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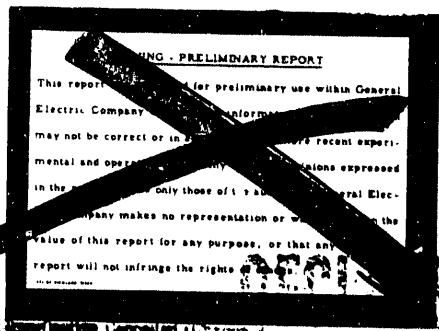
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IRRADIATION PROCESSING DEPARTMENT

MONTHLY RECORD REPORT

FOR

SEPTEMBER 1956



Compiled by Members of the
IRRADIATION PROCESSING DEPARTMENT

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October 23, 1956

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HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

Work performed under Contract No. W-31-109-Eng-52 between
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MONTHLY RECORD REPORTIRRADIATION PROCESSING DEPARTMENTSEPTEMBER 1956GENERAL SUMMARYRESEARCH AND ENGINEERING OPERATION

The definition of programs and responsibilities required by the September 1 re-organization is progressing smoothly within the Operation. Methods and procedures for initiating, identifying and authorizing Production Tests have been established. Procedures and responsibilities for Process and Radiation Standards have been defined and the issue of revisions is in process.

Data to guide CG-558 outages were prepared and a procedure for distribution of back-up cooling water in the event of failure of the primary system was recommended. Analysis of the back-up cooling system also resulted in a recommendation for increasing its capacity.

I & E slugs in the current run-to-rupture tests have reached 1000 MWD/T. The first failure of a control tube with solid slug load was experienced at 850 MWD/T. A new production test of enriched (1.44% U-235) I & E slugs is being circulated for approval.

A relationship of nuclear safety control capacity to enrichment was published for use in developing process standards.

An in-pile loop for recirculating organic coolants was charged into the KE Pile and operated briefly. The Facility recirculates a mixture of 75% monoisopropylbiphenyl - 25% biphenyl; conditions during the short test were within production test specifications. Minor equipment modifications and establishment of final operating procedures are in process and will be completed before restarting the facility.

PRODUCTION AND REACTOR OPERATIONS

Input production (Pu) for September was 110.2 percent of forecast, due largely to higher than forecasted operating level and efficiency. Forecast was exceeded at all reactors except B where a CG-558 outage was started approximately one week earlier than forecasted.

Output production for the month was 136.0 percent of forecast due to (1) reducing goal exposure at KE Reactor more rapidly than forecast, with resultant discharge of additional metal, and (2) discharging metal at B Reactor during the CG-558 outage, which was forecasted for October. The final discharge of low concentration material was made; this completed the HAPO commitment for high isotopic purity product.

Increases in the maximum established power levels, excluding burnout, were achieved at KE and KW Reactors where previous records were exceeded by 24 megawatts and 10 megawatts, respectively.

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Thirty-eight reactor outages, including 18 scrams, resulted in an overall time operated efficiency of 78.1 percent. Variance from the planned outage schedule included shutting the B Reactor down approximately one week early for a CG-558 outage, cancelling a five-day tube replacement outage at D Reactor, and postponing an eight-day outage at KE Reactor for the tie-in of the KER Recirculating Facility.

Twelve ruptures of regular metal slugs, two of which were charged on Production Tests, occurred during September and required 194 outage hours for removal from the reactors. Eight of the ruptures occurred at KE Reactor, three at C, and one at H. None could be removed by the "quickie" method.

Under the tube replacement program, 100 tubes were replaced at F Reactor and 99 tubes were replaced at H. A total of 205 hours of reactor outage time was required for this work. These replacements have reduced the backlog of tubes having a calculated corrosion above critical index to approximately 350, which are mostly fringe tubes where the calculated index has not been a true measure of the actual tube conditions. Seven Van Stone flange water leaks on process tubes were located and corrected during the month; one at B Reactor, one at D, and five at F.

There were no formal radiation incidents or disabling injuries during the month. Some spread of high-level contamination occurred in the discharge and storage areas of the C Reactor building when a ruptured slug ignited as it was being discharged. The exhaust fan system also was contaminated, but the resultant emission of radioactive particles from the process stack was not serious. Control of the contamination and subsequent cleanup was accomplished without over-exposure of personnel.

Significant items of equipment experience during the month, other than starting the CG-558 outage at B Reactor, were (1) successful first-time testing of the K Reactor emergency generators under full load conditions during reactor operation, (2) placing in effect a productive maintenance card system at K Area that will expedite scheduling and completion of the routine maintenance backlog, (3) correction of a leak which developed in the 42-inch effluent line from the 1904-D outfall structure, (4) correction of bellows gas leaks at F Reactor, thereby reducing gas losses by approximately 50 percent, and (5) rear face thermocouple lead wire inspection at the D and DR Reactors indicated the insulation on many of the leads to be extremely brittle, particularly in the center half of D Reactor.

Statistics for the Processing, Power and Radiation Monitoring operations in the individual reactor areas are tabulated on Pages Cg-1 through Cg-6.

FACILITIES ENGINEERING OPERATION

The transfer of personnel from the various sections to facilities Engineering Operation to implement the HAPO reorganization of September 1, 1956, was a major effort during the month. New change of status forms for 73 exempt employees were prepared and submitted to Salary Administration to complete the transfers.

Construction completion status of major process facilities at the end of September was as follows:

<u>Project Number</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
CA-512	100-K Area Facilities, Revisions Nos. 3 & 4	100%	100% ^a
CA-512	1706-KER Recirculation Facilities	98%	98%
CG-558-I	Reactor Plant Modifications	69%	74%
CG-558-II	Reactor Plant Modifications	21%	22%
CG-600	100-C Alterations	25%	1%

a Complete except for revisions and start-up items.

The 100-B Area outage for the accomplishment of work under Project CG-558 started on September 26, 1956. The work is tentatively scheduled for completion by November 10, 1956.

There were 19 project proposals under preparation at the end of the month. One was submitted to the Commission during September.

A report, "Summary and Evaluation of HAPO Design Concepts for Reactor Plants to Produce Plutonium and Electricity", HW-45671, compares data from the six studies on dual purpose reactors made in the last three years, including the latest supplementary production reactor, and evaluates the design concepts.

An interim evaluation report of a supplementary Production Reactor concept, including the recovery of electric power as a means of reducing plutonium unit cost, was issued as HW-45089.

A preliminary design study of the basic engineering problems associated with design and construction of a heavy water moderated and cooled reactor, currently being considered as a plutonium re-cycle demonstration reactor, is reported in HW-45548.

The engineering and economic studies of low temperature power recovery from an existing reactor were reported in HW-45471. Results confirmed earlier indications that the recovery of power from existing reactors, though technically feasible, cannot be justified on purely economic bases.

Completion percentages for the design of reactor and reactor buildings on Project CG-554 "Advance Reactor Design", are summarized as follows:

	<u>Beginning of Month</u>	<u>End of Month</u>
Drawings	39%	46%
Criteria	63%	73%
Testing	31%	39%
Overall Weighted Percentage	47%	55%

On the water system and supporting facilities, Kaiser Engineers have submitted preliminary rough draft flow diagrams to illustrate their current conceptions of project requirements.

EMPLOYEE RELATIONS OPERATION

Personnel Practices

An initial survey indicated the need for five Ph.D's during the coming year, four in Facilities Engineering, and one in Research and Engineering. With regard to experienced Technical candidates, the total number of active cases being

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centralized by IPD is nine. Other candidates of interest to IPD and centralized by other departments number five. There are six active transfer cases within the Department. There is one additional case of interest in IPD outside the Department. Two military reactivation cases are currently being processed. Six re-assignments of Technical Graduates have been processed, three of these involving personal interviews by and counselling on the part of the Specialist - Technical Personnel Placement.

Records are being established to permit daily reporting of payroll additions and removals for IPD, as well as periodic summaries of personnel movements. Since cancellation of open requisitions during the earlier part of the month, nine requisitions covering a total of 29 openings have been resubmitted by various IPD components.

Plans are in process to obtain statistics on participation in all the Benefit Plans from IBM as of September 1, 1956, for bases from which to chart our progress. Files on IPD personnel have been obtained from former centralized plant files and have been set up under Military Reserve, Selective Service, Patent Agreements, Pre-retirement, and Retired Personnel.

During the month, one Model 1250 offset press was received from Relations and Utilities, Office Equipment, which should materially assist in handling additional work loads created by reorganization. As an indication of the trend in work loads in the 100-H Duplicating Office, during the month of August a total of 113,742 copies were duplicated as compared to a total of 155,105 copies during September.

Personnel Development and Communications

Good progress was made in establishing channels of contact within and outside the Department to maintain uninterrupted flow of the more essential information in the early stages of transition to the decentralized operation. A number of communi-ques received broad and appropriate Department distribution through the following forms which were prepared: Management News Bulletin, IPD News Letter, Union Relations Information, and Accident Prevention Hi-Lights.

Principal attention was given to reactivation of the G.E. Supervisory Selection Program in the Department and to the disposition of training courses formerly given on a centralized basis by the Education and Training Section. It appears that several training courses for IPD should be retained and presented centrally by Personnel Development Specialists in Relations and Utilities. They include: (1) New Exempt and Supervisory Orientation, (2) HOBBSO I and II, (3) Principles and Methods of Supervision and Leadership, and (4) Practical Business Writing. The other courses, some 16 in number, will be decentralized. Plans were also being developed for presentation of the new Non-Exempt Personnel Development Program to IPD supervision.

Salary and Wage Administration

All exempt positions in IPD have been officially established and records and authorizations completed for the staffing of these positions in proper salaries. One new position was established during the month to fill the need for an intermediate step of progression between non-exempt and the existing Specialist, Materials Control Position.

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A revised procedure was established for the processing of changes of status of non-exempt personnel to fill the needs of both the centralized and IPD records. Organization directories and functional and structural organization charts were issued to selected local personnel.

Health and Safety

There were no disabling injuries during the month and 75 medical treatment injuries were reported. Man-hours worked totaled 356,306.

The roster and training procedures for rescue crews are being brought up to date. Assistance has been given to the newly formed Health and Safety operations in establishing their structure, objectives and methods.

One of the most significant accomplishments involved the outage at B which required coordination between the work forces for this operation, Facilities Engineering, Construction Operation and probable outside contractors' participation.

The first monthly meeting of the newly formed IPD Central Safety Council was held September 14.

Fire Protection

There were three HAPO fire alarm responses out of a total of five with no financial loss. One fire response concerned a private vehicle in the 100-D Area parking lot which involved a loss of \$100. Mechanical defects caused fire in brake lining of vehicle. The fifth alarm response involved Construction employees who left a torch burning in a tarp and plywood enclosed sand dryer in the Minor Construction area. The tarp ignited causing minor damage of \$10.

The 100-B Fire Station was closed on August 31, with all equipment and personnel assigned to the White Bluffs Fire Station until September 3. Fire officers are attending a First Aid Instructors course in Richland to supplant instructors transferred in the reorganization.

Union Relations

A total of 11 grievances were received and three Step II grievance meetings were held during the month.

A long standing jurisdictional dispute between the construction electricians and pipefitters regarding installation of panel boards was settled on September 20.

On September 17, employees who are members of the Instrument Craftsmen's Guild, Local No. 24546, voted to become affiliated with the International Brotherhood of Electrical Workers. Jurisdictional problems may arise if other crafts attempt to claim some of the work now being performed by the Instrument employees.

In a hearing conducted by impartial arbitrator John S. Harlow, a Seattle attorney, the Arbitration Committee voted two to one that the disciplinary action taken by the Company was warranted in the dispute with the HAMTC involving a one-day disciplinary layoff given each of two Mechanics in Transportation operation. Publicity of Union Relations activities in the department was started with the first issue of "Union Relations Information" on September 25 for management of IPD.

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FINANCIAL OPERATION


A total of 28 Organization and Policy Guides and 73 Advices were issued either prior to or during the month. Plans were initially scoped for the development of a Plant Defense Manual which will include such items as Evacuation, Plant Defense, Rescue and Contamination Control.

At September 30, 1956, the invested value in IPD was \$579,190,000 and chiefly represents asset of plant and equipment of \$358,000,000 and inventories of \$212,300,000. Gross plant and equipment is \$479,000,000 with a reserve for depreciation of \$121,000,000.

Base salary rates for all non-exempt employees except Business Graduates and Technical Graduates were increased by 3% effective October 1. Also effective were increases in shift differential for all non-exempt employees, and isolation pay and area differential increases for all employees who are eligible.

A report was issued covering the physical verification of the AEC Radium transferred from the Hanford Laboratories Operation to Irradiation Processing Department.

Began a study of procedures and forms used in authorizing work to be performed for or by Irradiation Processing Department. At present this study consists of a review of the present work order system.


GENERAL MANAGER
IRRADIATION PROCESSING DEPARTMENT

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IRRADIATION PROCESSING DEPARTMENT

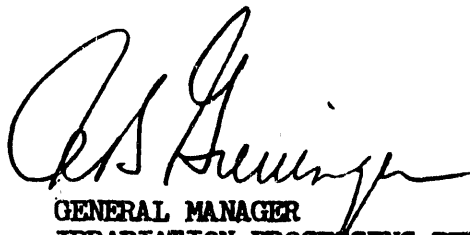
MONTHLY REPORT OF INVENTIONS OR DISCOVERIES

FOR

MONTH OF SEPTEMBER, 1956

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>
Truman Quinn	Slug Rupture Detection and Monitoring of Similar Type Systems



GENERAL MANAGER
IRRADIATION PROCESSING DEPARTMENT

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RESEARCH AND ENGINEERING OPERATION

SEPTEMBER 1956

VISITORS AND BUSINESS TRIPS

A. H. Fillnow of Westinghouse Corporation, Pittsburgh, Pa., visited Hanford to discuss irradiation testing on 9/19/56.

A. Lagani of Knolls Atomic Power Laboratory, Schenectady, visited Hanford to discuss the KAPL HEW-W-P program and operation on 9/26/56.

W. C. Houck, Jr., of Hanford visited the Atomic Power Equipment Department, San Jose, California, on 9/4/56 and 9/5/56.

J. H. Brown of Hanford attended the International Conference on Theoretical Physics at the University of Washington, Seattle, on 9/17/56 thru 9/21/56.

W. E. Niemuth of Hanford delivered a paper at the Brookhaven Conference on Resonance Absorption which was held at Upton, Long Island, New York, on 9/21/56 thru 9/26/56.

R. Nilson of Hanford attended the Brookhaven Conference on Resonance Absorption at Upton, Long Island, New York, on 9/21/56 thru 9/26/56.

ORGANIZATION AND PERSONNEL

	<u>September</u>	
	<u>Permanent</u>	<u>Rotational</u>
Research and Engineering Operation	4	
Process and Reactor Development Operation	26	2
Process Technology Operation	35	7
Coolant Testing Operation	23	2
Operational Physics Operation	18	7
Irradiation Testing Operation	20	4
Component Testing Operation	<u>20</u>	<u>1</u>
	146	23

Research and Engineering Operation: Doris M. Anderson, Secretary C, was transferred into the Operation from Relations and Utilities Operation on 9/24/56.

Process and Reactor Development Operation: G. J. Rogers, Engineer I, was transferred into the Operation from Facilities Engineering on 9/10/56.

Process Technology Operation: J. W. Sowards, Engineer II, was transferred to GE, Cincinnati, Ohio, on 9/28/56.

Coolant Testing Operation: R. E. Bailey, Utility Operator, was transferred to C Reactor Operation on 9/17/56. R. G. Moles, Engineering Assistant, was transferred into the Operation from Hanford Laboratories Operation on 9/17/56.

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Operational Physics Operation: M. R. Wood, Engineer II, was transferred to Facilities Engineering on 9/10/56. Carol K. Horne, Stenographer, was transferred into the Operation from Construction Engineering Operation on 9/10/56. D. A. Trott, Engineering Assistant, was transferred to Hanford Laboratories Operation on 9/17/56.

Irradiation Testing Operation: S. D. Deusser, Engineering Assistant, was reassigned to Hanford Laboratories Operation before 9/9/56. C. L. Buckner, Engineering Assistant, was reassigned to Relations and Utilities Operation on 9/24/56.

Component Testing Operation: W. C. Houck, Engineer I, was transferred to Atomic Power Equipment Department, San Jose, California, on 9/28/56. R. J. Marquis, Engineering Assistant, terminated on 9/21/56. F. J. Ouren, Engineering Assistant, terminated on 9/21/56. C. P. Ogston, Fuel Examination Clerk, transferred to Hanford Laboratories Operation on 9/24/56. L. L. Young, Fuel Examination Clerk, transferred into the Operation from Hanford Laboratories Operation on 9/17/56.

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PROCESS AND REACTOR DEVELOPMENT OPERATION

Administration

The Process and Reactor Development Operation was formed September 1 and substantial progress has been made on defining programs and responsibilities. Certain considerations regarding inter-Product Department and Laboratory-Irradiations Processing Department relationships have dictated a need to change the former administrative methods of handling production tests, research and development and process technology programming, Process Control Standards, and the Radiation Control Standards. The revision of the methods of administration of these critical matters was studied in a detailed way during the month and the broad framework within which the business will be conducted has evolved.

Sponsored Research and Development

Considerable attention was given to establishing mechanisms whereby the research and development activity sponsored in the Laboratory Operation or conducted by funds directly allocated, e.g., Fuels Processing, could be coordinated to ensure timely support for Irradiations Processing Department objectives, goals, and programs. This coordination will need to be derived through a two-way exchange of information, and informal working or programming groups are being established according to the appropriateness and need.

Production Tests

The mechanisms to accomplish the execution of Production Tests in the production reactors as are required to support technological development responsibilities delegated to other organizational components have been established. All Production Tests will be authored and sponsored by Irradiations Processing Department personnel; such tests will be performed if they can be safely accomplished and benefits to be derived are deemed to outweigh any production losses or other associated expenses to be incurred by the Department. The revised test numbering or identification system and authorization channels have also been established.

Process Control Standards

The Process Control Standards, which describe reactor process limitations and provide mandatory standards of reactor operation, will be prepared and issued by the Process Technology Operation. The engineering and technical bases or background for the Process Control Standards will be developed and documented by Process and Reactor Development to provide this critical information in a condensed and ready form. These bases are currently being prepared formally and should be complete by January 1.

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Radiation Control Standards

The plant-wide Radiation Protection Standards, issued by the Laboratory Operation, will form the basis for Radiation Control Standards which provide mandatory Irradiations Processing Department standards controlling radiation hazards. These Standards are being prepared with the initial ones currently circulating for approval and acceptance.

REACTOR PLANNING

Advanced Reactor Studies

An evaluation of plutonium costs in present operations as a function of process variables, e.g., exposure, power level, rupture rate, and slug type is being made to provide a basis for establishing the expected returns from development effort and monies expended in the various alternate technological areas. The point at which additional production can be more economically obtained through new construction is also sought in this work. The returns to be expected if D₂O were to replace light water in a new design are being determined.

Project Activities

Technical and engineering assistance to design and projects groups continued. The status of projects with Research and Engineering participation on a Projects Representatives basis include the following:

Project - CA-512

Installation of gamma water monitoring at KW and KE is progressing as scheduled. The construction of the 1706-KER loop is 97% complete and ATP's are in progress. The various modifications in the "K" Area facilities, which were authorized by Revisions 4 and 5 of Project CA-512, are continuing.

Project CA-548 (New Rod Tower)

The detailed designs and specifications have been received from the Architect-Engineer and have been advertised for bids.

CG-558

Construction of Phase I and II is reported to be 70% and 20% complete, respectively. The first major outage is scheduled for September 24 at 100-B. Outages at DR and D will follow at eight-week intervals.

CG-600

Testing of the first replacement pump is scheduled for the first of October at the vendor's plant. Installation of these pumps is not yet scheduled since couplings are not yet available.

CG-642

Detailed design of the 100-C full pile continuous charge-discharge facility is 69% complete. Completion of design is scheduled for November 1, 1957. The construction project proposal has not yet been prepared.

CG-681 ETR Facilities

The design of the ETR facilities is progressing as scheduled and is estimated to be 20% complete. This project will include two high pressure-high temperature loops in the ETR at ARCO. The users, Metallurgical Research, have requested that consideration be given to making one of these loops sufficiently flexible to handle either high pressure water or low pressure organic coolant. Discussions with the persons in charge of the design and with the Phillips Petroleum people at the MTR have led to the conclusion that such flexibility is not feasible.

