
Number of Forms Returned	126	122	748

Exempt Personnel Placement

Experienced BS-MS Recruitment

Two experienced G.E. engineers from off-site were interviewed by IPD personnel, with no offers extended. Two acceptances were received from former HAPO employees; one a Service Reactivate who will report July 14 and the other an APED employee who will report August 1st. One other offer has been extended to an experienced G.E. engineer from Seattle.

PhD Recruitment

Five PhD candidates interviewed by IPD representatives resulted in no job offers. Two offers previously made were rejected.

Transfers and Terminations

	<u>June</u>	<u>May</u>	<u>Year to Date</u>
Interviews for Transfer Purposes	16	18	125
Transfers - Other Departments to IPD	*4	3	14
Transfers - IPD to Other Departments	**2	3	11
Transfers Within IPD	5	9	77
Other Removals	***1	2	16
New Hires	0	0	0

* Two employees transferred from Hanford Laboratories Operation; one to Financial, the other to Research & Engineering Operation. One employee transferred from Chemical Processing Department to Facilities Engineering Operation and the other was a Technical Graduate permanently assigned to Facilities Engineering Operation.

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** One employee transferred to Hanford Laboratories Operation from K-Reactor, the other transferred to APED, Vallecitos Atomic Laboratory.

***One employee terminated to accept an AEC assignment at the Canoga Park office.

Efforts continue in the placement of eight exempt employees on ROF or available status.

Leave of Absence

One employee on assignment with the AEC was granted a year's extension to his leave of absence.

Technical Graduate Program

<u>Assignment</u>	<u>No. of Transfs.</u>		<u>No. Present at End of Mo.</u>	<u>No. Off-Program Assignments to IPD</u>	
	<u>Out</u>	<u>In</u>		<u>This Mo.</u>	<u>Since 1/1/58</u>
Research & Engrg.	5	3	8	0	7
Facilities Engrg.	2	3	8	1	3
B-C Reactor	0	0	1	0	0
D-DR Reactor	0	1	2	0	1
F Reactor	0	1	1	0	0
H Reactor	0	1	1	0	0
K Reactor	0	0	2	0	1
Employee Relations	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	7	9	23	1	12

Employment

Twenty-one service pins were awarded and thirty-six employees received attendance recognition. As of June 30, 1958, twenty-nine transfer requests were active (13 nonunit and 16 unit). Twenty additions to payroll and eighteen removals were made. No requisitions were on hold status at the end of the report period. Five contact notices, three warning notices, and no discharge notices were received.

Service Recognition Plan

<u>Years of Service</u>	<u>Number of Awards</u>	
	<u>This Month</u>	<u>FY to Date</u>
5 years	10	108
10 years	11	260
15 years	0	1

Attendance Recognition Plan

<u>Years of Perfect Attendance</u>	<u>Number of Awards</u>	
	<u>This Month</u>	<u>FY to Date</u>
1	4	56
2	10	61
3	6	55
4	2	56
5	6	50
6	1	25
7	6	22
8	<u>1</u>	<u>7</u>
	36	332

Request for Transfer

	<u>Nonunit</u>	<u>Unit</u>	<u>Total</u>
On Hand 6-2-58	13	15	28
New Requests Received	0	3	3
Transfers Completed	0	1	1
Requests Cancelled	0	1	1
Interviews Conducted	0	0	0
Requests on Hand 6-30-58	13	16	29

Personnel Changes - 6-1-58 through 6-30-58

<u>Additions to Payroll</u>		<u>FY to Date</u>
*New Hires	1	6
Re-Engaged	0	1
Reactivates	2	42
Transfers	9	150
**Re-Hires	<u>8</u>	<u>9</u>
	20	208

*Temporary employee
**Temporary employees

<u>Removals from Payroll</u>		<u>FY to Date</u>
Deaths	0	7
Retirements	0	10
*Terminations	8	102
Deactivates	0	60
Transfers	9	139
Lack of Work	1	101
Discharged	<u>0</u>	<u>3</u>
	18	422

*Two formerly ROF
One formerly ROF - enter military service

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Requisitions

Number of Openings as of 5-31-58	6
Additional Openings 6-1-58 to 6-30-58	4
Openings Cancelled	0
Number of Openings Filled	6
*Number of Openings as of 6-30-58	4

*One commitment made

Disciplinary Action

	<u>June</u>	<u>FY to Date</u>
Employee Contacts Received	5	46
Warning Notices Received	3	17
Discharge Notices Received	0	3
	8	66