REACTOR PHYSICS

Lattice Physics

Measurement of the lattice parameters for a 1.68" solid slug in a 7-1/2" lattice spacing have been made with air, water, and MIPB in the coolant channel. Results for the dry case and for MIPB are not yet available. The following results have been extracted for the water case.

- Fast Effect - $\epsilon = 1.041 \pm 0.004$
- Thermal Utilization - $f = 0.906 \pm 0.009$
- Resonance Escape - $p = 0.815 \pm 0.004$
- Initial Conversion Ratio - $ICR = 0.953 \pm 0.02$

The errors quoted here are based on past experience and do not represent a careful error analysis of this particular experiment.

A single number for the dry case is also available

Thermal utilization $f = 0.942$

A direct measurement of K_{∞} for each of the three coolants will be made in the near future in conjunction with the Hanford Laboratory Operation. Until these measurements are made, it is interesting to speculate upon the reactivity of the massive slug lattice. Comparing the measurements at KW startup made by W. E. Niemuth with the results reported above,

$$\frac{K_{\infty KW}}{K_{\infty MASSIVE}} = \frac{\rho_{KW}}{\rho_{MASSIVE}} \cdot \frac{(P\&f)_{KW}}{(P\&f)_{MASSIVE}} = \frac{\rho_{KW}}{\rho_{MASSIVE}} (1.0024)$$

Thus the loss in reactivity with respect to the K lattice as a standard appears to be very mild.

It is also of interest to note that the resonance escape probability as measured disagrees with the calculated value by about two percent. This is to be compared with the three percent discrepancy obtained by the same methods on the K pile lattice.

Final fabrication of the 1.93" solid slugs is in progress and lattice measurements should be obtained next month for this slug. Shop work continues on the fabrication of seven rod clusters which will enable measurements of p , ξ , and f to be made in a cluster lattice geometry.

Sub-Critical Monitor

The sub-critical monitor program was reviewed and the following conclusion reached.

1. The BF_3 system in D reactor has not been proven at the required counting rates and the fission counter system as this time offers the greater promise.
2. A project should be initiated as soon as possible to install two fission counter systems in test holes at each reactor. The useful locations are shown below:

<u>Reactor</u>	<u>Preferred Holes*</u>	<u>Also Available</u>
B	A,B	D
C	G,H	F,J
D	A,B	D
DR	X,A	
F	A,B	D
H	W,X	V,Z
KE	1B,1C	
KW	1B,1C	

*There is a possibility that old test facilities will have to be removed under the project in some locations. The expense involved here may become considerable.

Adoption of the two channel systems was accompanied by a recommendation that Facilities Engineering continue development on both fission counter and proportional counter systems. With the possibility in mind of employing proportional counters in an independent under pile location at some later date, the electronics gear has been revamped to accommodate either system.

Analog Computer

An effort is underway to establish a firm delivery date for the computer. In the meantime a reactor simulator program is being developed as the first problem for the analog. The following properties will be included in the program:

- 1) Delayed neutrons
- 2) Metal temperature coefficient
- 3) Graphite temperature coefficient
- 4) Xenon
- 5) Safety and control rods
- 6) Water loss

The effect of water loss can be studied with various rod speeds, instrument delays and other variables.

Reactor Safety

The post CG-558-600 Hazards Summary Report will be essentially complete in rough draft form on October 1. As a logical outgrowth of this report, an exploration of possible post disaster procedures has been started. This seems to be an area which could assist in minimizing damage and fission product release if a disaster should occur.

Process Assistance

The proposed change of Process Standard 105-C-040 which will provide either coincidence or regular trips was reviewed. Principal change recommended was the removal of permission to use logarithmic channels as level trips under this change.

Miscellaneous

Design criteria for J reactor covering electrical circuits and miscellaneous water instrumentation was reviewed. Improvements called for were:

- 1) Better rod motion direction indicating system.
- 2) Control room indication and master lock-out of Ball 3-X discharge valves.
- 3) Seismoscope protection in the 3-X safety circuit only.
- 4) An adequate instrument power supply.
- 5) Water supply to test holes housing sub-critical monitors.

REACTOR ENGINEERING

CG-558 Shutdown Considerations

An analysis was made of the adequacy of provisions for cooling during the CG-558 outages. The necessary data relating shutdown time, flow, and number and location of cooled tubes relative to an uncooled pile region, to the temperature expected in uncooled tubes have been prepared and transmitted to guide outage procedures. Numerous recommendations regarding the use of

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temporary piping, risers, and valves were also made; the most critical of these centered about the adequacy of the backup temporary riser in event the primary temporary riser failed. A sequence of valving to provide the best distribution of water over the pile in this event was developed and a recommendation that the capacity of the backup system be increased for the remaining reactors undergoing CG-558 outages was made. The post CG-558 startup tests were reviewed and recommendations for additions were made to ensure that all information required to properly establish the post-558 Process Control Standards and operating conditions will be obtained.

File Tube Temperature Limits

The technical bases for trip-before-instability limits are being rewritten along much the same lines as the existing specification, employing the experimental data of HW-42469 B and the limit curves of HW-42469 F.

The range of parameters in the limit curves will be extended as necessary to cover post CG-558 operation. The provision for relaxation of the low trip limit will be eliminated pending complete analysis for formulation of the results of transient instability laboratory test data.

The thermal and hydraulic characteristics of I and E slug loadings are being analyzed to develop concepts for tube power limits, and to indicate the laboratory test requirements in support of these limits.

Tube Corrosion Criteria

When the major tube replacement program was initiated, a large backlog of tubes requiring replacement existed. A somewhat arbitrary point was used as the basis for selecting tubes to be removed and it was recommended that the basis be reviewed when the backlog was substantially reduced. A preliminary review of the justification for changing the corrosion indices for B reactor, the first reactor to shutdown for CG-558 alterations, has been done.

This review showed that changing the basis to a value requiring the replacement of 200 additional tubes is attractive. The prevention of even one leaking tube would pay for the marginal cost of removing the tubes before such was required by consideration of the old basis. Further, if it be decided to return to the old basis after power levels are increased, there will be a period of time when few or no tubes require replacement. In essence then, tubes would be replaced when pile powers are low instead of high. This saving in production would alone more than equal the marginal costs of removing the additional tubes now.

KER Production Test

The rough draft of the production test authorizing operation of the KER facilities which was prepared within the former organization is being reviewed and revised in view of current policies and responsibilities.

File Graphite Studies

Detailed discussions were held with the Non-Metallic Materials Development Operation of the Hanford Laboratory Operation concerning the responsibility for

all current production tests on graphite. Work on these tests formerly carried on by Pile Graphite Studies Unit will be assigned to the new Laboratory Operations as part of the sponsored programs of Process and Reactor Development Operation.

Pile Graphite Temperature Limits

Two reports on graphite limits and temperature monitoring were issued this month: 1) HW-45027 "Graphite Temperature Monitoring" - D. H. Curtiss, September 4, 1956, 2) HW-45154 "Basis for Graphite Limits" - D. H. Curtiss, August 31, 1956.

As a result of the power cut at KE pile initiated to reduce ruptures, a relaxation of gas composition was made. Since KE pile has not had adequate graphite temperature instrument since December 1955, the temporary expedient of specifying the gas composition as a function of tube power was utilized to observe Process Specifications. When tube powers at KE pile were cut to 925 KW, it was necessary to reduce the concentration of helium from a range of 75-100% to 55-80%. This was accomplished by "Process Change Authorization #132 Graphite Temperature - KE Reactor" Confidential - Undocumented, J. F. Music, September 14, 1956.

Pile Mechanical Systems

A review is in progress on the bases of Technical Specifications 12.00, 22.00, 23.00, 42.00, 52.00, and 53.00 to determine the sufficiency of the technology basic to the specifications.

A study is being made to assemble "best guess" time estimates for the VSR systems on the reactors, including the detection times of the various sensing elements, delay times in the various electrical circuits, and rod position versus time after release. No progress reportable to date.

Internally and Externally Cooled Slugs

The run-to-rupture test currently in C-reactor is continuing. The first solid slug loaded control tube failed at 850 MWD/T while the I & E slugs have reached 1000 MWD/T without failure. Difficulty is again being experienced with the downstream thermocouple monitors and two of these assemblies are scheduled to be replaced at the next available outage. There is strong evidence, however, to indicate that coolant temperatures at the top of the I & E columns are running about forty percent above the average outlet temperature for the tube.

Instability limit and operational problems related to I & E slug loadings are being reviewed, and it is anticipated that the irradiation of loadings on the order of fifty tubes per month in C-reactor may commence in November.

A new production test of enriched (1.44% U-235) I & E slugs of C-reactor size is currently circulating for approval. This test will investigate I & E slug performance at powers expected with the operation of reactors on a 95-100 C bulk effluent limit.

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Cored Slugs

Cored slugs having a 1/2 inch diameter axial void are now being received at a rate of 25 tons per month. It is presently planned that an increase of slug receipts sufficient to satisfy one-half of the K-reactor requirement will commence in about three months. These fuel elements will be irradiated in about equal quantities with solid slugs in a K-reactor until relative performance is established. A smaller quantity (about 10 tons/month) will be irradiated in another reactor (probably DR) upon the completion of water plant expansion work.

The change in size of the axial void (from 3/8 to 1/2 inch) is based on the results of a small scale test and analytical work indicating that cored slug performance is improved by increasing the diameter of the void. The general performance of the 3/8 inch cored slug is considered unsatisfactory; primarily due to an increased amount of total dimensional distortion, at normal high goal exposures, which leads to high "stuck-charge" frequency.

Other Developments

The charging studies of projection slugs in ribless process tubes continues. These studies should result in the design of supporting ribs which cause no undue mechanical damage to process tubes, and which require a minimum amount of modification to charging machines and nozzles.

A production test has been authorized, and will be loaded shortly, involving slugs cocked with aluminum wire ribs. This test should reveal the contribution of cocked slugs to the rate of "hot-spot" type failures.

Enriched and/or Depleted Uranium Program

Two major uses of slightly enriched uranium are anticipated:

- 1) Special isotope production from irradiation of non-fertile materials such as lithium or cobalt.
- 2) Support reactivity.
 - a) Spike enrichment columns.
 - b) Fringe poison support.

The progress in developing these tubes will be detailed in this and future reports. The design document has been issued outlining the intended use of three tons of 0.94 percent enriched uranium available for test. This document is intended as the basis document for canning.

The metal will be charged under two separate IPD production tests.

- 1) Production Test IP-2-A. A test intended to give information on the enriched uranium stability, and conversion ratios of E-N loadings.
- 2) Production Test IP-3-AC. A test intended to secure pile data on fringe poisoning bolstered by adjacent enriched uranium columns.

Both of these tests have been drafted for approvals.

ACTIVE PRODUCTION TESTS - FUEL DEVELOPMENT

Test No.	Type Metal	No. of Tubes	File	Goal Exposure	Present Exposure	Remarks
105-586-A	U-S1 Ingots	1	B	900	Dis. at 1007 MWD/T	Not yet charged Not yet charged Not yet charged
	U-S1 Ingots	4		2 Rupts.		
	U-S1 Cored	3		900		
	Control	4		2 Rupts.		
105-590-A	Extruded Cored	4	C	Ruptures	Not yet charged	Compares performance of extruded and drilled cored slugs.
105-591-A	Cored		All but C	800		Authorizes irradiation of production quantities of cored slugs.
105-597-A	Mg.-U Matrix	1	B or D	3000	Not yet loaded	2 Matrix slugs + 31 reg. slugs. 10 Enriched matrix and 12 normal matrix slugs.
	4 slugs	1	B or D	6000	Not yet loaded	
105-608-A56MT	Dingot Slugs	16	B	7-600 9-900	All discharged at assigned goals	Compares various mechanical and heat treatments of dingot U. Irradiations complete.
105-608-A56MT Supplement A	Dingot Slugs	23	D	High Variable Goal	225-900	Three charges from each month's dingot uranium shipments are to be irradiated to high variable goal exposures.
105-608-A56MT Supplement B	Dingot Slugs Controls	4 4	C C	Ruptures "	Not yet loaded	Compares performance of dingot and ingot U slugs.

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ACTIVE PRODUCTION TESTS - FUEL DEVELOPMENT (Continued)

Test No.	Type Metal	No. of Tubes	Pile	Goal Exposure	Present Exposure	Remarks
105-610-A60MT	Vertically Heat Treated Uranium	10	DR	5-600 5-900	890-900	Rod heat treated in vertical position. Five tubes discharged at 574-594 MWD/T.
105-611-A	Reg. Produc.	33	19 B	500,900,1100	870-1000	Eight discharged at 500 Goal. Two discharged at 900 Goal. Investigates the effects of pile variables upon slug stability. Seven discharged at 500 goal. Two discharged at 800 goal, two discharged at 400 goal.
105-613-A-54MT	Solid	19	KW	3-400 8-600 8-900	350-410	Delays 35, 50 and 80 secs. between salt bath transformation and water quench. Heat treated in rod form.
105-615-A-63MT	Lead Dip Canned I & E	8	C	150,300,500 and 2 rupts.	about 1000	Provides basic information on I & E performance and conversion ratio. Four tubes of each type loaded 3-14-56. One I & E charge discharged, and replaced at about 50 MWD/T. Four additional charges of each type loaded 5-17-56. All goal exposure charges discharged.
	Control	8	C	150,300,500 and 2 rupts.	About 850 One rupture at 842 MWD/T	

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ACTIVE PRODUCTION TESTS - FUEL DEVELOPMENT (Continued)

Test No.	Type Metal	No. of Tubes	File	Goal Exposure	Present Exposure	Remarks
105-620-A-65MT	Tru-line		C	Normal Goal	Not yet started	Provides for the quantity charging of Tru-line slugs.
105-621-A-67MT	Anodized	12	10-D	600,800,MWD/T	550-580	To determine corrosion resistance and provides for the eventual charging of anodized slugs in quantity.
DT-105-623-A	Regular		DR	Normal Goal		Provides for the hand seating of charges loaded on alternate outages. Investigates effect upon failure rates.
DT-105-636A-58MT	C Metal	20	C	Normal Burn- out	Loaded 9-23-56	Ten charges each of double-length and tru-lined "C" slugs will be irradiated to normal burnout and inspected to determine the degree of protection from "chattering".

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Depleted Uranium

The use of depleted uranium as a flattening material appears attractive in that it is calculated to increase Pu production, decrease burn-out charges and reduce the material uranium inventory required per pile. Likewise it might be considered as material for poisoning the fringe tubes to lower the flux in the vicinity of the shield. Procurement is being requested for sufficient material to establish irradiation performance data.

RADIOLOGICAL ENGINEERING

Much of the statistical data compiled describing Irradiations Processing performance in the radiation control areas will be issued directly by a Radiological Engineering Operation monthly report. A summary of significant statistical data of general interest is as follows:

LAPSE OF RADIATION CONTROL
DISTRIBUTION BY REACTOR AND OPERATION
SEPTEMBER, 1956

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	
Processing		2	1		1		1	1	
Maintenance		1					2		
Supplemental Crews		1							
Radiation Monitoring					2		1		
Reactor Engineering					1				
Process Technology			1						
Project Maintenance	1								
I.P.D. Unassigned		1			1	1			
Department Total	1	5	2		5	1	4	1	17

Note: Responsibility for lapse of control was shared in two of the above cases.

Radiation Control Experience

No one within the Irradiation Processing Department received an over-exposure to radiation during the month. One radiation occurrence was formally investigated. It happened at F-reactor on September 3, 1956, and involved the inadvertent withdrawal of an irradiated fuel element from the rear of a process tube containing a stuck charge while splining the downstream perforated aluminum dummies from the tube. A Radiation Monitor received a dose of 155 mrad as the result of this and subsequent surveys made in the high level radiation field. (Doc. HW-45497.)

A radiation occurrence worthy of note happened at C-reactor on September 17, 1956. A charge containing a stuck ruptured fuel element was being pushed tube and all. With the ruptured slug contained in the section of tube exposed in the discharge area, the slug ignited and burned for several minutes before the tube could be pushed out farther and the section exposed broken off to drop into the storage basin. Products of combustion became airborne, thus contaminating the exhaust duct system. An estimated 1.4 curies of activity was liberated to the atmosphere via the stack with evidence of radioactive particulate fall-out in the ground south of the reactor building both within and outside the area perimeter fence. The fall-out density was in the order of 6 to 10 particles per 400 square feet.

Activities

A. Manual of Radiation Control Standards and Procedures

Considerable emphasis has been placed on developing a form and organization of the manual that will provide for maximum flexibility and utility in the future. A dummy manual was made up, illustrating the proposed form and organization. Several standards and procedures are in the rough draft stage.

B. Reactor Effluents

Documents on this subject were studied in an effort to become informed. A meeting with the Chemical Effluents Technology Operation of the Hanford Laboratory Operation was attended in order to determine the intended scope and direction of the Operation's efforts. This component will have considerable influence on radioactive waste disposal since its members will be responsible for the research and development work necessary to determine proper waste disposal methods as well as analytical methods and control limits. The activity of the reactor effluents is presently within limits but will have to be closely watched and controlled as better reactor operating efficiencies are obtained.

A proto-type beta monitor is installed at 100-K Area for measuring total beta activity of the effluent water as discharged to the river. This is satisfactory for the determination of total beta. However, another instrument is being developed which will analyze certain critical isotopes in the effluent as well as total beta. Such as instrument, if successful, will reduce the need for radiochemical analysis in a laboratory. It is expected that this instrument will be ready for field testing in about a month. The decision as to what laboratory facilities will be required for control of effluent activity is therefore delayed until the instrument can be evaluated.

C. Radiological Engineering

An improved slug deflector has been proposed for ball valve charge-discharge. Several mock-up tests were observed using different tube loadings and flushing pressures. In addition, movies were seen of other flow lab tests of the device. This device consists of an individual snout-like deflector for each tube. The installation would give good

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control of both slug trajectory and water splashing. While there is considerable uncertainty as to how much this device would raise rear face exposure rates if used on a full pile installation, it meets the criteria established by maintenance and operating groups much better than previously proposed schemes. The consensus of opinion is that the device shows enough merit to deserve an on-pile test. It is planned to install these "droop snoots" on the CG-651 continuous Charge-Discharge Demonstration Unit scheduled for 105-C. It is planned to have these "droop snoots" made of aluminum and used in conjunction with a link or chain screen on the rear face wall.

An opinion was asked as to the radiation hazards implications involved in the use of nitrogen as a pile atmosphere. It was felt that the prevalence of carbon-14 would be considerably increased, but that this increase could be tolerated without introducing new or severe radiation control problems.

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PROCESS TECHNOLOGY OPERATION

POWER LEVEL LIMITATIONS

File power levels have been limited during the month as follows:

<u>File</u>	<u>Limit</u>	<u>Basis</u>
B	100 C max. tube outlet	Trip-before-instability
1)		
C	98 C max. tube outlet	Slug rupture considerations
D	105 C max. tube outlet	Slug rupture considerations
DR	100 C max. tube outlet	Slug rupture considerations- Arbitrary 100° C
F	100 C max. tube outlet	Slug rupture considerations- Arbitrary 100° C
H	105 C max. tube outlet	Slug rupture considerations
2)		
KE	1025 KW max. tube power	Slug rupture considerations- Planned rise program
KW	1025 KW max. tube power	Slug rupture considerations- Planned rise program

1) One tube was operated at 100 C for several days due to slightly reduced flow. The cone screen had not been replaced with a crosswire screen on this tube.

2) Tube power was reduced to 925 KW on 9-13-56 due to a high incidence of ruptures.

GENERAL PROCESS ENGINEERING

Project CG-558

All Acceptance Test Procedures covering the modifications for B File were reviewed and, where needed, supplementary procedures were written to more fully insure safety of the reactor during the shutdown and the startup following completion of the modifications.

K Area Water Plant Modifications

Assistance was provided to the Process Design Operation in evaluating the need for increased water flow at the K Reactors.

Evaluation of "Radiacwash" Cleaning Solution

"Radiacwash" cleaning solution, developed by the Atomic Center for Instruments and Equipment Inc., was tested for tool decontamination. The solution was found to be inadequate as a primary decontaminating agent for this service.

It appeared to be effective when used as a rinse following normal decontamination procedures but its costs for this use compared to costs of equally effective agents was high.

WATER TREATMENT

Filter Test-183-DR

Two inches of a special grade of sand were added to a filter at 183-DR. The sand caused a substantial improvement in filter performance as compared to the control filters. At a filtration rate of 6.1 gpm per sq.ft. the runs were 20 hours on the test filter as compared to 15 hours on the control filters.

Film In Reactor Tubes

Film growth occurred in the reactor tubes at C, D, DR, F during the month. The film growth was arrested by increasing the alum feed rate and the accumulated film was removed by purging as required.

Separan Equipment

Separan equipment for KW area was finished for one-sixth of the plant. Preliminary tests showed the equipment to be satisfactory.

A design change to permit central control of Separan for 100-B area was tested and shown to be satisfactory.

PROCESS STANDARDS

Five revised Standards for the Reactor Cooling Water manual, HW-27155-Rev., were issued during September. The revisions were as follows:

Process Standard 183-010 - "Aluminum Sulphate, Coagulation Addition".

Standard was revised to permit the use of Separan 2610 as a filtration aid.

Process Standard 183-020 - "Separan 2610 or Activated Silica (Addition and Preparation.)"

Standard was revised to allow the use of Separan 2610 instead of activated silica in the water treatment process provided the water so treated is not used for drinking purposes. A procedure for preparation of the Separan 2610 solution was included.

Process Standard 183-A-060 - "pH Control".

Standard was revised to reduce the pH of process water from 7.2 to 7.0 to reduce aluminum corrosion rates.

Process Standard 183-A-070 - "Chemical Additives".

Separan 2610 was added to the list of chemical additives permitted in the water treatment process.

Process Standard 183-A-090 - "Location of Chemical Addition Lines".

The location of the Separan 2610 addition line was specified.

Three Process Change Authorizations were issued to provide temporary modifications of Process Standards - Reactor, HW-33000. The changes were as follows:

Process Change Authorization #132 - "Graphite Temperature - KE Reactor".

Included provisions for varying the composition of the reactor atmosphere with power level to control graphite temperatures within limits of Process Standards. This became necessary when tube power was reduced at KE Reactor for slug rupture control purposes.

Process Change Authorization #133 - "B-C Dual Area Intertie".

The B-C Dual Area Intertie became inoperable when a rectifier failed, causing one relay to open, and both reactors to scram. This PCA permitted both reactors to start-up without the intertie. The intertie was placed in service shortly after start-up by by-passing the defective relay.

Process Change Authorization #134 - "Outlet Water Temperature - H Reactor".

Rather than restrict H Reactor power level because of a higher than normal pressure drop on one recently charged new tube, approval was given to take full advantage of the TBI limit for this tube until the next scheduled outage. The higher rate of corrosion during the current operating period should not significantly reduce the life of the tube.

Standards Field Engineering

Conformance to Process Standards was monitored at all reactors by Process Standards Engineers on A, B, C, D shifts and at the water plants on day shift only. On the 12 midnight, September 16 shift, this auditing service was temporarily reduced to permit three of the Field Engineers to engage in the more pressing assignment of preparing Process Standards, Process Guides, etc., for post CG-558, 600 conditions. Partial auditing of reactor operations on all shifts is being provided by one Field Engineer working a staggered shift.

RUPTURE EXPERIENCE

Production Ruptured Slug Tabulation

<u>Failure Date</u>	<u>Tube No.</u>	<u>Lot No.</u>	<u>Type Metal</u>	<u>Exposure MWD/T</u>	<u>Type Failure</u>
8-30-56	0688-C	M-155	8" Reg.	490	Unclass.
9-1-56	4872-KE	Z-127	8" Reg. Reprocessed	657	N.A.
9-2-56	4570-KE	Z-129	8" Reg. Reprocessed	685	Split- Longitudinal
9-2-56	4573-KE	Z-152	8" Reg. Reprocessed	560	Split- Longitudinal
9-2-56	4771-KE	M-130	8" Reg.	664	Split- Longitudinal
9-4-56	4372-KE	Z-119	8" Reg. Reprocessed	694	Split- Longitudinal
9-6-56	1587-H	Z-137	8" Reg.	376	Side-HS
9-6-56	2788-KE	K-249	8" Reg.	743	Side-HS
9-14-56	4870-KE	Z-127	8" Reg. Reprocessed	671	Unclass.
9-16-56	1267-C	V-816	8" Reg.	248	N.A.
9-27-56	2486-C	K-335	8" Reg.	363	Side-HS

Production Test Ruptures

9-6-56	*4863-KE	Z-114	8" Reg. Reprocessed	479	Split- Longitudinal
9-23-56	**1080-C	K-276	8" Reg.	836	N.A.

*1706 Corrosion Study Tube, PT 105-550-MT

**PT 105-615A-63 MT Control Tube for I&E Production Test.

Legend:

- N.A. - Information not available.
- Side - HS - Failure caused by hot spot.
- Side - RR - Failure caused by reduced rib height in the tube.
- S - Other - Failure, probably caused by some mechanism other than RR or HS such as pin hole penetration or other unknown mechanism.
- Cap - Failure caused by loss of cap.
- Split-Longitudinal - Lengthwise or diagonal split.

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Split-Transverse
Unclassified

- Split normal to axis of slug.
- Failure type does not fit into any of the above categories.

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PILE PHYSICS ASSISTANCE - OPERATIONAL PHYSICS

Summary of Significant Problems and Data

Particular attention was given during the month to recent changes in the target exposure plans for the K piles and C pile. These changes have resulted in a reduction in flattening efficiency and effective central tubes. At C pile the exposure change was upward, and subsequent flattening adjustments are expected eventually to improve the tube power distribution; however, the exposure increase is expected to increase the rupture rate, and more reactivity must also be held in the rods to permit "quickie" discharges of ruptures. At the K piles the target exposure was reduced, and the subsequent large discharges of 650 to 800 MWD/T uranium has reduced the reactivity available for flattening to near zero. Enrichment additions have been made at KE and will be necessary at KW during the next outage. The K piles have continued to operate with different control rod configurations. The KE configuration is planned around the use of the central half-rods, whereas the KW configuration is based on the use of upstream and downstream long and short rods as initiated under PT-105-630-A. Both piles have been relatively stable with regard to tube power distribution problems during the month.

Table I contains summary data which describe the pile operation in a general way and illustrate some of the Area Physicists' problems. Two additional items will be included in future reports as soon as definitions are agreed upon and methods of calculation are established. These will be "flattening efficiency" and an "operating efficiency" measure. Publication of reactivity balance information in a separate report will be continued by the Pile Physics Operation.

B-Pile - J. T. Worthington and L. B. Ufkes

During September the effective central tube value increased from 1310, reported last month, to 1375. The pile power level does not reflect this increase because of limiting tubes in the fringe. The reactor is actually over-flattened because potential poison column control tubes have been saved by charging with dummies. During the CG-558 outage all permanent poison will be discharged and the flattening will be effected afterward through PCCF usage exclusively.

The estimated maximum scram recovery time increased from 40 to 47 minutes during the last operating period. The maximum graphite temperature was calculated to be 490°C; the pile atmosphere was 15% helium.

During the last two scram recoveries the Proportional Counter did not show an indication until well after the galvanometer and the No. 2 Beckman. Preliminary investigation indicated trouble outside the scaler circuit, possibly in the chamber or the co-axial switch. The gamma-compensated chamber for the No. 2 Beckman has also been erratic, necessitating switching to the galvanometer chamber in "B" test-hole; the galvanometers were switched to the erratic chamber in "D" test-hole during the last startup. Maintenance work on both the P. C. and Beckman systems is planned during the CG-558 outage.

Plans have been made to use the recent DR pile rod calibration test results after the completion of the CG-558 outage in conjunction with xenon calculation by the method of J. O. Erkman, for making critical predictions. In the meantime

TABLE I

SUMMARY OF OPERATING DATA OF PHYSICS INTEREST FOR MONTH OF SEPTEMBER (8/25 - 9/25)

Pile	B	C	D	DR	F	H	KE	KW
ECT, Sept. *	1375(1)	1550(2)	1390	1440	1295	1565(3)	2210	2170
12 Mo. Ave. ECT	1280	1565	1400	1415	1310	1550	2300	2335
Equil. Scram Time ** (Minutes)	40-47	32-38(2)	50-60	43-50	70-85	70-90	28-35	31-37
No. of Scrams Recoveries ***	3	2	3	1	2	3	2	2
Non-Scram Outages ****	2(4)	3	1	0	1	2	7	1

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

** This is defined as the maximum time available in minutes between scram and first indication of the start-up. The times given represent estimates in some instances where scram transient tests have not been run and may also indicate a range in time, which varies with operation.

*** Includes all instantaneous shutdowns, equilibrium or non-equilibrium, and "quickie" outages from equilibrium from which recoveries were attempted. The time period covered is since the previous report and includes the last week of August.

**** This includes "quickie" type outages from non-equilibrium operation.

- (1) The B Pile power level does not reflect this high ECT value because fringe tube temperatures limited total pile power.
- (2) In preparation for high-exposure operation the scram time at C Pile has been increased from 13 minutes; this change in control rod configuration partially responsible for the reduction in effective central tubes.
- (3) The ECT value at H Pile is 20-30 lower than it should be because of a single tube operating 15° C hotter than the surrounding tubes.
- (4) The second outage was for the CG-558 modification.

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A File - J. T. Worthington and L. B. Ufkes (cont.)

analyses of past shutdowns, startups, and operating transients on the basis of the revised calibrations have begun.

C File - F. C. Franklin

The last scheduled discharge of low exposure uranium was made at C Pile on 9-16-56. The reactivity increases that have occurred up to this time because of this conversion to a high exposure program have increased the available scram time by seven minutes. Under the high exposure program a higher rupture rate is expected and more scram time is desired so that "quickie" discharges of ruptures can be accomplished. The scram time was increased to about 35 minutes by:

1. Replacement of 16 depleted enrichment columns.
2. Addition of 6 new enrichment columns.
3. Discharge of all permanent flattening.

In spite of the above changes and the changes in the relative exposure of the fringe and central regions of the pile, the effective central tube value dropped to 1550 as compared to 1615 last month. The amount of reactivity held in the rods is not optimum for heat control; the lack of flattening and the poor control-rod pattern has resulted in some heat cycling. The additional reactivity gains which will occur as the in-pile exposure increases will be used to improve the control-rod configuration which will further increase scram time and also to provide some flattening.

During the first half of the month the level was limited by a single central tube. It was found that the cone screen and venturi assembly had not been replaced with a cross-wire venturi.

Helium concentrations between 55 and 65 percent were used to keep the graphite temperature between 500 and 530°C.

The three ruptures which have occurred since 8-30-56 have all been stuck, precluding "quickie" recovery even if sufficient scram time had been available.

A power level reduction based on the expected high-exposure rupture rate is anticipated next month; the reactor power level will be restricted by a lower column heat generation limit.

D-File - G. R. Parkos

During the tube replacement outage (8-26 to 9-3-56) the charges in 28 "hot" tubes were displaced upstream to reduce their power. Major adjustments were made to the permanent flattening pattern to compensate for anticipated long term gains. A gain of 35 MW over the maximum power level for the previous operating period resulted from the displacements and flattening adjustments; this was also 20 MW higher than the maximum level attained in August. Four tubes which will be used as poison column control facility tubes after the CG-558 outage were added to the permanent flattening pattern. Potential PCCF tubes will be added to the flattening pattern as they come up for discharge whenever possible, though this may reduce the flattening efficiency in some instances.

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D-Pile - G. R. Parkes (cont.)

During the report period the maximum scram recovery time varied from 50 to 60 minutes. Helium concentration of 10-14% was required to maintain graphite temperatures between 460 and 490°C.

The inner "B" test-hole proportional counter chamber was found to be faulty during the start-up of 9-3-56. It was repaired during the outage of 9-21 and functioned properly during the subsequent start-up. An instrument sensitivity test was run during the start-up of 9-22-56; data from this test are yet to be analyzed.

Work has continued on the analysis of reactivity predictions at all 9-rod piles, B, D, DR, and F, using the results of the rod calibration test at DR Pile. Multiple linear correlations between the final prediction errors for approximately 75 outages and several possible sources of error were completed. The largest source of error was found to be high exposure discharges. Significant improvements in prediction accuracy were obtained by assuming the reactivity effect of a high exposure discharge was zero in the cold pile; this assumption is consistent with long term gains results reported this month under process physics studies. The report is now essentially complete and is expected to be issued during October.

DR-Pile - D. E. Goins

The long reactor operating period during September has resulted in DR Reactor reaching a near record high weighted-residual exposure of 515 MWD/T. The primary compensation for the reactivity gain associated with the plutonium buildup was additional flattening charged in the Poison Column Control Facility during operation, and the ECT value was maintained between 1435 and 1445 throughout the month. Had the PCCF not been available to absorb these long term gains the reactor might have been shut down to change flattening and more than a day's production would then have been lost.

The estimated range of allowable scram time was 43-50 minutes without discharge of the PCCF tubes. Graphite temperatures were maintained at about 475°C by the use of 8% helium.

During the outage scheduled for the latter part of September another scram transient test is planned. The final part of the Horizontal Control Rod Calibration Test will also be run if conditions permit.

F Pile - D. E. Simpson

A decrease in flattening efficiency reduced the ECT value from 1340 to 1295; this was the largest factor in reducing the power level by 25 MW from last month. The reduction was caused by over-estimating the reactivity loss associated with the discharge of high exposure uranium. This provided more reactivity in the control rods than was desirable from the tube power distribution standpoint, but the scram time was increased to 70 - 85 minutes.

Both the No. 1 and No. 2 galvanometers were found to be inoperative during the initial cold start-up of September 10. It was discovered that the leads from the

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F Pile - D. E. Simpson (cont.)

ion chamber had been severed, and repair of the leads returned both instruments to normal service. First indication of a rising period on September 10 was detected on the proportional counter at a reactor power of approximately 7 watts; on the No. 2 Beckman (on bucking voltage) at 5 KW, and on the No. 3 Beckman at 13 KW.

H Pile - Y. Murakami

The number of effective central tubes has varied from 1565 at the start of the month to 1550 after the tube replacement outage. The 1550 value is estimated to be 20 to 30 lower than normal because a single isolated tube operated approximately 15°C higher than the surrounding tubes. Tube 3877 was replaced and charged during the tube replacement outage of September 9 to 15. During operation after the outage this tube was discovered to be operating with a Panellit pressure 30 psi higher than normal and at a high exit temperature. A temporary relaxation to allow tube 3877 to operate on TBI limits was obtained; however, it is limiting the equilibrium power level by an estimated 20 MW and requires operation with a skewed rod configuration. The maximum graphite temperature has been approximately 490°C with around 30% helium. The estimated scram time has varied between 70 and 90 minutes under equilibrium conditions.

A sensitivity check of neutron flux monitors during the start-up on September 7, the following results:

<u>INSTRUMENT</u>	<u>SENSITIVITY LEVEL (WATTS)</u>	
	<u>OBSERVED</u>	<u>REQUIRED</u>
Proportional Counter (Cold Start-Up Chamber)	3	500
No. 1 Galvanometer	400	50,000
No. 2 Beckman	1200 estimate	

The new Radiation Development Laboratory scalar was used for the first time on this start-up, and with the exception of its power supply, operated quite satisfactorily. The cause of the fluctuations in voltage obtained from the new power supply is being checked.

A continuing analysis of start-up prediction data was improved by assuming that the reactivity effect of discharging high goal exposure uranium was zero in the cold pile. The graphite temperature coefficient of reactivity as a function of weighted in-pile exposure was then determined in this analysis. This assumption reduced the spread of values to about ± 0.02 ih/MW for the data taken from 15 outages; this spread represents an uncertainty in predictions of ± 20 ih at present operating levels. The assumption which was made regarding long-term changes is consistent with the results obtained in the test pile by F. O. Gumprecht for low exposure and high exposure uranium. It is also consistent with the statistical study of about 75 predictions at B, D, DR, and F Piles by G. R. Parkos.

KE Pile - W. S. Nechodom

Repeated unscheduled outages for slug rupture removal prevented reaching equilibrium until after the outage of September 14. During the outages of September 4, 9, 14, and 23, metal was discharged to reduce the normal goal concentration at KE from 800 MWD/T to 650 MWD/T; because of these frequent, relatively large discharges the in-pile plutonium residual has been reduced sharply with a consequent reduction in the cold clean reactivity of the pile and in the graphite temperature coefficient.

Until September 9, the equilibrium power level was restricted by the 1025 KW tube power limit specified by Process Change Authorization No. 125, "Tube Power Limits - K Reactors." Between September 9, and September 23, the equilibrium power level was restricted by an arbitrary 925 KW tube power limit imposed in an effort to eliminate slug ruptures in high concentration metal.

The reduced cold clean reactivity and graphite coefficient obtained as a result of the large metal discharge program would not have provided sufficient reactivity to permit operation on the 1025 KW tube power limit under existing graphite temperature and CO₂ concentration limits. During the outage of September 23, all the flexible flattening was discharged, and the "C" enrichment replenished in order to obtain the needed additional reactivity. After this outage it is planned to operate on the 1025 KW tube power limit and a 650 MWD/T goal exposure.

The reduction in the graphite temperature coefficient of reactivity did permit a higher level start-up (1700 MW) than had ever been attained before. The maximum scram recovery time from equilibrium was 28 to 35 minutes. The maximum graphite temperature was about 530°C with 80% helium.

KW Pile - S. R. Stamp (For R. D. Carter on Vacation)

The recent reduction of the exposure goal has initiated heavy central zone discharges at the KW Pile and has thus partially cancelled previous flattening loadings and rod configurations serving to damp reactivity cycling. An unbalanced discharge in excess of 90 tons during the scheduled outage of 9-11-56 caused an ECT reduction from 2250 to 2170 since there was not enough flattening available to adequately compensate for reactivity losses in the regions of heavy discharge. Similar difficulties are anticipated next month when approximately 180 tons are scheduled to be discharged during two outages about four weeks apart. The equilibrium power level following the outage of 9-11-56 does not accurately indicate the reduction in flattening efficiency attributed to the discharge since the average maximum tube power was increased about two per cent. The inability to adequately compensate local reactivity variations has resulted in a minor control problem which has prevented further evaluation of the effectiveness of using extreme upstream and downstream rods to reduce front-to-rear heat cycling. The maximum scram recovery time during the report period was estimated to be 34 minutes. The equilibrium helium concentrations varied between 68 and 82%; graphite temperatures ranged up to 546°C.

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PROCESS PHYSICS STUDIES - OPERATIONAL PHYSICS

HCR Calibrations - PT 105-605-A and PT 105-635-A

The results of the DR horizontal control rod calibration test have been found to compare favorably with original startup critical size data in the study reported in HW 45062. The second confirming test at the DR Pile calling for a critical configuration check after an extended shutdown is scheduled for the next outage. The H calibration test authorized under PT 105-635-A is awaiting plant scheduling. Foil traverse equipment has been prepared, and arrangements for instrumentation assistance for the test have been made with the Instrument Development Operation of Facilities Engineering.

File Safety Studies

Intended as a basis for Process Standards Preparation, HW-45490, "Calculated Control Capacities: Effects of Enrichment", was issued during the month. Results are given in terms of permissible enrichment as a function of lattice reactivity (which is dependent on plutonium buildup, temperature coefficients, and water loss as well as on original lattice design).

An examination of the qualitative factors entering into the metal coefficient would indicate that the effect of a 1° change in local water temperature would nearly compensate a 1° change in metal temperature. This factor would not show in the operating pile because the metal runs so much hotter than the water; however, it should have been observed during the uniform-temperature wet coefficient test during the KW Pile startup but was not. This factor would have to be investigated further for recirculating pile design.

A study is underway to provide bases for startup rod withdrawal rates related to the recent DR calibration results and the subsequent re-evaluation of transient coefficients. Results of this study will be documented when it is completed.

K Reactor Temperature Cycling Control - PT 105-630-A

Theoretical flux distribution calculations to determine the "peaking" of the central flux when using the test HCR configuration have been completed. It is calculated that the central slug power in a column operating at a given power would be 3% higher when using front and rear rods and 15% lower when using central rods than if a true cosine flux existed front to rear.

Temperature Coefficient Studies

A study of possible methods for measuring the metal temperature coefficient of reactivity in the operating reactors is underway. At present three methods are under consideration: low level rising periods, high level incremental power cut, and a scram transient test in which critical is followed after a rapid shutdown from a high level.