Military Service

	<u>June</u>	<u>FY to Date</u>
No. of letters written to S.S. Boards requesting deferments or reclassifications:		
Deferment in S.S. Draft	4	31
Standby Reserves	0	2
No. of interviews conducted for employees entering Military Service	0	0
No. of employees returned from M.S.	0	4
No. of deferments granted	1	30
No. of deferments denied	1	5
No. of deferments appealed to State Board	1	5

Office Service

Mail and Addressograph

MAIL STATISTICS

	<u>June</u>	<u>May</u>
Pieces of registered delivery mail	2,162	1,932
Pieces of Postal mail	1,506	1,348
Pieces of regular mail	909,621	896,901
Number of addressograph orders handled	36	38
Number of addressograph impressions	16,067	20,407
Number of plates made	44	56

Duplicating

Two special equipment requests for lithographic reproducing machinery and an office type, power paper cutter were prepared and forwarded to R&U Office Equipment during the month.

Two items concerning new or altered services provided by Printing-Duplicating-Reproduction components outside IPD were published in the News Bulletin during June.

DUPLICATING STATISTICS					
	JUNE				May
	100-H	100-D	100-K	Total	Total
<u>Off-Set</u>					
Orders Received	629	235	370	1,234	1,232
Orders Completed	626	238	375	1,239	1,263
Orders on Hand	1	0	3	4	8
Xerox Masters Made	466	143	178	787	1,036
Total Masters Handled	2,344	784	1,233	4,361	5,069
No. Copies Duplicated	164,805	36,502	56,216	257,523	311,131
<u>Verifax</u>					
Orders Received	44				32
Orders Completed	44				32
Orders on Hand	0				0
Total Masters Handled	226				519
No. Copies Duplicated	1,274				1,409

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Mass communication activities for June included the publication of four Management NEWS Bulletins and one "Memo From the General Manager." The Health Bulletin was distributed to all employees and the "Monogram" to all exempt people. In addition, a special leaflet, prepared by the Hanford Laboratories Operation on the subject of "Fallout," was distributed to all employees.

The June Round Table Guide, consisting largely of an explanation of "Operation Upturn," was prepared and distributed. This issue was sent to all supervisors and managers in the department rather than to the normal Round Table Guide distribution list.

One Management Information Meeting was held during the month. One Priority Message was disseminated.

GE NEWS coverage during the month included the normal suggestion awards, safety promotions and retirements. In addition, a double page spread featuring improvements made in IPD working conditions appeared in one issue.

Publicity concerning "Operation Upturn" within the department included a "Memo From the General Manager" introducing the program, a Round Table Guide devoted almost exclusively to it, a letter to all Managers and Supervisors, the distribution of two sets of "Operation Upturn" posters and the distribution to all supervisors and managers, a leaflet entitled "What's Happening to U. S. Business Today?"

A letter explaining the need for upward communication was prepared for the General Manager's signature and distributed to all IPD exempt people.

The following Organization and Policy Guide was published during the month:

3.1 Authorization and Performance of Work (revision)

The following Advices were published:

- 1.1.1 General Electric Educational Assistance Program (new)
- 3.4.9 Authorization of Work Performed Within the Irradiation Processing Department (revision)
- 5.4.2 Accidents Involving Government Motor Vehicles (revision)
- 6.2.6 Retirement of Government Property (revision)

HAPG OPGs received and distributed during the month were:

- 2.2.5 Organization Announcement (re: Acting General Manager of IPD)
- 2.2.6 Organization Announcement (re: Acting General Manager of CPD)
- 2.2.7 Organization Announcement (re: Acting General Manager of HAPG)
- 2.3.3 Fuels Preparation Department General Manager Position Guide
- 2.3.4 Hanford Laboratories Operation Manager Position Guide
- 2.3.5 Construction Engineering Operation Manager Position Guide
- 2.3.6 Relations and Utilities Operation Manager Position Guide

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UNION RELATIONS

In an effort to implement the IPD program for reduction of radiation exposure, Chemical Workers' union representatives in IPD were informed on May 28 of our plans to perform decontamination of "dummy" slugs in CPD on at least a 6-months trial basis.