Lighting calculations have been completed on the first five KE tests of the dependence of the graphite coefficient on exposure and will now be started on the final two tests. Least squares analyses can now be initiated on the results of the first five tests.

Long Term Gains Study - PT 105-553-A

A least squares fit has been calculated for the long term gains measurements which had been obtained by individual slug reactivity measurements in the test pile before and after irradiation in the F Pile. Scatter in the data has resulted in a considerable uncertainty in the value of the coefficients; the measurements made dry in the test pile may not apply strictly to the wet case; and the value deduced for the Samarium saturation effect from this analysis is only half that calculated theoretically. Because these are the only data for high exposure metal in a Hanford pile, however, they have been converted to equivalent full pile values for use in pile physics plant assistance work. The equation obtained by least squares was:

$$Y = \left[-(95 \pm 33\%) + (655 \pm 24\%)X - (574 \pm 52\%)X^2 \right] \text{ ih}$$

where X is the discharge exposure in MWD/ton $\times 10^{-3}$ and Y refers to the total pile change if all columns were irradiated to the same exposure (but with cosine longitudinal flux distribution).

Shield Protection Studies

The CG-558 shield thermocouples at the B Pile have been installed and indicate maximum shield temperatures of 90 - 95°C with adjacent fringe tubes operating at 210 kw. The observed temperatures are slightly cooler than predicted by fringe power vs. shield temperature relationships developed previously at other piles.

A production test to load fringe poison compensated by E metal in the DR Pile is being initiated. Thermocouples have been installed in a far side test hole plug to monitor shield temperatures, and arrangements have been made with Irradiation Testing Operation for obtaining side to side flux traverses during the proposed loading.

Miscellaneous Physics Assistance

A schedule was initiated to provide regular theoretical physics consultation to the area physicists and simultaneously to refer area problems which required further assistance to the appropriate individuals working on special studies.

Assistance is being given to the Process Technology Operation in developing a procedure for ascertaining the various aspects of operating efficiency in a consistent manner. The concepts previously proposed by Dow of the Process Sub-Section for denoting and separating variables such as equilibrium and non-equilibrium losses appear logical, but some modification of definitions may be required to insure the simplest and most uniform application on a routine basis.

Significant Documents Issued During the Month - Operational Physics

HW 45062, "A Comparison of HCR Calibration Methods and Results", C. L. Miller, 9-10-56, Secret, Informal.

HW 45490, "Calculated Control System Capacities: Effects of Enrichment", C. L. Miller, 9-14-56, Secret, Informal.

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IRRADIATION TESTING OPERATION

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KAPL-120 LOOP

During the reactor outage of September 10-16, the following items were accomplished:

1. A new hydroclone was installed.
2. The malfunctioning of the control valve was corrected.
3. A valve leak in the sample bomb system was repaired.
4. The monitor chambers were calibrated.
5. The motor generator set was balanced.
6. A new depletion ion column was installed.

The water chemistry program is proceeding favorably. Negotiations are in progress to permit Transportation personnel to deliver the large number of samples to the various analytical laboratories; this will enable Loop personnel to concentrate their efforts upon operating activities. A new facility for securing thermally cold bomb samples and for the addition of chemicals to the loop water has been installed. This facility will back up the thermally hot sample bomb facility which has presented many operational problems in the past.

ARMY (100 DR) RECIRCULATING GAS LOOP

Exploratory calculations for the emergency cooling system, based upon information supplied by the customer, were performed during the month. Six seconds is the maximum time that the test section can remain at normal power without heat removal.

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The preliminary study indicated that, under the conditions of a reserve supply pressure at 200 psig expanding to an initial tube backpressure of 100 psig, an initial flow of 1000 lbs/hr (1/2 the normal flow) would be optimum from all viewpoints. After the residual heat has been removed from the in-pile tube, a flow reduction proportional to the fractional reduction in test section power is permissible. After exhaustion of the reserve supply, it is anticipated that gas from standard cylinders will be used for further cooling as needed.

The points of primary consideration in the emergency system are: (1) Fast acting valves for initiation of emergency flow; and (2) thermal shock to the in-pile tube. It does not appear, however, that these will present major problems in solution. Information from the responsible Project Engineer indicates that entirely negative responses were received in answer to letters directed to prospective vendors for the loop blowers. Members of design are now visiting other prospective vendors. The development and procurement of this equipment item is, presently, the major uncertainty in the loop design.

FLUX STUDIES

A report has been issued (HW-45199) summarizing the physics studies performed with regard to the KAPL-120 Loop. All of the prototype tests which were conducted in the Hanford Test Pile, and neutron flux studies which were performed at the KAPL-120 site are described in this report.

Rise factors and reactivity values were measured in the Hanford Test Pile for the five types of process tube cobalt slugs (ORNL-183). Two sets of rise factor measurements were performed on each of the types. One set of measurements was with aluminum spacers in the slugs; the other was with graphite spacers. The two types of spacers were found to have negligible difference in effect upon nuclear properties. Rise factors for the five types ranged from 0.66 to 1.2. Reactivity values were found to range from 0.39 to 0.82 nominal inhours per piece, and from 0.75 to 1.7 nominal inhours per piece for the old piles and K piles, respectively. A summary report (HW-45638) has been issued giving the details of the study.

Bare and cadmium covered cobalt-aluminum alloy foils which had been irradiated in Process Tube 2577 of C Pile, and in the front-to-rear test holes 3674 and 0074 of KE Pile were counted. The preliminary results are summarized as follows:

Measurements	<u>Tube 2577</u> C Pile	<u>Tube 3674</u> KE Pile	<u>Tube 0074</u> KE Pile
Average adjacent tube powers during foil irradiation	768 KW	728 KW	353 KW
Measured thermal flux ϕ_{2200} corrected to front-to-rear pile center	9.2×10^{13}	5.9×10^{13}	2.5×10^{13}
Rise Factor	Approx. 3	Approx. 3	2.4
Total neutron flux above cadmium cutoff energy (0.475 ev)	Approx. $0.9 \phi_{2200}$	Approx. $1 \phi_{2200}$	Approx. $0.5 \phi_{2200}$

These data must be considered very preliminary. More foils will have to be irradiated

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in these locations to substantiate the findings.

An experiment is being planned to determine the feasibility of obtaining a relative thermal neutron flux traverse in a process tube by scanning the fuel slug activities as the pieces are discharged from the tube. A special, sealed ionization chamber is being fabricated which will be suitable for attaching to a rear nozzle. If the method proves feasible, the frequent irradiation of columns of numbered aluminum pieces to obtain traverses will be eliminated.

Two thermal neutron flux traverses are to be taken in a DR Pile side test hole (HAPO 194) as a joint effort of the Process Physics Specifications Unit and the Irradiation Testing Operation. One traverse will be taken prior to charging a fringe poison loading that has been compensated by enrichment. The second traverse which will be taken after the special loading is in place, will serve as a measurement of the change in flux pattern. It is presently planned to conduct the irradiations during November and December.

IN-PILE IRRADIATIONS

The loop for recirculating an organic coolant (75 % monoisopropylbiphenyl and 25% biphenyl) was charged into a general purpose facility at KE pile during September (HAPO 182). Startup of the loop is scheduled for late this month.

The WAPD-114 uranium oxide fuel irradiation was discussed with R. H. Fillnow (Tetris Plant, Westinghouse) during his visit to Hanford. Samples (slug size cans containing small oxide fuel rods in a NAK bath) are expected to be available for shipment to Hanford within the next two months.

A proposal for an additional irradiation program was discussed with Mr. Fillnow. This program would involve the irradiation of 124 assemblies, each 5-3/4 inches long, containing uranium alloys in a NAK bath. The Hanford Irradiation Request for this program can be expected in the near future.

A Production Test authorizing the capsule irradiation of organic coolants (HAPO 183) in a KW side-to-side test hole (general purpose facility) is ready for approval signatures. The customer is assembling the in-pile apparatus.

A draft of the Production Test for the front-to-rear test hole irradiation of an insulated fuel element (HAPO 174) has been circulated for comments. Rupture monitoring instrumentation is now being installed. The panellit scram settings for the tube have yet to be established.

The preparations for routinely irradiating HAPO 184 material are proceeding on schedule. The Hanford Laboratory Operation has requested this service to aid in the accomplishment of a large activation analysis program for the AEC's Division of Research. The irradiations will be accomplished in Poison Column Control Facilities and the facilities of two piles will be required when the program reaches a full schedule. The first irradiations are anticipated during the second week in October.

The pile irradiation of four run-to-rupture I & E tubes with temperature probes (HAPO 159) continued during the month; two probes with defective thermocouples were replaced.

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The NAA Safety Fuse experiment (HAPO 162) continued dormant pending the receipt of a new test assembly. The temperature and pressure data obtained during the first two fuse tests were received from Atomics International (North American Aviation). An analysis of these data has not been completed at HAPO.

Annulus tube components are being fabricated for an experiment to irradiate graphite at intermediate, controlled temperatures (HAPO 124). The target for charging of this experiment has been postponed by the customer until November or December because of higher priority of work.

The following pre-post experiments were charged and/or discharged during the month:

1. One set of effluent water residue samples (HAPO 174) was irradiated in the quicky facility at 105 F. These irradiations are aimed at identifying the concentrations of effluent water impurities.
2. Two graphite boats were discharged from the hot graphite facility (YTH) at 105 C.
3. One tube of cobalt pieces (ORNL 183) was discharged and shipped to the Oak Ridge National Laboratory. This represents a contribution of about 30,000 curies of cobalt-60 in support of the Radioisotope Distribution Program.
4. Three isotope samples were charged into the 2D magazine at 105 KW.

The irradiation of cobalt-60 pieces requested by The Product Inspection Operation, Chemical Processing Department, (HAPO 180) continued in tube 1377-C. This irradiation must continue for 20 months to achieve the radiography source intensity required.

The four temperature probes designed to measure annulus water temperatures for normal slugs (HAPO 178) continue to operate at D-Pile. This is being done by means of temperature probes similar to those used with the I & E experiments. The probes have been installed in four process tubes. Each probe contains four thermocouples; temperatures for a single probe have varied from 10 C below to 25 C above bulk outlet temperature.

Two experimental assemblies for studying the in-pile reaction between zirconium and pile gas impurities (HAPO 105) continued to operate at F pile. Two new assemblies are ready for charging.

The last charge (eighth in the series) of uranium bond tensile specimens (HAPO 165) is being irradiated in 3266 H. An upstream charge was added to eliminate panellit instability with this charge; there has been no further difficulty with instability. It is anticipated that the loading will be discharged at the next outage and this will conclude the irradiation portion of this experiment.

Experiments to investigate the effects of irradiation upon the physical and metallurgical properties of natural uranium (HAPO 108 and HAPO 145) by exposure of small samples in poison column control facility tubes are being terminated without completion of the intended work. The stringent conditions required by this test (especially, low constant neutron flux and rigid scheduling) have proven incompatible with the available Poison Column Facilities.

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irradiations will be performed instead in the KW snout facilities which are better suited for experiments of this type (HAPO 173). A Production Test for this experiment has been approved and issued. A supplement is being prepared to permit the irradiation of these small quantities of uranium without the use of a scram device in the safety circuit. Assemblies for the snout irradiations are now being fabricated.

The irradiation of cobalt to be used as the source in a gamma irradiation facility located in the 300 Area (HAPO 142) continued without incident in tube 2160 H. These are due for discharge in approximately one year.

GAMMA STUDIES AND GAMMA FACILITIES

The irradiation of one sample has been completed in the Air Force Gamma Facility located in the 105-KE basin. One sample tube is now in use. It is anticipated that the required revisions to slug holders for three additional tubes will be completed and the tubes put into service by October 14. The completion of the auxiliary services for this facility, although delayed by changes in customer requirements, is anticipated by January 1, 1957.

In support of further investigations to establish the ability of various plastics and rubbers to resist gamma ray damage (HAPO 171), a new heater assembly, designed to maintain sample temperatures up to 200 C, was installed for a trial run in an F Area gamma tube. Minor adjustments were necessary for satisfactory operation. The heated tube is now loaded and operating at a temperature of 150 C.

The following is an account of the Gamma Facility charge-discharge activities for the month of September:

<u>Request No.</u>	<u>Charged</u>	<u>Discharged</u>	<u>Facility</u>
HAPO 171	43	24	F
HAPO 148	3	1	F
AF 100	1	1	KE

Thirty slug-size cans of cobalt (HAPO 167) continued under irradiation without incident in 2469 DR and 2487 DR. These are the pilot charges for a proposed irradiation of cobalt sources for the F area gamma pit. These sources will be irradiated as useful poison charges.

One assembly of source rods for the Hanford Cobalt Facility (HAPO 179) continued under irradiation in 0074 KE front-to-rear test hole without incident. It is planned to discharge this assembly and charge two full sets (in two tubes) of source rod assemblies during November. Information from the single assembly irradiation will determine length of exposure which will be required for the full tube charges.

FACILITIES

Preparations were continued to permit the operation of the 2 B test hole at 105 KW for graphite irradiations with a heated water supply. A satisfactory control of the inlet water temperature has been achieved. Some instruments

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revisions are yet to be made. Following these revisions, the magazine will be operated empty as a final check-out. The magazine will then be charged with graphite samples and routine, heated operation will begin.

A Facilities and Engineering Operation Work Authority was issued during the month for the project for the renovation of the 105-KW Irradiation Testing Laboratory.

The B test hold magazine, F pile, was removed on September 6, 1956. This removal was necessary because two of the sample bearing tubes were leaking. A short portion of the magazine was saved and is being examined to determine whether the tube failures were caused by corrosion.

The necessary modifications have been completed and test runs made on the 4 C Snout Facility 105-KW. On September 18, an operationally successful charge-discharge during reactor operation was accomplished. This test was for the purpose of determining the heat generation of aluminum. The test results will be reported when the analysis has been completed.

BORESCOPING

Assistance was rendered the Mechanical Development Operation of the Facilities Engineering Operation, in borescoping six "problem tubes" at 105-B to aid in planning an improved removal method.

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LOOP TESTING OPERATIONActivities

Loop Testing Operation activities were confined to: (1) Operation of the in-pile and out-of-pile facilities comprising the 1706 KE Semiworks, (2) Operation of the H recirculation loop, and (3) preparations for the startup of the KER facility, including training, preparation of an Operating Manual and following Acceptance Test Procedures.

In-File Facilities

Single pass tube 4863 KE was discharged with the charging machine on September 6, 1956, due to a split rupture. A 3.1 hour outage was charged to the 1706 Semiworks. The exact cause of the rupture has not been determined. The tube was supplied with pH 7 water, normal dichromate addition and an outlet temperature only slightly higher than surrounding tubes.

Organic recirculation apparatus #2 (ORA-2) was started up and ran for approximately two hours on September 27, 1956. The facility recirculates a 75% MIPB - 25% biphenyl mixture through the 2A test hole of the KE reactor. Thirty ppm organic chloride resulted in predicted radiation levels of 600 mrad/hr on the retention tank. An estimated equilibrium radiation level approximately three times this figure will result from longer lived sodium and manganese. A two percent drop in reactor power level resulted from the reactivity absorbed by the five gallons of organic contained in the in-pile piping. The reactivity loss is approximately equal to that which might be expected if the piping were filled with water, and was within the limits specified by the Production Test. The organic, which is circulated inside a water cooled jacket, gradually heated, due to gamma heating, to the 100 degree C limit specified by the Production Test. Noticeable darkening in coolant color was either due to the radiation or heat effect. The loop will be re-started pending minor equipment modifications, establishment of final operating procedures and further study of the physical changes occurring in the organic coolant.

The final run in the H recirculation loop, with 4.5 phosphate treated water, was initiated September 15, 1956. Based on previous system leak rates and the expected activation of phosphorus to P32, an increase of 25 to 50 percent in 105H effluent P32 content was anticipated. However, a concentrated leak correction program reduced the leak rate from 200 gallons/day to 30 gallons/day, and a lower activation rate has maintained the P32 far below the danger level. The loop will be discharged, the zirconium tube removed for metalography inspection and the out-of-pile loop placed on standby on or about October 11, 1956. The operating personnel will be transferred to 1706 KE-KER for KER training and startup.

Out-of-Pile Facilities

Out-of-pile corrosion test recirculation loops, ELMO 2, ELMO 6 and ELMO 9, ran throughout the month with normal shutdowns for discharge of samples and minor maintenance. ELMO 5 remained shutdown the entire month awaiting arrival of a 150D Westinghouse canned motor pump.

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EIMO 4, slug rupture loop at H reactor, was shutdown for pump replacement.

Minor Construction forces completed the installation of EIMO 7, an out-of-pile prototype of a KER loop. The loop, which was prefabricated by Byron Jackson Company, will be started up in October for the testing of KER tube to nozzle connections and for evaluation of KER operating conditions.

Organic recirculation apparatus #1 (ORA-1), an out-of-pile organic loop designed to test the cooling and heat transfer characteristics of organic coolants, was 75% complete at month's end.

ORA-3, a small out-of-pile recirculation loop to test valves, valve packing, flanges and other components for an organic system was in operation at month's end.

The sixteen tube mock-up facility was only partially operational during the month. Single pass high temperature corrosion tests were in progress in two of the tubes and one tube was in service to test a "Barco" swiveled stainless steel pigtail. Installation of a dowtherm heating jacket on mock-up tube #16 was started during the month by a lump sum contractor under Project CG 512, Revision 5. The dowtherm jacket will allow out-of-pile corrosion studies at elevated coolant temperatures not possible with the present steam jacketed tubes.

Engineering

Liaison and planning necessary to convert single pass tube 3043 to high temperature liquid phase and subsequent single pass boiling studies were initiated during the month. Installation of the necessary heat exchanger, control valves and instrumentation will be carried out, insofar as practical, during the KER outage.

Out-of-pile Acceptance Test Procedures on three of the KER loops were completed during the month. The KE reactor shutdown for the installation of KER in-pile equipment is scheduled to start October 29, 1956.

Four KER size ribless zircaloy tubes have been pressure tested, radiographed and will be ready for in-pile installation as soon as the interior weld beads have been machined from the two tubes originally found to be defective.

A comprehensive startup, training and testing program will be carried out following the KER-KE reactor tie-in. Equipment performance will be satisfactorily established before in-pile recirculation is initiated.

A decision to start up carbon steel KER loop #1 with organic coolant was made during the month. Following completion of the reactor tie-in, immediate steps will be initiated to modify piping and instrumentation to allow out-of-pile recirculation of organics.

COMPONENT TESTING OPERATIONIrradiated Material Examination

Engineering data was compiled on twenty-three tubes of irradiated material.

Results of a statistical study using the Basin II weigher indicated that due to a sloping bias curve the beam would require modification. The modifications were completed and preparation of new calibration curves was in process at month end.

Process Tube Corrosion Monitoring Program

Twenty-four tubes removed for routine purposes and the tube replacement program were examined in the B, F, D and H storage basins during the month. A hole caused by internal corrosion was found in tube 2766-H, nine and a half feet from the rear Vanstone flange directly above the rib.

Fourteen of the above mentioned tubes were examined in the 189-D Metallurgical Laboratory. One of these, 3374-B, a central zone tube, was found to have a sixteen mil wall thickness both from its calculated value and its actual measured value. This is fourteen mils less than the thirty mil criteria for tube removal.

In-Pile Measurement of Process Tube Corrosion

Sixty-four process tubes which were scheduled for replacement were measured in-pile using the Probolog. These measurements were made to check calculations used in selecting tubes for replacement.

A correlation has been made of the data obtained from in-pile Probolog examinations and out-of-pile actual tube wall measurements since January 1956. The correlation upon sixty-five process tubes showed that the Probolog was in error an average of only three mils with a maximum of seven mils. By comparison, the difference between Probolog measurements and calculated wall thickness from corrosion data showed a difference of nine mils average with a maximum of twenty-two mils.

Penellit Gauges

Penellit gauges inspected and approved during the month included 276 CG-558 gauges and 122 other type gauges. This completes the CG-558 gauges for the 105-B installation.

Analysis of failed penellit gauges this month indicated that the failure rates decreased approximately 50% from previous months. However, a serious problem was noted with three failed CG-558 gauges from D, DR and H Areas. The switch vanes of three of the gauges were stuck so completely that the vanes would not pull out of the mercury pool, hence the gauge would not trip. It should be noted that this is a non-fail safe condition.

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

Inventor(s)

Title

None

O. J. Drueger

MANAGER, RESEARCH AND ENGINEERING
IRRADIATION PROCESSING DEPARTMENT

PRODUCTION AND REACTOR OPERATIONS SUMMARY

SEPTEMBER, 1956

Input production (Pu) for September was 110.2 percent of forecast, due largely to higher than forecasted operating level and efficiency. Forecast was exceeded at all reactors except B where a CG-558 outage was started approximately one week earlier than forecasted.

Output production for the month was 136.0 percent of forecast due to (1) reducing goal exposure at KE Reactor more rapidly than forecast, with resultant discharge of additional metal, and (2) discharging metal at B Reactor during the CG-558 outage, which was forecasted for October. The final discharge of low concentration material was made; this completed the HAPO commitment for high isotopic purity product.

Increases in the maximum established power levels, excluding burnout, were achieved at KE and KW Reactors where previous records were exceeded by 24 megawatts and 10 megawatts, respectively.

Thirty-eight reactor outages, including 18 scrams, resulted in an overall time operated efficiency of 78.1 percent. Variance from the planned outage schedule included shutting the B Reactor down approximately one week early for a CG-558 outage, cancelling a five-day tube replacement outage at D Reactor, and postponing an eight-day outage at KE Reactor for the tie-in of the KER Recirculating Facility.

Twelve ruptures of regular metal slugs, two of which were charged on Production Tests, occurred during September and required 194 outage hours for removal from the reactors. Eight of the ruptures occurred at KE Reactor, three at C, and one at H. None could be removed by the "quickie" method.

Under the tube replacement program, 100 tubes were replaced at F Reactor and 99 tubes were replaced at H. A total of 205 hours of reactor outage time was required for this work. These replacements have reduced the backlog of tubes having a calculated corrosion above critical index to approximately 350, which are mostly fringe tubes where the calculated index has not been a true measure of the actual tube conditions. Seven Van Stone flange water leaks on process tubes were located and corrected during the month; one at B Reactor, one at D, and five at F.

There were no formal radiation incidents or disabling injuries during the month. Some spread of high-level contamination occurred in the discharge and storage areas of the C Reactor building when a ruptured slug ignited as it was being discharged. The exhaust fan system also was contaminated, but the resultant emission of radioactive particles from the process stack was not serious. Control of the contamination and subsequent cleanup was accomplished without over-exposure of personnel.

Significant items of equipment experience during the month, other than starting the CG-558 outage at B Reactor, were (1) successful first-time testing of the K Reactor emergency generators under full load conditions

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uring reactor operation, (2) placing in effect a productive maintenance card system at K Area that will expedite scheduling and completion of the routine maintenance backlog, (3) correction of a leak which developed in the 42-inch effluent line from the 1904-D outfall structure, (4) correction of bellows gas leaks at F Reactor, thereby reducing gas losses by approximately 50 percent, and (5) rear face thermocouple lead wire inspection at the D and DR Reactors indicated the insulation on many of the leads to be extremely brittle, particularly in the center half of D Reactor.

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

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B-C REACTOR OPERATION

SEPTEMBER, 1956

B-C REACTOR OPERATION - GENERAL

I. RESPONSIBILITY

On September 1, 1956, the B-C Reactor Operation was created in accordance with the HAPO reorganization and assumed the responsibilities defined for this function in the Irradiation Processing Department Functional Charts, dated September 1, 1956.

II. ORGANIZATION

The reassignment and physical relocation of personnel, in connection with the reorganization effective September 1, was completed during September.

III. FORCE REPORT

	September 4			September 31			Net Change of Total
	<u>NE</u>	<u>E</u>	<u>Total</u>	<u>NE</u>	<u>E</u>	<u>Total</u>	
B-C PA & PD	1	3	4	1	3	4	0
B Processing	35	8	43	35	8	43	0
C Processing	32	8	40	32	8	40	0
B-C Power	105	14	119	105	14	119	0
B-C Radiation Mon.	19	5	24	18	5	23	-1
B-C Maintenance	<u>114</u>	<u>21</u>	<u>135</u>	<u>115</u>	<u>21</u>	<u>136</u>	<u>/1</u>
Total	306	59	365	306	59	365	0

Changes during September included 4 transfers into B-C Reactor Operation, 3 transfers out, and 1 termination.

IV. SAFETY EXPERIENCE

There were no disabling injuries and no serious accidents in the B-C Reactor Operation during September.

V. PERSONNEL ACTIVITIES

E. D. Ferguson and A. C. Whiteside, B-C Power Operation, met with the Consulting Engineer for Combustion Engineering Company, on September 5, to discuss Post CG-558 power house operating problems.

At month end, two employees are receiving on-the-job training for potential engineering or supervisory assignments. One is on assignment under the Tech Grad Rotational Training program.

VI. NON-ROUTINE REPORTS ISSUED

No significant non-routine reports were issued this month.

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VII. INVENTIONS AND DISCOVERIES

A canvass of all personnel within the B-C Reactor Operation revealed that no inventions or discoveries were conceived this month.

B-C PLANT ADMINISTRATION AND PERSONNEL DEVELOPMENT

A. ADMINISTRATIVE ACTIVITIES

The official papers necessary to effect the transfers, nomenclature, suffix, and level changes, and salary adjustments for all personnel assigned to the B-C Reactor Operation under the reorganization, were processed.

C. COST CONTROL ACTIVITIES

A procedure was established for obtaining and reporting the B-C Reactor Operation work force on a semi-monthly basis to insure control of the manpower status within established ceilings.

E. LANDLORD ACTIVITIES

A post-reorganization survey was made of all B Area buildings and a Landlord Space Assignment report was issued to the Product Cost and Budget Operation for rental charge purposes.

B PROCESSING OPERATION

A. PRODUCTION

B Reactor input production was 89 percent of forecast due to downtime required for repair of a water leak, charge-discharge and work connected with Project CG-558. Operating levels were restricted by problems associated with non-equilibrium conditions caused by three scrams and one unscheduled outage.

B. OPERATING EXPERIENCE

There were five outages totaling 224.9 hours outage time at B Reactor in September as follows:

<u>Date</u>	<u>Outage Hours</u>	<u>Cause</u>
9-7-56	0.4	Reactor scrambled due to a Panellit trip caused by mercury separation in a gauge.
9-7-56	24.2	Reactor shutdown when water collection rates indicated a process tube leak. A severed rear Vanstone flange was found on tube 3960-B.
9-14-56	0.6	Scrammed by rectifier failure in the B-C intertie.
9-20-56	0.4	Reactor scrambled by a trip on Panellit row #35. The cause was undetermined.

<u>Date</u>	<u>Outage Hours</u>	<u>Cause</u>
9-22-56	199.3	Reactor shutdown for Project CG-558 Outage and associated outage work and remained down the remainder of the month.

2. Equipment Experience

The drip leg transmitters were overhauled following the troubles experienced with them during the leak testing outage on September 7. The operation is still not satisfactory and further repairs are planned.

VSR #12 failed to drop full in on a scram and is scheduled for repair.

A total of ten problem tubes were investigated. Three were found to be free in the channel, two were freed for later removal, and five boroscoped.

C. IMPROVEMENT EXPERIENCE

1. Production and Process Tests

PT-105-608--"Irradiation of Dingot Uranium."

Operation under this test was completed following discharge of the three remaining tubes during September. Outage time charged to the test during September was 0.3 hours.

PT-105-611--"Study of Effect of Pile Variables On Slug Dimensional Stability."

Six of the nine remaining tubes operating under this test were discharged during the month. Outage time of 0.6 hours was charged to the test during September.

2. Projects

Further details concerning projects may be found in the Semi-Monthly Project Status Report issued by the Facilities Engineering Operations

CG-558--Reactor Plant Modification for Increased Production.

The CG-558 outage work began at 8:00 a.m. on September 26. All critical valving was accomplished without major incident. Work completed during the month included removal of the old downcomer, far side tunnel piping, and Panellit system, and installation of a temporary riser and emergency backup system. Installation of the new Panellit system and Poison Column Control Facility was started.

CG-666--Zone Temperature Monitoring

During the CG-558 outage, 130 "Y" pigtailed out of 211 were installed.

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CG-578 Gamma Monitor

Installation of larger size sample lines for improved flow control was continued during the CG-558 outage.

3. Other

Replacement of all rear face thermocouples was started during the CG-558 outage.

D. EVENTS INFLUENCING COSTS

1. Overtime Usage

Shutdown work, illness, and vacation relief required 56 hours of non-exempt overtime during the month.

C PROCESSING OPERATION

A. PRODUCTION

C Reactor input production for September was 102 percent of forecast. Efficiency was less than forecast due to three ruptures, which required 99.4 outage hours for removal. Equilibrium power levels were limited by exit tube temperatures.

B. OPERATING EXPERIENCE

There were six outages totaling 170.7* hours outage time at C Reactor during September as follows:

<u>Date</u>	<u>Outage Hours</u>	<u>Cause</u>
9-14-56	0.4	Reactor scrambled due to failure of the GX relay on the B Reactor side of the B-C intertie circuit.
9-16-56	78.5	Reactor shutdown for removal of a rupture from tube 1267. The charge was stuck and removal was accomplished by pushing metal and tube intact. The rupture was reprocessed "dingot" material and had reached a concentration of 248 MWD/ton.
9-20-56	6.7	Temporary poison discharge.
9-23-56	0.3	Reactor scrambled by a high trip on Panellit row #10. Subsequent events indicated a rupture to be the cause although the cause was not determined at the time.
9-23-56	41.2	Reactor shutdown for removal of a rupture from "I and E" control tube 1080-C. The charge stuck after removal of eight slugs,

*Includes 4.2 hours carried over into September from the August 30 outage.

<u>Date</u>	<u>Outage Hours</u>	<u>Cause</u>
9-23-56 (Cont.)		and final removal was accomplished by pushing tube and rupture intact. The tube concentration was 836 MWD/ton.
9-27-56	39.4	Reactor shutdown for removal of a rupture from tube 2486. Discharge of the rupture required the use of a hydraulic jack. Tube concentration was 363 MWD/ton and the rupture was classified as a "hot spot" side-type failure.

During the removal of the rupture from tube 1267 on September 16, one of the slugs ignited and burned for approximately six minutes in the discharge area before it could be dropped into the basin. High level contamination was spread through the discharge area, storage area, and exhaust fan ducts.

3. Other Significant Items

A crack in the weld on the far high tank sensing line was noted during the yearly preventive maintenance check of the raw water Grove valve operation. The Grove valve did not operate until the far high tank was completely drained. The crack was repaired and subsequent checks showed the Grove valve to operate satisfactorily.

While attempting to remove tube 1479 under the tube corrosion monitoring program, the tube became stuck and resisted further efforts to effect its removal. The tube was blanked off to avoid further extension of downtime.

C. IMPROVEMENT EXPERIENCE

1. Production and Process Tests

PT-105-519-E--"Raising Permissible Outlet Water Temperatures of Selected Tubes At C Pile."

Tube 2071 was discharged at goal exposure of 500 MWD/ton on September 27. The B-D-F type annulus tube was replaced by a C Reactor type tube.

DT-105-636A-58 MT--"Evaluation of C Alloy Fuel Elements."

Ten tubes of double-length C metal pieces were charged on September 17 along with ten tubes of true-line C metal as control tubes.

Spike Enrichment

A second tube of C metal was charged into the central zone of C Reactor this month to further evaluate the economic feasibility of using spike enrichment to increase reactor reactivity.

2. Projects

CG-651 - Continuous Charge-Discharge Equipment

Installation of conduit and wiring for this project continued during September.

CG-600 - 190-C Pump Modifications

Work was started on September 27 increasing the range of the Foxboro power recorder and its associated equipment.

CG-656 - C Reactor Raw Water Cross-Tie

The far high tank sensing line was relocated during the month to make room for the cross-tie line. All preliminary fabrication of the cross-tie has been completed in preparation for its final installation.

3. Other

A total of 50 insulated-back Panellit gauges were installed during September.

D. EVENTS INFLUENCING COSTS

1. Overtime Usage

A total of 190.1 hours overtime was required at C Reactor during September as follows:

<u>Hours</u>	<u>Reason</u>
62.0	Rupture removal
96.1	Charge-discharge
16.0	Vacation relief
16.0	Illness relief

2. Other

Tube 1267-C rupture outage of 78.5 hours, during which the slug ignited, resulted in a temporary poison outage.

The September 27 outage was extended ten hours in an unsuccessful attempt to remove tube 1479 for the tube corrosion monitoring program.

Special handling was required to discharge the rupture from tube 1080 due to the presence of low concentration material in the chutes.

B-C RADIATION MONITORING OPERATION

A. RADIATION OCCURRENCES

There was no radiation incident requiring formal investigation and

reporting.

A ruptured uranium piece which ignited while being discharged caused an emission of radioactive particles from the 105-C stack. Ground surveys within the 100-B limited area revealed the disposition of radioactive particles in an area south and southwest of the 105-C stack. The maximum particle density was approximately one particle per 1000 square feet. Most of the particles found showed activities of from 5,000 c/m to 30,000 c/m; one particle gave a surface dose rate of 350 mrad/hr uncorrected for source size. Radioactive particles were detected along Route 11-A south of 100-B Area by surveys made by Regional Survey, Hanford Laboratories Department. Contamination levels on rear process tube caps and piping were as high as 100 rads/hr at two inches, and a maximum personnel dose rate of 5 rads/hr was experienced during clean-up work.

B. EXTERNAL EXPOSURE CONTROL

Control of external exposure was in general good during September. The maximum personnel dose rates experienced were 5 r/hr at 105-B during tube removal operations and 5 rads/hr including 3 r/hr at 105-C during decontamination work in the discharge area. Work associated with the B Reactor CG-558 outage was performed at normal personnel dose rates.

C. CONTAMINATION EXPERIENCE

Seven cases of skin contamination were reported with the maximum level of contamination being 10,000 c/m. In all cases the contamination was successfully removed.

Three cases of low-level contamination were found on surveys of 123 vehicles. The contamination was easily removed in all cases.

Gross air contamination in the 105-C discharge and storage areas followed the igniting of the ruptured fuel element. The maximum activity density shown by air samples was 1.2×10^{-8} uc/cc. No personnel were exposed to contaminated air without appropriate respiratory protection.

D. EVENTS INFLUENCING COST

1. Overtime Usage

A total of 57 hours of overtime were used. This is the lowest overtime usage for the past two years, and represents a reduction of 93 percent since the first of this calendar year.

B-C POWER OPERATION

A. OPERATING EXPERIENCE

The river level varied between 387.0 feet and 390.9 feet while turbidity ranged between 2 and 6 PPM during the month. This uniform

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high quality raw water permitted minimum coagulant dosages while producing "super quality" treated water.

The broken 30" south tie valve between 181-B and C raw water headers was replaced with a Limitorque valve from 185 Building on September 26. This will make it possible to divert flows quickly and safely without entry into the pipe gallery.

182-B assisted in carrying the export load until September 23, when it was necessary to transfer the load to 100-H in preparation for 181-182-B tie-ins during the extended CG-558 outage.

C. IMPROVEMENT EXPERIENCE

1. Flow Test Through 24" Tie Line Between 182-B and 183-C

A flow test was conducted on September 24 to make sure sufficient supplemental flow was available from 182-B to make up for river pumping units that would be out of service while replacing the 30" tie valve. A total of 19,000 GPM was supplied through the tie line during the test period.

2. Separan for Water Treatment

Approval for use of Separan for treatment of fire and sanitary water is being withheld by the Washington State Board of Health. The feasibility of a separate filtering system for sanitary use is being surveyed. Separan facilities for 183-C will be installed when the sanitary water problem is solved.

3. Projects

The extended CG-558 outage began September 22. The majority of the work scheduled for 181, 183, and 190 buildings is complete.

CG-616 - Installation of Acid Feed Equipment 100-B and C

The installation of a new storage tank, head tank, and lines to 183-B, and neutralization pit is nearly completed. Total project is about 80% complete with October 11, 1956 as the tentative completion date.

CG-600 - 100-C Area Alterations

A flow test to determine the capacity of sewer drains to the 190-C basement was conducted on September 17. The test showed that 13,000 GPM could be wasted through existing drains by flooding the basement floor a maximum depth of 8".

The test was conducted to find out if capacity tests and flushing of one of the new units could be accomplished without extensive piping.

CG-618 - Replacement of Steam Line Support Poles

The replacement of 125 poles and cross arms has been completed. An

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emergency Work Order #A-09191 was issued on September 28 for replacement of an additional 20 poles. A project is being prepared for the replacement of all old poles.

D. EVENTS INFLUENCING COSTS

1. Water treatment costs will be low because of the high quality of raw water and low average flows at 183-B due to the CG-558 outage.
2. Maintenance costs will be higher due to the extra maintenance required to have 190-B turbines, 183-B feeders and 184 boilers ready for Post CG-558 operation.
3. Overtime payments for coal handling will be below normal because Saturday crews were not required the last two week-ends of the month.

B-C MAINTENANCE OPERATION

A. EQUIPMENT EXPERIENCE

4. Other

B-C Gas System

The majority of the Helium and CO₂ valves were repacked with an improved packing, Garlock #945, as a test to reduce gas losses. Preliminary tests indicate this material may be effective in reducing leaks from this source.

Supervisory Control 181-C & 183-C

A heavy duty rectifier was installed on the 181-C and 183-C supervisory control system on a test basis. If the test is successful, it will eliminate the need for batteries and provide more stable voltage to the system.

C. MAINTENANCE ENGINEERING AND PLANNING AND SCHEDULING

1. Instrument Engineering

Rear Face Thermocouple Replacement

The engineering and design work for the B Reactor thermocouple replacement program was completed this month.

2. Electrical Engineering

Design Change #137-B, Safety Circuit Revisions

The necessary drawings were completed; the circuit revisions, designed to provide greater simplicity and reliability, were started concurrent with the CG-558 outage.

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3. Mechanical Engineering

C Reactor Rear Face Walkway

A design was developed, and detailed sketches prepared, of a walkway to be installed in the rear face of C Reactor to facilitate thermocouple replacement. The walkway will be permanently installed for future maintenance work.

C Reactor Front Nozzle Modifications

It has been established that the bore of the front nozzles must be enlarged approximately 30 mils to facilitate trouble-free charging of experimental I & E slugs into C Reactor. However, the enlargement should be made eccentrically to the center line of the tube to preclude the possibility of slug damage from the tube ribs. A study was started of various methods of effecting the modification with available machinery to determine the cost, time required for tooling, and the outage time required.

4. Planning and Scheduling

A major portion of efforts during the month, aside from outage planning and scheduling, involved: (1) coordination of services necessitated by reorganization, space modifications, and service alterations; (2) planning and scheduling associated with the CG-558 outage, not only for direct assignments but also assistance to other groups.

D. EVENTS INFLUENCING COSTS

1. Overtime

A total of 303 overtime hours were used during the month. Of this amount, 129 hours were chargeable to the B-C Reactor Operation.

A. R. Maguire

Manager
B-C REACTOR OPERATION

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KE-KW REACTOR OPERATION
SEPTEMBER, 1956

KE-KW REACTOR OPERATION - GENERAL

I. RESPONSIBILITY

On September 1, 1956, the KE-KW Reactor Operation assumed responsibility as defined in the Irradiation Processing Department Functional Charts dated September 1, 1956.

II. ORGANIZATION

L. J. Schuck, Junior Engineer - K Plant Maintenance Operation, terminated on September 7 to accept employment in Seattle, Washington. H. J. Miller was reassigned from Maintenance Engineer to Methods Analyst to replace Mr. Schuck. D. E. Baderstadt, Supervisor II, transferred from Supplemental Crews Operation to KE-Processing Operation, supplemental coverage, effective September 17. G. V. R. Smith, Specialist - Measurements and Administration, transferred to Personnel Practices Operation - Employee Relation Operation, effective September 1, 1956.

III. FORCE REPORT

	<u>Beginning of the Month</u> (As of Reorganization)			<u>End of this Month</u>			<u>Net Change</u>
	<u>NE</u>	<u>E</u>	<u>Total</u>	<u>NE</u>	<u>E</u>	<u>Total</u>	
Management, General	1	1	2	1	1	2	0
K-Plant Admin. & Pers.Prac.	1	3	4	1	3	4	0
KE-Processing Operation	35	8	43	36	8	44	+1
KW-Processing Operation	37	8	45	37	8	45	0
Supplemental Crews Oper.	63	10	73	63	10	73	0
KE-KW Power Operation	76	13	89	76	13	89	0
KE-KW Radiation Mon. Oper.	18	9	27	18	9	27	0
KE-KW Maintenance Oper.	<u>135</u>	<u>20</u>	<u>155</u>	<u>132</u>	<u>19</u>	<u>151</u>	<u>-4</u>
Total	366	72	438	364	71	435	-3

The changes include one termination, four transfers out, and one transfer into K Plant.