The Chemical Workers' union has informally requested a meeting "in the near future" to discuss manning the HLO test reactor with bargaining unit personnel. Apparently the HAMTC plans a campaign to convince the Company that bargaining unit personnel should operate this facility. However, the recent decision by the NLRB relative to the research and development status of 1706 KE-KER should seriously hamper their efforts to successfully claim this work.

The arbitration hearing of the discharge of an IPD employee for "bugging" his badge is being scheduled for the week of June 30. This office is currently participating in the preparation of the Company's case.

The "You and Labor Law" training program was presented to seven supervisors on June 3.

The HOO-AEC Labor Standards Board approved two jobs for assignment to plant maintenance forces which are estimated to cost \$3,499. Since the procedure for obtaining LSB approval was started in IPD, eighty-six jobs have been approved, representing an estimated total cost of \$3,020,514.

The following statistics summarize work review approvals during the month:

<u>Work Review No.</u>	<u>Estimated Cost</u>	<u>Description of Job</u>
IP-58-84	\$ 1,705	Air cooler installation, 105-F
IP-58-87	1,794	Remodel shower room, 1761-H

Bargaining Unit Check-Off Statistics

	<u>Last Month</u>	<u>This Month</u>
Cancellations	9	7
Additions	7	6
Total Participating	958	957
Total In Unit	1333	1331
% Participating	71.9	71.9

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IPD GRIEVANCE STATISTICS
5-20-58 through 6-15-58

A total of 18 grievances was received and three Step II grievance meetings were held. Following is a breakdown of the status of these grievances:

	<u>Unit</u>	<u>Non-Unit</u>
Received this month	18	0
Received this year	113	0
<u>Step I</u>		
Answer satisfactory	5	0
Answer unsatisfactory	11	0
Pending time limit	19	0
Settled this month	15	0
<u>Step II</u>		
Discussed this month	8	0
Pending time limit	5	0
Settled this month	12	0
<u>*Arbitration Pending</u>	26	0
Active	7	0
Inactive	19	0
<u>Total Settled This Month</u>	27	0

*Inactive status means that there has been a lapse of three months without further action in the case.

Subject of June Grievances

<u>Unit</u>	<u>B-C</u>	<u>KE-KW</u>	<u>D-DR</u>	<u>H</u>	<u>F</u>	<u>Fin.</u>	<u>Emp. Rel.</u>	<u>Prod.</u>	<u>Fac. Eng.</u>	<u>Res. & Eng.</u>
Jurisdiction		4	3	1	2					
Overtime	1			3						
Ratio Agreement					1					
Job Classification					1					
Work Force Size					1					
Transfer					1					
TOTAL	1	4	3	4	6	0	0	0	0	0
Non-Unit	0	0	0	0	0	0	0	0	0	0

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EMPLOYEE COMPENSATION OPERATION

Salary Administration

A study of selected engineering positions was completed during the month which resulted in a finalized packaged recommendation for revaluation of three positions. Concurrent with this recommendation, a complete report was submitted covering analysis, results, and comments on the reconciliation tour completed last month by the Manager, Employee Compensation.

A detailed numerical analysis of all departmental position evaluations was completed. Results were reviewed and discussed with W. R. Jacobson, Employee Compensation Service, and it was concluded that the present system yields sufficiently consistent results in each of the three categories of exempt positions to preclude the necessity for a major overhaul of the evaluation system.

Dissolution of the administrative operations in the B-C and D-DR Reactors Operations was accomplished in June.

CHANGES OF STATUS OF PERSONNEL

Transfers into Dept.	4
Transfers Out	4
Location Changes	3
Suffix Changes	12
FLSA Changes	7
Reassignments	<u>13</u>
Total	43

CHANGES IN SALARY OF PERSONNEL

Promotional Increases	6
Salary Review Increases	61
Interim Merit Increases	10
Salary Adjustments	<u>0</u>
Total	77

Wage Administration

A series of meetings have been held during the first two weeks of the report period with other Managers, Employee Compensation and Specialists, Wage Administration. These meetings are being held with Mr. W. R. Jacobson, who is assisting the HAPO group in a comprehensive study of the Nonexempt Wage Plan at HAPO.

CHANGES OF STATUS OF PERSONNEL

Transfers between Depts.	13
Transfers within Dept.	34
Location Changes	0
Reclassifications	<u>14</u>
Total	61

CHANGES IN SALARY OF PERSONNEL

Automatic Increases	51
Reclassifications	48
Merit Increases	<u>1</u>
Total	100

Employee Benefits

A letter has been written to the Manager, Employee Sales at Appliance Park proposing a revised procedure for issuing purchase certificates to eliminate the confusion resulting from back-dating certificates and other causes which

result in employee complaints.