IV. SAFETY EXPERIENCE

No disabling injuries occurred during the month. Twenty-one medical treatment injuries were reported.

All plant employees participated in the September Safety Theme of the Month, "Someone is Watching You." R. J. Bursey was Chairman of the program and L. P. Reinig the K Plant representative.

PERSONNEL ACTIVITIES

The KW-Processing Operation played host to the General Electric officials who toured the area in connection with the General Electric Business Review. Guided tours and discussion aids were provided.

A group of forty industrial leaders visiting HAPO in connection with the Atomic Power Program were given tours through the 105-KW and 165-KW Buildings.

A Radiation Training Program for all processing operators is being organized by E. T. O'Sullivan in cooperation with personnel of the Radiation Monitoring Operation. E. T. O'Sullivan is also Chairman of the committee formulated to establish a training course in Reactor Engineering Fundamentals at the G-E School of Nuclear Engineering. He is working with Columbia High School officials to establish a night school course in physics for process operators.

J. P. Jones of Travelers Insurance Company visited K Plant on September 19 and 20 to conduct inspections of fired and unfired pressure vessels.

Radiation Monitoring Operation Supervisors have conducted a number of meetings with K Plant personnel on Radiation Hazards Topic No. 50, "Administrative Details."

VI. NON-ROUTINE REPORTS ISSUED

Nothing to report.

VII. INVENTIONS AND DISCOVERIES

A canvass of all personnel within the component revealed that no inventions or discoveries were conceived this month.

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K PLANT ADMINISTRATION AND PERSONNEL DEVELOPMENT

I. FUNCTIONAL ACTIVITIES

A. Administrative Activities

Administrative efforts during the month revolved around organizing the plant administrative program, establishing files and records, conducting manpower, equipment and material surveys, and processing the necessary papers to comply with exempt and non-exempt payroll procedures.

B. Personnel Development

Activity relative to the plant training program consisted of determining the training needs and investigating ways to accomplish the program. Meetings were held with Employee Relations personnel, and their assistance was requested to supply material and guidance on specific training courses. Instructors for K Plant training programs will be supplied by plant supervisory personnel. Manpower forecasts were prepared for present and future (FY-'57) Plant needs. The forecasts included exempt, non-exempt, technical graduates and technical assistance personnel.

C. Cost Control Activities

The K Plant (FY-'57) budget allocation was resolved with Financial Operation. An analysis of the budget requirements of each of the plant components is in progress to determine if the budget allocation is adequate. The establishment of essential material and setting up the plant cost system is in progress.

D. Landlord Activities

A report to the Financial Operation outlining K Plant space assignments was issued. Other activities have been somewhat curtailed because of a vacancy in the position of specialist who will follow this activity.

KE PROCESSING OPERATION

I. FUNCTIONAL ACTIVITIES

A. Production

Input production for the month was 100 percent of forecast but fell below the previous record high by 30.2 percent, primarily due to unscheduled outages caused by slug failures. A 100-KW reduction of maximum operating tube power, imposed as a means to reduce rupture frequency and equipment failures, contributed to the reduction of input production. Attainment of the forecasted figure was made possible by deferment of the KER tie-in outage originally scheduled for the month. This outage is rescheduled for October 29.

Reactor time operating efficiency for September was 71.4 percent, a reduction of 9.2 percent from the August figure. Major items necessitating

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downtime in order of importance were (1) Charge-discharge, (2) Rupture removal and (3) Maintenance.

B. Operating Experience

1. Operating Continuity

Reactor outages were as follows:

<u>Date</u>	<u>Hours</u>	<u>Remarks</u>
September 1	48.4	Unscheduled outage to discharge rupture from tube 4872. Three additional rupture suspects were found and discharged.
September 3	.7	Unscheduled outage, panellit low trip on 0573.
September 4	35.3	Unscheduled outage to discharge rupture from tube 4372. Completed charge-discharge of 145 tubes.
September 6	3.1	Unscheduled outage to discharge rupture from 1706 tube 4863.
September 9	52.4	Unscheduled outage to discharge rupture from tube 2788. Completed charge-discharge of 475 tubes.
September 11	1.0	Unscheduled outage, panellit scram due to mercury separation.
September 11	2.1	Unscheduled outage to investigate rupture indications on Beta monitor. No rupture was confirmed.
September 14	25.3	Unscheduled outage to discharge rupture from tube 4870. Completed charge-discharge of 196 tubes.
September 24	37.3	Scheduled outage, charge-discharge of 255 tubes.
Total Time	205.6 hours	

The following table summarizes the ruptured slug information:

<u>Tube No.</u>	<u>Lot No.</u>	<u>Chg. Date</u>	<u>Rupture Date</u>	<u>Exposure</u>	<u>Type of Rupture</u>
4872	Z-127	4-2-56	9-1-56	657 MWD/T	Unknown*
4570	Z-129	4-2-56	9-1-56	685 MWD/T	Split
4573	Z-152	5-2-56	9-1-56	560 MWD/T	Split
4771	M-130	4-2-56	9-1-56	664 MWD/T	Split
4372	Z-119	4-2-56	9-4-56	694 MWD/T	Split 5 pieces
4863	Z-144 (PT)	5-3-56	9-6-56	479 MWD/T	Split

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<u>Tube No.</u>	<u>Lot No.</u>	<u>Chg. Date</u>	<u>Rupture Date</u>	<u>Exposure</u>	<u>Type of Rupture</u>
2788	K-129	3-7-56	9-9-56	743 MWD/T	Side hole and split
4870	Z-127	4-2-56	9-14-56	671 MWD/T	Split

*Tube and rupture were discharged together since the slug was stuck. Efforts to remove slug for examination have failed to date.

2. Equipment Experience

a. Vertical Safety Rods

Gas seals on 14 VSRs were replaced during the September 14 outage. A relay panel and a fuse panel, part of the ISA revision, were installed during the outage.

b. Pressure Monitors

Panelit difficulties are summarized as follows:

Totally plugged lines-----	2
Partially plugged gage lines (slow response)--	7
Mercury separations (corrected)-----	252
Gages replaced (trip failures)-----	6
Gages recalibrated-----	194

c. Temperature Monitors

Four thermobulbs were replaced during the month due to indications of low resistance to ground.

3. Significant Items

a. Charge Face Cap Leaks

During Reactor startup preparations on September 25, approximately 50 front nozzle caps were found without "O" rings delaying the Reactor startup two hours.

b. Gas Concentrations and Maximum Graphite Temperatures

A Process Change Authorization was issued permitting reactor operation at reduced helium concentrations. This was necessary to maintain adequate tube temperatures following the large discharges. As a result, Reactor scram recovery time was necessarily reduced approximately 10 minutes below normal time.

c. Emergency Crosstie System Valve (V-73)

Tests of the valve operating reliability continued to be within specified limits. To assure continued operational reliability,

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a low pressure alarm system has been installed on the air receiver chamber.

C. Improvement Experience

1. Production Tests

Operationally significant Production and Process tests are reported below, together with other items of improvement significance.

PT 105-568-E, Irradiation of Monoisopropylbiphenyl (MIPB)

Completion of the organic loop, ORA-2, during the month permitted initial startup of the facility for two hours. Approximately four in-hours of excess reactivity were lost when flow was started.

PT 105-550-E, Operations of the In-Pile Facilities of the 1706-KE Semiworks

Operation of six 1706 tubes continued under this production test during the month. A ruptured slug in tube 4863 required reactor downtime of 3.1 hours on September 6.

2. Projects

1706 KER

All possible work on the KER facility in the 105-KE Building has been permitted to minimize the length of the planned extended outage in October.

Project CA-512-R
Revision No. 4

a. Pressure Monitor System

The coordinate lighting system has been completed and the KE design switch bulb for the gages is being ordered for both areas.

b. Gamma Monitor System

Delay in shipment of the spectrometers is extending the completion date.

D. Events Influencing Costs

1. Overtime

A total of 209.5 overtime hours was required, 26.5 hours by KE personnel, 47 hours by Supplemental Crew and 135 hours by other Processing Operation personnel.

2. Gas Losses

Gas losses continued high with 99,000 cubic feet of helium consumed during the six cold start-ups and daily losses averaging 5,400 and 2,340 cubic feet of helium and carbon dioxide respectively for the month. Replacement of 14 VSR seals during the month is expected to decrease the losses.

KW PROCESSING OPERATION

I. FUNCTIONAL ACTIVITIES

A. Production

Input production for the month was 107 percent of forecast due principally to improved production efficiency brought about by a reduction in the number of scrams. A record power level which exceeded the previous level by 10 MW was maintained for nine days until the reactor was shut down for a scheduled outage. Maximum power level was limited by a 1025 KW tube power limit imposed as part of the slug evaluation program.

Reactor time operated efficiency for September was 82.4 percent, a 4.3 percent reduction from the August figure. Major items necessitating downtime in order of importance were (1) Charge-discharge, (2) Instrumentation and (3) Miscellaneous maintenance.

B. Operating Experience

1. Operating Continuity

Reactor outages were as follows:

<u>Date</u>	<u>Hours</u>	<u>Remarks</u>
September 11	70.9	Scheduled outage for 92 ton charge-discharge.
September 14	0.9	Unscheduled outage, panellit scram during rise to power, cause unknown.
September 28	<u>54.8</u>	Unscheduled outage initially, panellit scram due to high resistance on gage and wiring connection. VSR malfunction prevented recovery. A 91 ton charge-discharge previously scheduled for October 1 was completed.
Total Time	126.6 Hours	

2. Equipment Experience

a. Vertical Safety Rods

Push rods broke on limit switch LSB of Number 49 VSR and LSAA on Number 24 VSR. The LSAA failure necessitated removal of Number 24 VSR from service. Difficulty continues to be experienced because of slowness of VSR withdrawal.

b. Pressure Monitor

Difficulty with plugged panellit sensing lines, due to rust accumulation, continued at a rate similar to that of last month as shown by the following breakdown.

Totally plugged gage lines-----	6
Partially plugged gage lines (more than 3 seconds/100 PSI change)-----	60
Mercury separations-----	43
Trip failures - Low-----	4
High resistance - Gages-----	3
High resistance - Jumpers-----	31

c. Temperature Monitor

One temperature bulb failure occurred during the month. Approximately thirty bulbs gave indications of low resistance to ground when they became wet during the charge-discharge operations. Five of these became connector failures when the water saturated the connector and were replaced. The remainder were dried out after several days operation.

Operation of the temperature monitoring system within 5C of the individual Sensitrol trip setting during the recent months has revealed that many Sensitrols will alarm (trip) when one to four degrees below the set trip point.

3. Significant Items

a. Emergency Water Cross-Tie System (V-72)

The V-72 guard valve continued to function improperly under differential pressure conditions during the outage of September 11 and failed completely during the September 28 outage. The gear assembly was removed and the valve operated satisfactorily on manual operation. Replacement gears are on order. Reactor operation was resumed with the valve on manual control.

C. Improvement Experience

1. Production Tests

No significant developments.

2. Projects

a. Project CA-512-R
Revision No. 4

The 107 tank foundation and curbing repairs were completed during the month. Work on float controls for maintaining water heel is scheduled for October.

b. Project CA-512-R
Revision No. 5

Shop work assembly is in progress on VSR latch modifications (Design Change Number 138).

D. Events Influencing Costs

1. Overtime

A total of 22 hours of overtime was required. Of this total 14 hours were worked by Supplemental Crew personnel and the remainder by personnel from other processing operations.

2. Gas Losses

An unexplained increase in the amount of air entering the reactor forced a return to high pressures and high flow rates with a resultant increase in gas losses. By mid-month, low gas flow rates were re-established and the pressure gradually lowered. The VSR gas seal replacement was completed during the month. Tests revealed that four seals continue to leak and these were scheduled for repair during the next outage.

SUPPLEMENTAL CREWS OPERATION

I. FUNCTIONAL ACTIVITIES

A. Operating Experience

During charge-discharge, considerable difficulty has been experienced with thin-walled tubular dummies which tend to jam onto the charge machine plungers and are difficult to remove. Steps have been taken to correct the charging machine difficulty.

B. Events Influencing Costs

1. A total of 226.7 hours of overtime was worked by Supplemental Crew personnel of which 23 hours was exempt overtime. All overtime worked was chargeable to the particular area involved.

2. Scheduled and unscheduled outages required essentially all Supplemental Crew time. Time distribution during September was as follows:

<u>Area</u>	<u>Percent</u>	<u>Area</u>	<u>Percent</u>
100-B	17	100-F	18
100-C	12	100-H	15
100-D	8	100-KE	13
100-DR	4	100-KW	13

K POWER OPERATIONI. FUNCTIONAL ACTIVITIESA. Operating Experience

The following items were operationally significant in addition to statistics reported separately.

1. K Generators Operated to Control Electrical Peak Load Conditions

Increases to generator output to control plant peak power demands were made during peak periods occurring on September 15, 16, 19, 20 and 21. Peak control efforts during these periods necessitated generation of approximately 200,000 KW hours in excess of normal load. During one of these periods, when peak control measures were in effect, a new electrical peak, (approximately 400 KW), in excess of the previously established peak, was inadvertently set when the K Plant demand meter failed to indicate the exact peak condition. At the time this new peak was recorded; however, the peak limit was being decreased 6000 KW through the increased output of the K Plant generators.

2. Liquid Rheostat Phase Insulator Failure During Routine Startup

The Number 4 high lift unit in 190 Building failed as a result of a phase insulator breakdown on the liquid rheostat during a scheduled KE Reactor startup. The spare high lift unit was placed in service and no delay in the reactor startup resulted.

B. Equipment Experience1. Electrical Flash-Over - Number 1 High Lift Motor - 165 KW Building

An electrical flash-over occurred on the Number 1 high lift motor on September 18 during scheduled maintenance. Only minor surface damage resulted and the motor was restored to service on September 24.

2. Installation of New Epoxy Cells

The phase insulator failure in the liquid rheostat of the Number 4 high lift unit was repaired by installation of the new Epoxy cells. This is the second rheostat now completely equipped with the new type cell in place of the original metal-lined type.

3. Removal of Sand From Basins

Draining of basins three and four in 183 KW Building and basin seven in 183 KE Building during the month, to accomplish routine maintenance work, has permitted an examination of the amount of sand being carried in the raw water stream and deposited in the flocculator pits. Although the necessary removal of this accumulated sand before refilling was accomplished on the subject basins, the removal problem is

extremely difficult due to the inadequacy of the flushing and drainage system for this use, and the service labor required if accomplished by manual means.

4. Change of Electrolyte Concentration

During the month the change in electrolyte solution concentration in the liquid rheostats from 0.4 to 0.8 of one percent was completed on all remaining K Plant units.

C. Improvement Experience

1. Projects

a. Project CA-512 - 100-K Plants

Two broken backwash valve disks were replaced with the heavier type disk now available in backwash valves 14E and 9E in KE Reactor.

The installation of flame failure detection and ignition system equipment is near completion on three of six boilers. The Number 1 boiler in 165 KW Building was tested following completion of the installation and was found to function satisfactorily.

b. Project CA-586 - Third 230 KVA Supply

The tie-in to the K Plant system was completed on September 19 and the line energized.

2. Others

A new type brush (T-948) was installed on the Number 1 high lift motor at 165 KW Building while this unit was down for electrical maintenance. This is the fourth brush type installed for purposes of testing and evaluation of brush performance.

D. Events Influencing Costs

1. Overtime Usage

A total of 32.5 hours overtime was required for payment of "no lunch relief". In addition 34.8 hours for safety meetings resulted in a total of 67.3 hours for the month.

2. Others

Cost of water treatment chemicals and additives, based on total water treated was \$5.26/MM gallons, a reduction of \$0.26/MM from August.

Cost of fuel oil per thousand pounds of steam generated was \$0.880 as compared to \$0.885 experienced during August operation.

The electrical peak control efforts during the month added an amount estimated at \$2000 to the fuel oil cost.

100-K RADIATION MONITORING OPERATION

I. FUNCTIONAL ACTIVITIES

A. Radiation Occurrences

No radiation incidents were experienced. Four Lapses of Radiation Control were recorded, three at KE and one at KW Reactors. All four involved contamination spread beyond established radiation zone boundaries.

B. External Exposure Control

A maximum dose rate of 400 r/hr at one inch was measured on nozzles containing ruptured slugs at KE Reactor. Maximum dose rate to personnel during rupture removal work was 3 r/hr. A dose rate of 50 r/hr was detected on nozzle 4043 - KE due to a displaced metal charge.

A maximum dose rate of 600 mr/hr was detected on the 105-KE Building roof over a gamma irradiation facility in the technical view pit. A temporary radiation zone was established.

C. Contamination Experience

Seventy-seven vehicle surveys were made; one vehicle was found contaminated.

Two cases of skin contamination were reported. Both were cleaned to less than detectable limits.

Four cases of personal clothing contamination were detected; all were decontaminated to less than detectable limits and released.

All air samples indicated concentrations of radioisotopes which were below established limits for the respiratory protection worn.

K MAINTENANCE OPERATION

I. FUNCTIONAL ACTIVITIES

A. Equipment Experience

1. Instruments

A scram occurred at KW Reactor when a loose panellit jumper was coupled with a high resistance switch of the adjacent gage during a routine range change. The faulty gage was replaced but reactor recovery could not be made due to malfunction of a VSR.

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Restrictions in 49 panellit sensing lines at KW Reactor were cleared by replacing the fittings at the nozzles and back-flushing the lines. A total of 295 mercury separations were corrected and 184 gages adjusted.

Due to the unusual number of rectifier failures in the seismoscope relays in the past, a resistor was installed in the circuit to reduce the voltage across the rectifiers. This appears to have corrected the difficulty. All relays in the KE Reactor have been similarly modified.

2. Electrical Equipment

New light weight, low voltage, push button controllers were designed, fabricated and installed on the three hoists on the KW Reactor charge elevators. These controllers appear to have eliminated the sticking experience in the "up" and "down" operation.

Installation of ammeters and selector switches for measuring the rotor current in the 190 Building lift pump motors has been completed in both reactor areas.

A check of the Number 1 KW high lift pump bearings in the 190 Building revealed them to have only 20 to 25 percent bearing surface. These were scraped and fitted properly.

3. Mechanical

A ruptured slug in tube 4872 - KE required removal of the rear gunbarrel and application of 2000 pounds of force for removal.

Lead lining was installed on the wall separating the wash pad and cask storage room in 105-KW Building to reduce the radiation background level of the latter location.

B. Shift Maintenance Activities

Shift crews worked on tube replacement in 105-H during the first week of September. For the remainder of the month they have been effectively utilized to make class "A" overhauls and class "B" inspections of 183 KE basin sample pumps and heating and ventilating equipment. Drain line modifications of 183 KE and KW chemical pumps were made and guard valves installed between air traps and backwash pumps in 165-KE Building.

C. Maintenance Engineering, Planning and Scheduling

1. Instrument Engineering

a. Temperature Monitor Lead Wire - Discharge Areas - 105-KE & KW

An inspection was made and the conditions of the leads were evaluated. Contacts were made with the Materials Development Operation to obtain assistance in the development of a suitable

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replacement wire. A test installation of five leads using wire having newly developed insulation is planned.

b. Dual P.C. Tube Installation

Two coaxial switches were assembled in conduit boxes for use at KE and KW Reactors and were functionally tested. New P.C. tube sleds are being fabricated to accommodate the additional tubes. The first installation is scheduled for KW Reactor during a subsequent outage.

c. Single Point Octant Monitor Recorder

The installation of this item was completed at KE Reactor and put into service on September 23. Operation of the system has been satisfactory.

2. Electrical Engineering

a. Process Water Pipe Heating Units - 181 KE & KW Buildings

In the past the 181 KE & KW Buildings heating units have failed periodically and repairs to the equipment have been extensive. An engineering study is in progress to determine a more practical way of heating the process piping.

b. Testing of 165 KE Building Emergency Generators

Emergency generators of 165 KE were tested under full load conditions during reactor operation. No serious malfunctions occurred. Routine generator tests during reactor operation cannot be accomplished until revisions of the Beckman trip circuits and critical alternating circuit power supplies are affected.

c. Design Change Number 148 - Dual Beckman Trip Circuits

A design change has been approved and issued which will require the trip of two Beckmans to scram the reactor. Installation is planned during subsequent outages at 105-KW.

3. Mechanical Engineering

a. Work Area Cranes - 105-KE & KW

The structural strength of the supporting members in the work area cranes is being evaluated by the F. T. Crowe Company, the vendor.

b. Service Building Studies

A study was conducted of the 1717 Building relative to storage, heating, fire protection and safety requirements.

4. Planning and Scheduling

A productive maintenance card system was placed into effect during the month. Class "A" overhauls were completed on 91 pieces of equipment.

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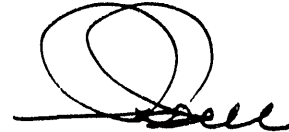
D. Events Influencing Costs

1. Overtime

A total of 256.7 hours of overtime was worked at K Plant, a slight reduction from that worked in August.

2. Spare Parts

There was no significant change in the status of spare parts during the month.



Manager, KE & KW Reactor Operation
IRRADIATION PROCESSING DEPARTMENT

R. S. Bell:RJB:rf

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D-DR REACTOR OPERATION
September, 1956

I. D-DR REACTOR OPERATION - GENERAL

A. Responsibility

In conjunction with the decentralization of the Hanford Atomic Products Operation on September 1, D-DR Reactor Operation assumed the responsibilities specified in the Irradiation Processing Department Functional Chart dated September 1, 1956.

B. Organization

Commensurate with reorganization, E. W. O'Rorke was appointed Manager, D & DR Reactor Operation. The six components and managers established within the Reactor Operation were as follows:

<u>Component</u>	<u>Manager</u>
Power Operation	F. P. Britson
Radiation Monitoring Operation	M. M. Cox
Maintenance Operation	R. R. Meyers
Administration and Personnel Development Operation	R. D. Miller
D Processing Operation	E. J. Filip
DR Processing Operation	E. T. Hubbard

C. Force Report

	<u>September 4, 1956</u>			<u>September 30, 1956</u>			<u>Net Change of Totals</u>
	<u>NE</u>	<u>E</u>	<u>Total</u>	<u>NE</u>	<u>E</u>	<u>Total</u>	
D-DR General	1	1	2	1	1	2	0
D-DR Admin. & Per.Dev.	1	3	4	0	3	3	- 1
D Processing	35	8	43	35	8	43	0
DR Processing	33	7	40	33	7	40	0
D-DR Power	117	14	131	117	14	131	0
D-DR Radiation Mon.	18	5	23	18	5	23	0
D-DR Maintenance	<u>131</u>	<u>22</u>	<u>153</u>	<u>130</u>	<u>22</u>	<u>152</u>	<u>- 1</u>
Totals	336	60	396	334	60	394	- 2

D. Safety and Security Experience

There were 12 medical treatment injuries and no disabling injuries during the month.

Assigned personnel incurred no security violations during September.

E. Personnel Activities

A. F. LaMonte, "B" Shift coordinator of the Radiation Training Program for the Processing Operations, completed the instructors training program.

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E. Personnel Activities (Continued)

Leo C. Lessor, Technical Graduate, was assigned to "C" Shift, D Processing Operation, effective September 14.

T. W. Cannon, Technical Graduate, completed a 13 weeks assignment with D-DR Maintenance Operation on September 30.

G. Inventions and Discoveries

A canvass of all personnel within the component revealed that the following invention or discovery was conceived this month:

Truman Quinn, Instrument Specialist, submitted a "Report on Invention," titled "Slug Rupture Detection and Monitoring of Similar Type Systems."

II. D-DR ADMINISTRATION AND PERSONNEL DEVELOPMENT - R. D. Miller

A. Administration Activities

Instruction letters and report formats were developed for the Level III and Level IV Monthly Record Reports of the five Irradiation Processing Department Reactor Operations.

D-DR Administration and Personnel Development has established a complete set of Position Guide duplimats for all exempt positions within the five Reactor Operations as of September 1, 1956.

A new secretarial arrangement, initiated in September, provides one secretary for every two Level IV managers plus one stenographer and one clerk for centralized clerical duties.

E. Landlord Activities

Landlord space assignments within 100-D Area were reviewed and a letter was issued specifying space apportionment for September cost distribution purposes.

A general survey of 100-D Area was made to determine the current status of buildings and grounds, and the short range landlord maintenance needs. Agreements were arranged with the Transportation Operation to have them continue to provide road, walk, and parking lot maintenance services.

II. D PROCESSING OPERATION - E. J. Filip

A. Production

Reactor input production for September was 134 percent of forecast. A high time operated efficiency brought about by the absence of ruptures and the cancellation of a tube replacement outage were the main contributors to the high production noted.

A. Production (Continued)

Equilibrium power levels were limited by tube outlet water temperature limits of 105-C.

A marked improvement in the over-all time operated efficiency and the input production for the last two months is evidenced by the following data:

	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>
Average Operating Level	922	831	853	764	847	841
Time Oper. Eff. - Over-all	68.3	55.3	73.5	51.9	78.2	87.1
Input Production	18,883	14,235	18,815	12,300	20,543	21,967
Production Forecast						16,400

B. Operating Experience

1. Operating Continuity

The operating continuity of D Reactor was interrupted as follows:

<u>Date</u>	<u>Outage Hours</u>	<u>Reason</u>
8-26-56	190.1 (57 in Sept.)	Tube Replacement
9-3-56	0.4	Panellit Scram - fluctuating gage
9-21-56	34.8	Panellit Scram - malfunction of a VSR clutch prevented recovery in available scram time.
9-23-56	0.5	Panellit Scram - fluctuating gage

The Panellit Scram of September 21 was caused by a stuck vane pivot in the meroid switch of a replacement gage being inserted in the monitor board. To prevent recurrence of this type of incident, continuity of replacement gages is now being checked prior to installation as well as at the Panellit Shop. Start-up was delayed 20 minutes when the clutches on VSR's 20 and 22 did not function properly. The two VSR's were tied out of service and start-up proceedings continued. Recovery was successful but the reactor was shutdown manually when lack of reactivity prevented good control of tube temperatures. Upon inserting VSR's, No. 22 stuck - it was removed from service pending determination of the source of the sticking. The clutches on VSR's 20 and 22 were repaired during the outage and the rods returned to service.

During the September 21 outage, all front and rear nozzles installed during the August 26 tube replacement outage were tightened in an effort to further reduce water collection rates. Removal of a stuck charge encountered in tube 1071-D consumed 3.6 hours of outage time. Forces up to 4500 pounds were used to dislodge the charge - the tube was recharged with regular metal after leak testing. Five faulty thermocouples which failed between September 3 and 21, were replaced.

The effluent line adjacent to 1904-D was uncovered on September 21 to investigate the source of a water leak evidenced during the previous operating period. A portion of a gasket at a joint in the line was missing - the line itself was in good condition. The missing section

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1. Operating Continuity (Continued)

of gasket was replaced with rubber hose. Jute packing held in place by steel plates and "C" clamps was also added. Since start-up, there has been no evidence of further leakage.

On September 15, the power source for the HCR selsyn indicators failed. The cause, a broken wire, was located and repaired with no loss of operating continuity.

D. Events Influencing Cost

1. Overtime Usage

Non-routine overtime for the month totaled 14.5 hours, the lowest total to date in 1956.

2. The high operating efficiency and relatively high operating levels will be reflected in lower unit costs for September.

IV. DR PROCESSING OPERATION - E. T. Hubbard

A. Production

Input production was 128 percent of forecast for September. High time operated efficiency and higher than anticipated power levels were the main contributors to exceeding the forecast.

Equilibrium power levels were limited by 100 C tube outlet water temperature limits. Maximum level attained was 17 percent below record levels because of seasonally high inlet water temperatures.

B. Operating Experience

1. Operating Continuity

DR Reactor operating continuity was interrupted by one scheduled outage on September 27. There were no unscheduled outages. During the outage, 320 tubes of regular metal were processed, work was performed on four production tests, and numerous maintenance items were accomplished. Outage time was 65.4 hours.

2. Equipment Experience

During charge-discharge operations, it was discovered that the charge in tube 2589-DR was stuck. The tube and metal were removed intact when the charge could not be dislodged. At month end the charge had not been inspected to determine the cause for sticking.

Failure of the connector to the "A" test hole ion chamber and high radiation levels necessitated replacing the chamber during the September 27 outage. The chamber supplies signal currents to the No. 1 and 2 Galvanometers. Since the connectors to the chamber are the weakest points in the circuit, they were eliminated and the leads soldered directly to the chamber.

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2. Equipment Experience (Continued)

Five individual tube outlet water temperature thermocouples failed during the month - they were repaired during the September 27 outage. The manipulator on the discharge area periscope failed during the month. In order to make most efficient use of outage time, repairs will be made during the CG-558 outage.

C. Improvement Experience

Metal charged on alternate outages is being hand seated at DR as outlined in DT-105-623A "Relation Between Hand and Flow Seating of Charges as They Affect Slug Rupture Rates." Two hours outage time was required to seat the 320 charges during the September 27 outage.

Scram transient tests, PT-105-11 MR "Scram Transient Test," were run during the September outage; outage time used totaled 1.4 hours.

PT-105-605A "HCR Calibration Test - Part II" was run during the September outage. Outage time used totaled 1.9 hours. The test shows good confirmation of the HCR calibration tests performed at DR in February and June, 1956.

Four process tubes were removed during the September outage as authorized by PT-105-522 E "Removal of Process Tubes for Corrosion Study." Fifteen hours outage time was required to accomplish this work.

D. Events Influencing Costs

1. Overtime Usage

Only 1.5 hours of non-routine overtime was used by the DR Processing Operation for September. This represents a new 1956 low for DR.

2. Unit operating costs for September will compare favorably with those for July and August.

V. D-DR POWER OPERATION - F. P. Britson

A. Operating Experience

Critical power conditions were in effect in 100-D & DR Area, September 1 through September 6, and on September 17, 26, 27, and 28.

D-DR Power Operation has functional responsibility for the operation of the export water system. The main pumping load was transferred to 100-D Area from 100-B Area on September 7. B Power Operation provided assistance in maintaining system pressure until September 23, when their portion of the load was transferred to Power Operation.

The semi-annual inspection of the 100-D & DR Area septic tanks was completed on September 17 - all tanks are in good condition.

A. Operating Experience (Continued)

A surge occurred on the export system on September 9, when an operator accidentally tripped off the transfer switch to the surge suppressors in 100-D Area.

A semi-annual survey of the coal storage was completed on September 26. Survey results and inventory results agreed closely.

B. Equipment Experience

1. 181 Building

The new No. 15, 13,000 GPM pump installed under Project CG-558 was placed in service on August 31. No. 1 pump was removed from service on September 17 and 24, due to excessive vibration. Minor Construction has started an alignment test on the pump unit and discharge header to determine the source of the vibrations.

2. 183-D, DR Buildings

In anticipation of plant wide usage of Separan, conversion of the temporary Separan feed system at 183-DR to a permanent system was begun. Installation of similar permanent feed equipment was also started at 183-D.

One inch of sand was added to each filter except No. 6 at 183-DR for CG-558 test purposes. The filters normally contain 12 inches of gravel, four inches of sand, and 26 inches of anthrafil. The annual addition of anthrafil to the 183-D filters was completed on September 7.

C. Improvement Experience

1. Project CG-558

No. 14 and 13 pumps were released from 181-D Building to Minor Construction for dismantling on September 5 and 27 respectively.

Installation of the new No. 6, 15,000 GPM pump was completed in 183-D Building on September 26. Since placing the pump in service on September 27, excess noise and cavitation have been apparent.

New effluent controllers were installed in each of the 183-D filters.

D. Events Influencing Costs

Significant events influencing costs included addition of anthrafil to the 183-D filters, replacement of three steam line poles for Minor Construction on the work order basis, and replacement of the 183-D filter Simplex Valve diaphragm and bronze bushings.

VI. RADIATION MONITORING OPERATION - M. M. Cox

A. Radiation Occurrences

There were no radiation incidents, two lapses of radiation control, and eight radiation occurrences during the month. Three of the radiation occurrences involved failure to follow established procedures; the remaining five occurrences involved contamination found outside radiation zones, and on personnel. A lapse of radiation control occurred when a rotational trainee was observed eating lunch while wearing SWP clothing in the 108-D lunchroom.

The second lapse of control occurred when two 105-D Processing personnel received skin contamination up to 5,000 c/m and personal clothing contamination up to 40,000 c/m while transferring poison material from the wash pad to zero-far level.

B. External Exposure Control

Maximum dose rates of 800 mr/hour were received by D Processing personnel during the manual raising of VSR 22 immediately after a scram. After the reactor had been shut down for eight hours, the dose rate decreased to 25 mr/hour for work on this rod.

A maximum dose rate of one r/hour at 12 feet was detected during the unlocking of a cask containing tube sections removed from the 105-D storage basin for burial. A dose rate of 100 mr/hour at 18 inches was detected on one side of the cask after return from the burial ground. Further investigation revealed that a two foot section of thermocouples was still in the cask. The thermocouples gave a dose rate of 200 r/hour at one inch. The wire was buried with a subsequent load of tube sections.

Four process tubes were split and removed from the DR Reactor at a maximum dose rate of 150 mr/hour to personnel. Maximum dose rate on the splitters used was three r/hour including 100 mr/hour at two inches.

Irradiated foil samples were removed from the 105-DR test wells at a dose rate of 200 mr/hour to personnel. A maximum dose rate of 10 r/hour including 50 mr/hour at two inches was measured on the removed foils.

A shielding plug was removed from the "B" hole facility at DR Reactor at a maximum dose rate to personnel of 2 r/hour. A dose rate of 18 r/hour at four inches was measured on the plug.

Dose rates to personnel working near the storage caves in the 189-D Metallurgy Laboratory were reduced from 25 mr/hour to 10 mr/hour when a lead sheet was placed in front of drain lines below the caves. The maximum dose rate experienced in the laboratory during the month was 2 r/hour while transferring process tube sections.

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C. Contamination Experience

With one exception, all air samples taken were within the maximum permissible limits for the respiratory protective equipment worn. An air sample taken during punching of samples from tube sections at 189-D Building gave an activity density of 5.9×10^{-8} uc/cc. No respiratory protective equipment has been used on the job in the past. A study of the situation is underway to determine the type of respiratory equipment needed and/or redesign of equipment.

A total of 128 plant vehicles were surveyed during the month. Four vehicles were found contaminated. The maximum contamination found was 90,000 c/m in the bed and 20,000 c/m on the cab floor of the 105-DR Processing Operations' pick-up. The contamination was removed without difficulty.

Water contaminated up to 10,000 c/m at one inch was discovered on the walk outside the 105-DR Wash pad. The source of this contamination was condensation of vapors from the wash pad decontamination tank. The affected area was made a temporary radiation zone.

D. Events Influencing Costs

A total of 58.8 hours of Radiation Monitoring overtime was used during the month. This was the smallest amount of overtime used to date in one month in 1956.

VII. MAINTENANCE OPERATION - R. R. Meyers

A. Equipment Experience

1. Instruments

a. Panellit Data

	<u>105-D</u>	<u>105-DR</u>
Base checks	All gages	All gages
Gages adjusted during operation	711	426
Gages replaced:		
Mercury separation	2	2
Defective switches	4	1
Capillary tube failures	1	1
Impulse lines:		
Response checks	All gages	All gages
Sluggish lines corrected	7	3
Oil added	0	31

b. Pressure Monitor System

The Panellit gage on tube 0471-D in 105-D Building was removed because of a leak in the Bourdon tube. The replacement gage, though visually checked and seemingly functioning properly prior to installation, caused a scram when the by-pass jumper was removed. The switch vane on the replacement gage was stuck in the open position due to mercury coming in contact with the switch pivot. The replacement gage was inspected in the Panellit Shop in December, 1955, and had been stored in a prescribed storage box since that time. All replacement gages will be checked for continuity immediately prior to installation in the Panellit board to prevent recurrence of the incident.

c. File Control Instrumentation

No. 4 Beckman controller at 105-D Building became erratic and would not hold a set point on the right high trip. After replacing electronic tube 2050, the potentiometer, and two capacitors, the controller functioned properly.

2. Electrical

On September 14, a loose wire on the 105-D selsyn indicators for the horizontal rods burned off. The wire was repaired and the indicators were returned to service.

During an attempted scram recovery at D Reactor, VSR's 20 and 22 would not pull up in normal fashion. Oil was found in the housing of the magnetic clutch collector rings on the rods. The oil was removed, collector rings cleaned, clutches readjusted, and the rods returned to service.

3. Mechanical

All front and rear face pigtailed at 105-D and DR have been inspected, no faulty pigtail nuts were found.

No. 7 exhaust fan at DR has vibrated severely in the past causing the anchor bolts to pull loose. A new shaft and bearings were installed and the unit "electronically" balanced.

A six inch by-pass line was installed around the hot water recirculation pump in 105-DR to reduce the start-up load. The steam turbine and Birmingham drive gear on No. 7 Pomona pump in the 181 Building were given a class "A" overhaul. All parts were found to be in good condition.

3. Mechanical (Continued)

The 42 inch effluent line from 1904-D was leaking at a point between the area fence and the bank of the river. The line was exposed on September 21 and the leak located at a joint in the pipe. The joint seal on this pipe is a neoprene "O" ring; the upper third had failed. A three-fourths inch rubber hose was forced into the opening that had been occupied by the "O" ring. Jute was then packed into the remaining void. A quarter inch steel plate was cut to the desired shape and then clamped to the collar on the pipe with "C" clamps.

Material handling:

- 183-DR - 1000 bags of sand to filter beds.
- 2 carloads of chlorine.
- 183-D - 2 carloads of anthrafilt distributed to filter beds.
- 184-D - 1 carload salt
- 185-D - 133 barrels of dichromate
- General - 137 empty drums returned to Stores.

B. Shift Maintenance Activities

The shift crews performed "cold" maintenance in the area and rendered assistance on CG-558 outage work at 100-B Area.

C. Maintenance Engineering and Planning and Scheduling

1. Instrument Engineering

Lead wires to the individual outlet water temperature thermocouples were inspected at both D and DR Reactors. At D Reactor, the insulation on the wires in the center half of the reactor has become extremely brittle. The degree of brittleness decreases with distance from the center of the reactor. At DR Reactor, the leads to approximately 600 thermocouples in the upper center of the reactor are brittle. Follow-up inspections will be made in six months to determine the rate of deterioration of the insulation.

Installation of graphite thermocouple stringers progressed at both D and DR Reactors. Two of the three stringers planned for D and two of the nine stringers for DR have been installed.

2. Planning and Scheduling

Preparation of PM (Preventive Maintenance) cards for the 181-D, 182-D, 183-D, and 184-D Buildings has been completed. PM Cards for D-DR Reactor Operation equipment are approximately 50 percent complete.

EW O'Rourke

Manager
D & DR Reactor Operation
IRRADIATION PROCESSING DEPT.

H REACTOR OPERATION

September, 1956

H REACTOR OPERATION - GENERAL

I. RESPONSIBILITY

Effective September 1, 1956, H Reactor Operation was established as a part of the Irradiation Processing Department to operate processing and supporting facilities in 100-H Area, and to provide the Central Maintenance function for all Reactor Operations. During the month there were no changes in the originally assigned responsibilities as detailed in Irradiation Processing Department functional charts and guides.

II. ORGANIZATION

The organization of H Reactor Operation was established effective September 1, 1956, in conformance with manpower requirements as specified in detail in Irradiation Processing Department organization charts and directories. During September, there were no significant changes in the organization or organizational nomenclature of H Reactor Operation. Routine transfers of personnel into and out of H Reactor Operation are reported in the H Reactor Operation Personnel Accountability Summary for September, 1956.

III. FORCE REPORT

	<u>As of Sept. 4</u>			<u>End of This Mth.</u>			<u>Net Change</u>
	<u>NE</u>	<u>E</u>	<u>Total</u>	<u>NE</u>	<u>E</u>	<u>Total</u>	
H Reactor Oper. Gen.	1	1	2	1	1	2	0
H Pl. Adm. & Pers. Dev.	2	3	5	1	3	4	-1
H Processing	38	8	46	36	8	44	-2
H Power	70	12	82	70	12	82	0
H Radiation Monitoring	11	4	15	19	4	23	+8
H Maintenance	81	15	96	84	15	99	+3
Central Maintenance	78	14	92	77	14	91	-1
Total	281	57	338	288	57	345	+7

IV. SAFETY EXPERIENCE

There were no disabling injuries or near-serious incidents in H Reactor Operation during September.