The AEC has approved the \$40,000 total allocation for the HAPO Suggestion System. The Irradiation Processing Department has requested a total of \$15,000 as originally budgeted. No final determination has been announced to date.

The total suggestion backlog has shown a slight decrease over the last two months.

The last of a series of four pre-retirement group meetings was held on June 3, 1958. A total of twenty-three IPD employees were invited and eighteen actually attended.

	Current Month <u>June</u>	7/1/57 <u>To Date</u>
<u>Employee Purchases</u>		
Special purchases handled by this office	3	22
Complaints by employees investigated and resolved	5	21
Letters written to obtain special G. E. goods	3	16
<u>Retirement Program</u>		
Retired	0	14
Pre-retirement Contacts	6	134
<u>Deceased Employees</u>	0	6

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HEALTH & SAFETY

Personnel

Employees: Exempt - 4. Non-exempt - 1.

Accident Statistics

	<u>June</u>	<u>May</u>	<u>Year to Date</u>
Disabling Injuries	0	0	2
Frequency	0	0	.86
Severity	0	1.02	11.12
Medical Treatment Injuries	82	75	560
Frequency	2.21	1.95	2.40

Accumulated hours of exposure
since last Disabling Injury (4-21-58)
Estimated.

869,979

Fire Statistics

Fires	3	0	7
Loss	\$30.00	0	\$70.00

The loss of \$45.00 shown in May has now been charged to Relations & Utilities and deleted from our year-to-date total.

Security Violations

Research & Engineering	3	4	15
Facilities Engineering	0	0	1
Finance	0	0	1
H - Reactor	0	0	1
K - Reactor	0	1	1
	<u>3</u>	<u>5</u>	<u>19</u>

F. J. Williams attended Mosquito Control Clinic held in Richland June 18th. and 19th.

L. H. Rice, together with AEC and CPD representatives and the State Safety Inspector, surveyed the fire problem between HAPO operating facilities, Riverland, Midway and Priest Rapids Dam.

Recommendations were given for the method of handling, and the protective equipment needed in the use of a Turco solvent to be used in decontamination work. Industrial Hygiene was requested to make test of possible gases given off.

Carbon monoxide readings were made during coal bunker fire in 184-D. Time limits were established for exposure while fire was in progress.

HEALTH & SAFETY (Continued)

Investigation of IPD Serious Accident No. 58-8 was conducted and pictures of terrain were taken to illustrate hazard and existing conditions. A meeting was held with Relations & Utilities' Health & Safety Specialists at the railroad crossing and they concurred with the recommendation of the investigating committee. The report will be presented at the R&U Safety Council meeting during July.

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Fire Protection**DECLASSIFIED**Organization and Personnel

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees - Beginning of the month -----	11	40
Employees - End of the month -----	11	40

Fire Responses

Responded to eight alarms during the month of June.

Description of Fires

June 2nd - 11:42 A.M. Private vehicle accident in the vicinity of Hanford Ferry Landing - No fire damage.

June 5th - 2:00 A.M. Grass fire 1.1 miles West of boat house, \$10.00 damage.

June 8th - 9:05 P.M. Spontaneous ignition of old coal pile East of Old White Bluffs Bank Building, \$10.00 damage.

June 12th - 8:38 P.M. Telephone line trouble cause of run to Riverland, No Fire.

June 13th - 10:29 A.M. Wiring of Government vehicle HO ID 4908 at 100-H Area shorted out causing \$35.00 damage.

June 19th - 9:32 P.M. Auxiliary box at 190 DR Bldg. activated accidentally, No fire.

June 27th - 2:56 P.M. Grass fire on Route #2 South at Mile Post #2 burned 2,500 acres destroying one pole supporting a warning sign over the highway causing \$150.00 damage.

June 29th - 6:28 P.M. Grass fire at Midway causing \$10.00 damage.

Drills held during June

Outside drills -----	61
Inside drills -----	28
Feet of ladders used on drills -----	140
Feet of Hose used on drills -----	13,835

Meetings

<u>Type of Meeting</u>	<u>Number of meetings</u>	<u>Number Attending</u>
Round Table	3	28
Information	4	32
Security	4	38
Safety	4	38

General

Held one class with 11 members of 105-KE Reactor on Fire Procedure.

I.P.D. Rescue Crew training got under way June 6th.

Assisted F.P.D. on a grass fire June 26th and June 27th.

General

Windshield stickers warning employees of the serious grass fire situation were printed and are being installed on all government vehicles.

Serviceman's Activities

Fire Extinguishers:

Inspected	478	Gas Masks Inspected	10
Installed	2	Hose Boxes Inspected	10
Seals broken	17	Hose Boxes Serviced	10
Serviced	185		
Weighed	185		

E. J. Fitzmaurice

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HW-56527

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FINANCIAL OPERATION
MONTHLY RECORD REPORT
JUNE, 1958

General Accounting

Assistance to Hanford Program authorization ATH-IP-58-S4, in the amount of \$5,244 was forwarded to General Engineering Laboratory for Vibration Analysis of New Prototype Pumps for CG-558 - 190 Building Pump Replacements.

An inventory of IPD movable equipment was taken this month and reconciliation has been effected. The net increase to plant accounts is \$9,000. Prior years' cost was credited \$9,000.

No discrepancies were noted in the quarterly custodial inventory of Precious Metals and Special Materials which was taken as of June 30, 1958. A special report of contaminated precious metals was prepared for the Commission. 8.2 grams of gold, valued at \$11.24, and 19.1 grams of platinum, valued at \$66.08, are contaminated in our present inventory. 173.9 grams of platinum, valued at \$601.66, were determined to be in excess to the needs of the department and HAPO and were transferred to the Commission during the month.

Approval was received from the Commission to capitalize IPD equipment items carried in the R & U Spare Parts Inventory and to fund the transfer from FY 1958 Equipment Not Included in Construction Projects. These items, with a recorded cost of \$267,889, consist principally of replacements for 100-K reactors.

IPD cost plus commitments for Equipment Not Included in Construction Projects - FY 1958 is \$1,346,000 compared to our allocation of \$1,408,000.

Of \$70,100 in NPR commitments at June 1, 1958 for FEO procurement of material and equipment, only \$9,881 was outstanding on June 30. No cancellations of commitments were necessary since they can be charged to the FY 1959 allocation received from AEC on June 18.

Liquidation rate study for FEO has been completed and Process Design rate was reduced from \$68 to \$64.

Facilities Engineering Operation underran the FY 1958 budget by \$179,000. Programs which accounted for the major portion of the underrun are: CWIP & EWIP - \$72,000, NPR - \$56,000 and Maritime Gas Loop - \$43,000.

One business graduate was assigned to Plant Accounting and a nonexempt employee was exchanged for another nonexempt employee between Facilities Engineering Cost and General Accounts.

Product Cost and Budgets

The Research and Development inventories were reviewed with inventory custodians and SS Accountability personnel for proper material identification to determine correct valuation. Special material identification procedures have been placed in effect for determination of any future adjustments.

Detailed schedules of maintenance cost over the past years were prepared for H. A. Carlberg.

The feasibility of Level V cost reports for all IPD maintenance forces has now been determined and each maintenance component has been notified of its availability.

Special studies were made and informal reports issued of product unit costs and maintenance for past periods compared with budgets and estimates of costs for future periods for the IPD General Manager.

Personnel Accounting

The personnel information files, formerly held by Personnel Accounting Operation and Employee Relations Operation, have been combined and are located in Personnel Accounting, 1760-H Building. This centralization will permit easy reference to all information relative to an employee.

Procedures

Edit and assembly of the department monthly record report was transferred to the function and performed this month for the first time.

G. E. Pilcher was appointed Specialist-Procedures effective June 1.

Economic evaluations were made of the buy vs. rent decision regarding IBM equipment presently leased by the department. It was recommended that such equipment continue to be leased.

Studies were undertaken in conjunction with procedures and property accounting personnel in all departments to improve and streamline the data processing routines for uninstalled cataloged equipment.

Studies are continuing of all data processing routines of the department that include services by R & UO Data Processing Operation. Input and record data are being assembled to improve results of these services and achieve complete integration of all data handled.

A general definition including flow charts has been made of present systems of reporting essential materials within the department.

Assistance is being given to Employee Compensation Operation in a study to determine if improvements can be made in procedures used for the monthly issuance of the department organization directory.

Manager-Finance
IRRADIATION PROCESSING DEPARTMENT

PD Lee:kd

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END

**DATE
FILMED**

7 / 27 / 92