A Safety-Housekeeping Committee for 100-H Area was established to promote both safety and housekeeping within the area. The committee, composed of one fourth level manager as chairman and four members, all on a rotational basis, was named to inspect one-third of 100-H Area each month, providing complete coverage of the area once each quarter.

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V. PERSONNEL ACTIVITIES

At month end, two Technical Graduates were on rotational assignment in H Reactor Operation.

W. P. Howell, Radiation Analyst, presented a radiation hazards discussion to 26 Project Engineers in the Facilities Engineering Operation to acquaint them with radiation problems in the 100 Areas.

Throughout the month, functional managers of H Reactor Operation met regularly with their counterparts in other Reactor Operations to discuss mutual problems and exchange information.

VI. NON-ROUTINE REPORTS ISSUED

No non-routine reports of reporting significance were issued during September.

VII. INVENTIONS AND DISCOVERIES

A canvass of all personnel within the component revealed that no inventions or discoveries were conceived this month.

H ADMINISTRATION AND PERSONNEL DEVELOPMENT OPERATION

Administration

During September, administration activities were confined primarily to those necessary for and characteristic of the establishment of a new organization. Exempt employee salary papers necessary to effect the initial transfer of exempt people to the H Reactor Operation organization, and subsequent transfers to other Reactor Operations were processed. IBM listing of non-exempt personnel assigned to H Reactor Operation were revised and corrected, and the necessary papers reflecting these changes were submitted. H Administration and Personnel Development Specialists continued the coordination of all personnel movements for all Irradiation processing Department maintenance craft personnel.

Personnel record systems for all people in H Reactor Operation were established including alphabetical rosters and a force accountability system. In addition, existing Reactor Section administrative procedures were reviewed and new procedures were established as required by the Irradiation Processing Department organization. Finally, many miscellaneous administrative details were performed as required to promote effective functioning of H Reactor Operation in particular and 100-H Area in general.

B. Personnel Development

At month end, surveys were in progress to provide a basis for manpower forecasts and Technical Graduate requirements both to cover the remainder of FY 1957 and FY 1958.

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C. Cost Control

A procedure for the weekly reporting of overtime usage by each function within H Reactor Operation was established to provide an effective control of overtime usage for the plant as a whole. These reports summarize the overtime worked for H Reactor Operation by both H Reactor Operation people and personnel from the other plants. In addition an overtime forecast for the remainder of the FY 1957 was prepared as requested by the Financial Operation. Included with this forecast was a resumé of overtime usage by the various functions for the first eight months of CY 1956.

E. Landlord

As requested by the Financial Operation, a complete review of space occupancy within 100-H Area buildings for which H Reactor Operation has landlord responsibility was made to provide a basis for rental charges under the Irradiation Processing Department organization.

A letter outlining in detail the scope of landlord services within 100-H Area, together with explanatory information relative to methods for securing these services, was prepared during the month and at month end was ready for distribution to all tenants within the area.

The necessary Work Orders and Purchase Requisitions for improving the 1704-H Building conference room were issued. Major items included covering of the ceiling with acoustic tile, installing of a wall mounted motion picture screen, constructing a new lectern, providing facilities for displaying charts or graph type material, and replacing tables and chairs with comparable furniture of uniform design.

During the month numerous requests for office alterations for the convenience of new tenants within the area were reviewed and approved. Assistance was provided in the preparation of appropriate work orders, together with the necessary liaison to insure the expeditious execution of priority items.

H. PROCESSING OPERATION

A. Production

Input production of plutonium exceeded forecast by 22.9 per cent. Equilibrium power levels were restricted by operating limits based upon tube corrosion. The maximum power level attained during the month was 95 MW below the theoretical maximum, principally because flattening was less than optimum.

B. Operating Experience

1. Operating Continuity

Operating continuity was affected by the following events:

- a) 9-6 Reactor shut down because of a ruptured slug in tube 1587-H. Removal within minimum scram recovery time failed because the rear cap equipment was placed on the wrong tube.
- b) 9-7 Reactor scrammed because the flux monitors were not by-passed and re-ranged fast enough during a cold start-up.

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- c) 9-9 Reactor shut down for scheduled replacement of 100 process tubes.
- d) 9-17 Reactor scrammed during Panellit system maintenance because of faulty toggle valve.
- e) 9-24 Reactor scrammed during Panellit system maintenance because of improper jumpering of electrical contacts.
- f) 9-25 Reactor scrammed twice during Panellit system maintenance because:
 - 1. The wrong toggle valve was opened.
 - 2. A gauge apparently was binding within the panel.

2. Equipment Experience

- a) Ball 3X System - All extraneous electrical circuits were removed from the Ball 3X System according to Design Change No. 142. Plans for processing irradiated balls from the October, 1955 drop are nearly complete.
- b) Process Water System - Pumping of waste from the retention basins to the crib in the past has resulted in damage to the 1907-H Building due to thermal expansion applied to the building wall. Work is in progress to anchor the line and force deflection toward the crib.
- c) Gas System - Several aspects of the gas system received attention during the month. An automatic system for converting high pressure gas to usable low pressure was installed. Instrumentation for establishing daily gas inventory is being reworked. Three rear bellows were sealed with silicone grease to evaluate the benefits of a whole-sale program to reduce gas losses by this method. Dryer performance is being improved in step-wise fashion by repacking the blower oil seals (to prevent contamination of silica gel by oil), replacing the silica gel adsorbent, and installing automatic drain lines for removing condensate which accumulates between the blower outlet and heater-cooler.
- d) Pressure Monitor - The toggle valve installation (part of Project CG-558), was completed this month. Procedures were revised to require continuous pressure monitoring while recalibrating gages during operation to assure that all adjustments were within Process Standards. This extra precaution resulted in two Panellit scrams.
- e) Temperature Monitor - Process Change No. 121 which provides for faster monitoring during hot start-ups was completed. Twenty-four inoperative thermocouples were repaired during the month.

D. Events Influencing Costs

Overtime usage consisting of 171.5 man hours, together with a lengthy tube replacement outage and other maintenance programs combined to adversely effect costs. There were no significant factors beneficially influencing costs.

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H POWER OPERATION

A. Operating Experience

Process water flow was reduced three times during the month for a total of 159 hours.

During the reactor outage of September 10, several water systems were isolated for "ties" with Project CG-558 facilities.

The 182-H Building surge suppressors on the export water system cycled once at 12:41 a.m. on September 9, due to inadvertent trip of an electrical transfer switch in 100-D Area. Service was restored to normal immediately. One export water pump was placed in service on September 23, in order to assist 100-D Area in carrying the load during the extended Project CG-558 outage at 100-B.

A break occurred in the ten-inch 183-H Building normal filtered water supply line to 184-H Building on September 15. Repairs were completed and the line was returned to normal service on September 25.

No. 2 boiler in 184-H Building was removed from service on September 12, for an annual third-party inspection and overhaul, and was completed on September 19.

The semi-annual survey of the coal storage pit was completed by the Project Engineering Field Unit on September 27.

Number thirteen 800 hp process motor in 190-H Building failed during a routine start on September 13. A spare stator was installed and the pump unit was returned to service on September 14.

During September the Analytical Laboratories performed routine control services and special analyses on 250 essential material samples, 210 water samples, 31 lubricating oil samples and three special samples of water soluble oils.

B. Equipment Experience

Routine inspections of relief valves, chain hoists and overhead cranes were made during the month.

Leveling of the 225 psi steam distribution system was completed on September 7.

A bent agitator shaft and faulty electrical breaker were repaired on the solids feed tank in 190-H Building. These difficulties were attributed to insufficient clearance between the solids agitator paddle and mix tank bottom. This problem has been corrected by increasing the clearance to twelve inches.

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Improvement Experience

E. H. Jeschke, Combustion Engineering Company representative, visited 184-H Building on September 10, 11, and 12, to inspect the steam generators and review operating procedures in an effort to improve operating efficiencies under post CG-558 operating conditions. His report will be submitted at a later date.

The standard analytical procedure for determining phosphate concentration in raw and filtered water samples has been revised to meet the low concentrations normally encountered. The revised test method increases the sensitivity by a factor of two and requires less work.

D. Events Influencing Costs

Maintenance items which adversely influenced costs included, overhaul of No. 2 boiler, repairs to the normal filtered water supply line to 184-H Building, preparatory work for pumping anthrafil to the 183-H Building filters, and repairs to the air compressor and solids mix tank in 190-H Building.

H RADIATION MONITORING OPERATION

A. Radiation Occurrences

There were no radiation incidents during the month. One lapse of radiation control was recorded involving the spread of contamination of 4000 c/m to an employee's face and shoes, and to the storage area during work activities on the wash pad. Decontamination was effected in all cases.

B. External Exposure Control

A maximum dose rate of 200 r/hr at one inch was measured on the pigtail of rupture tube 1587-H. A maximum dose rate to personnel of 2 rads/hr was experienced while installing removal equipment.

Dose rates associated with tube removal operations remained essentially the same as during previous H Reactor outages. All operations in the discharge area were accomplished at background levels with exception of the hand sawing of an irradiated process tube. A maximum dose rate of 10 rads/hr at surface including 4 r/hr at four inches was measured on the jaws of a guillotine removed from the discharge area by remote handling at dose rates of 45 mr/hr to personnel.

Remote swabbing of push poles on the charge face was accomplished at a maximum dose rate to the hands of 250 mrad/hr.

A maximum dose rate to personnel of 2 r/hr was encountered while installing lock bars on the third safety system ball hoppers. The presence of irradiated balls in the hoppers created these dose rates.

Tube burial operations were carried out at average dose rates of 100 mr/hr to the crane operator at the transfer area crane control station, and 35 mr/hr to the driver of the pick-up truck transporting the loads to the

burial ground. Extensive tube burial operations were suspended during the month pending the completion of a new access road to the burial ground. This road will permit this operation to be performed without exposing construction employees to the associated radiation hazards.

A test run of the KAPL - 120 "crud" sampling technique was carried out at a maximum dose rate of 25 mrad/hr including 15 mr/hr.

Radiation work in other locations of H Reactor Operation was performed at normal radiation levels.

C. Contamination Experience

There were two cases of contamination spread beyond boundaries of established radiation zones. Contamination to 3000 c/m was spread into the work area corridor during the tube removal outage while transferring contaminated broaches. Radiation control measures to cover this phase of tube removal work are being incorporated into revisions of the Radiation Work Procedures.

During a routine survey, the storage area and adjacent corridors Nos. 3, 4, and 5 were found contaminated to 800 c/m. The affected areas were decontaminated and released to normal status.

During the poison discharge following the tube outage, fresh air respiratory protection was required for all discharge area work due to gas indications up to 150 mrad/hr in the work locations.

A total of 61 vehicles were surveyed during the month, two of which were found contaminated. The contamination was reduced to less than detectable limits in both cases.

There were two cases each of hand and skin contamination. All were easily reduced to less than detectable limits and did not present exposure problems to the personnel involved.

D. Radiation Training

A radiation training program for Processing Operations non-exempt employees was initiated during the month. Coordination of the program is by the Analyst assigned to the H Radiation Monitoring Operation. Five of the seven planned lectures have been completed. Four Processing Operations extra coverage supervisors completed a two-week training period covering lecture presentation and program philosophy. Actual presentation of the first lecture was in progress as of month end.

Eight Radiation Monitor Trainees are currently receiving on-the-job training under the direction of H Reactor Operation personnel.

The classroom training program for Radiation Monitors and Journeymen which had been scheduled for early October was postponed pending the completion of space accommodations in the 190-H Building.

Preparation of the results evaluation of the Radiation Attitude Survey is proceeding. The Statistics Operation is preparing graphical illustrations of data.

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Events Influencing Cost

A total of 48.2 hours of overtime was required for shift change coverage during the tube removal outage and for additional manpower which was required to meet work schedules. Overtime requirements for September were the lowest for any month of 1956.

H MAINTENANCE OPERATION

A. Equipment Experience

1. Instrument

Maintenance of the Panellit system included routine trip checks, base checks, and range changes. Five faulty gauges had to be changed as the result of leaking, faulty trip, stripped threads, or gauge binding. The installation of the rapid scanner system for tube temperature monitoring was completed during the tube replacement outage.

The gamma monitor system required maintenance as the result of Bristol recorder electrical failure and L & N recorders synchronization problems. In the latter case, several relays had been changed and replaced with a mechanical device which is showing considerable wear resulting in the equipment not synchronizing.

A study has been completed on the maintenance problem concerning the gamma monitoring recorders in 105-H Building. A request has been made to the Instrument Development group to evaluate development of the "print on command" circuit in the L & N recorders.

Work is proceeding on the gas addition control system. Main work accomplished included regulating valve installation, meter installation, and starting of high pressure tank thermocouple replacement.

2. Electrical

Design Change No. 142 affecting 105-H Building Ball 3X circuitry was completed during the tube replacement outage. This change did not make any excessive alterations in the electrical system, but merely removed the superfluous wiring and equipment from the system to make it easier to maintain.

Work was continued as outage time allowed on the modifications to the 105-H Building communication system.

3. Mechanical

The primary pump units in 190-H Building are being overhauled as they are made available. These units will be kept on standby after work relative to Project CG-558 is completed.

Subsequent to the establishment of desirable elevations for 100-H Area steam lines at the support poles, lines were repositioned.

Hanger changes of as much as four inches were required.

One VSR at H Reactor required adjustment during September as the result of dropping improperly. Since this work is seldom necessary and is a considerable problem in adjustment, a write-up is being prepared covering the procedure used and will be distributed to other areas.

Anthrafilt is being placed in 183-H Building filter beds to bring them up to the required level. This is being accomplished by pumping directly from the railroad car to the filter floor.

Dry filters in the 105-H Building ventilation system were changed as the result of an excessive pressure drop of 2.7 inches of water. After changing the filters, the drop decreased to 0.4 inches of water. The new filters can be back-washed when the pressure drop is excessive. A manometer will be installed to make it possible to check this pressure drop periodically.

B. Shift Maintenance Activities

At month end shift personnel were being used primarily at B Reactor for work during the Project CG-558 outage. General area work is being assigned to the shift crews on an individual basis to permit each group to feel responsible for the completion of assignments.

C. Maintenance Engineering, Planning and Scheduling

1. Instrument Engineering

a. Graphite Thermocouple Replacement

Parts to complete the first orders for graphite thermocouple stringers have been completed, and Instrument Engineers of the operations involved have been informed as to the status of their thermocouple replacement problem. The design change of the graphite thermocouple stringers will be complete following a study of the check prints. The complete design of the 1/2 test thermocouple stringer has been forwarded to D/DR Reactor Operation.

2. Mechanical Engineering

a. Production Planning Offices - 105-H Building

The required engineering on this addition has been completed. The air conditioning unit is available and working sketches showing recommended duct installations have been submitted.

b. Preheater Coil Freeze-up - 105-H Building

To insure proper installation of the changes necessary to alleviate this problem, it is not advisable to start this work so late in the fall. A general solution to the problem has been submitted, but details of installation have not been completed. Engineering work regarding details and final estimates is continuing.

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Planning and Scheduling

a. Preventive Maintenance Program

Organization of the preventive maintenance program continued during September at a reduced rate due to a lack of clerical personnel.

b. Individual Time Sheets

Use of individual time sheets was started by the electrical and instrument craftsmen during September. This time sheet is a key factor in the preventive maintenance system. To orient craftsmen on the necessity of recording accurate data, a series of meetings was held to explain the objectives of the program and to instruct the men how to fill out the cards.

Coincident with the start of the individual time sheets, a McBee Key-sort filing system was started which will be utilized for timekeeping and backlog purposes.

D. Events Influencing Costs

During September, 165 hours of overtime were utilized, representing one per cent of available hours.

A study is being made to determine reasons for lost time in an attempt to improve the per cent of applied labor. Steps in the study include monitoring starting and quitting times, working on a planned basis, minimizing interruption of scheduled work, and putting productive maintenance methods into effect as soon as possible.

A Spare Parts Coordinator has been added to the work force. A large part of his time is to be utilized in an effort to reduce the spare parts inventory to a reasonable size for continuous operation.

CENTRAL MAINTENANCE OPERATION

A. Tube Removal

During two major tube removal outages, 195 tubes were replaced, and four air channels were retubed. Three tubes at F Reactor were shielded as air columns after removing stuck charges. One tube at H Reactor was successfully split, but could not be removed by normal means. This channel was shielded and left for removal on a subsequent outage.

In addition to the scheduled tube removal outages, assistance was provided during twelve other outages.

A special study of problem tubes in each reactor is being made by the Shift Specialist to develop plans and tools for reactivation during minimum outages.

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B. Machine Shop

The shop backlog was reduced to two weeks during the first three weeks of the month when work requests were slowed by reorganization. However, the month closed with a 20-crewday backlog.

The Cincinnati milling machine procured from 2101 Building was installed and placed in service, and the hydraulic planer procured from 100-B Area was set and energized. An 18-foot lathe procured from 100-B Area was installed in the 108-D Building Hot Shop replacing a smaller 1917 model machine that was excessed.

Decreased tube removal activity allowed time to recondition tube removal tools in the Hot Shop. Also, the use of hydrochloric acid with formaldehyde inhibitor increased the rate of decontamination as well as reduced the shop exposure resulting in greater efficiency.

C. Sheetmetal

The backlog remained at approximately 2000 manhours. Much activity has been given to Panellit system work during the 100-H and B outages. Metal lining the feeders at the 146-F Building animal farm, and installation of six air conditioners at 108-F Building was completed.

E. Central Maintenance Engineering

1. New Hanging Guillotine

The initial design of this all-aluminum guillotine was completed and approved prints were issued to the shops for construction. Final design of the cutting blade is pending further tests when the prototype is complete.

2. One-Shot Van Stone Tool

Failure to this tool to perform satisfactorily has been found to be due to the end preparation of the tube by the rib remover tool, and the inability of the machinist to carry out the designer's intent. The rib remover trimming docks were redesigned to eliminate the end-preparation problem. Engineering has discussed the machining problem with the shop, and will assist with layout and inspection to provide the desired results.

3. C Reactor Nozzle Boring

The fixture, method, and machine set-up to permit boring C Reactor nozzles to accommodate oversize slugs has been developed. The cost and time estimates have been forwarded to B/C Maintenance Engineering.

4. Work Area Tube and Push Pole Rack

A new work area rack has been designed for H, DR, and B Reactors to provide both tube storage during tube replacement, and push pole storage. At present, two separate racks are necessary. The fabrication

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of these racks will eliminate the need of hauling separate tube racks between areas.

5. Standardization of Jackbolts and Willmott Couplings

Maintenance Operation personnel in all areas were contacted to standardize jackbolt procurement and revise SK-1-2137 so that off-plant orders can be placed. Comments were reviewed and verified through actual measurement by the Outage Specialists. The revised SK-1-2137 has been sent to Plant Engineering for drafting.

Agreement was reached with Maintenance Operations to standardize the square-type Willmott coupling. Four-hundred of the approved square type were ordered off-plant, and will be adapted to existing mandrels and splitters in the 108-D Building shop.

6. New Decontamination Procedure

A new decontamination solution composed of hydrochloric acid with a formaldehyde inhibitor has been developed from a suggestion made by a craftsman, and has proved to have wide application in the removal of contamination from aluminum and zinc. A series of tests were made, and the new solution has been adopted as an approved decontaminating agent. In addition, the solution has good application as a derusting agent.

Shop Modernization and Layout

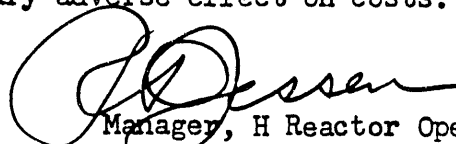
The tool crib in 1717-H Building was studied to determine the possibility of better tool handling and storage. A mezzanine or second floor was designed and structural materials ordered. The first floor layout was established to facilitate control and accountability of critical machine shop jigs, fixtures, and cutting tools.

Exact scale templates of all machines in the 108-D Building shop were made and positioned on a scale floor layout drawing. Relocation of the shop is in progress. Scale drawings of the main 1717-H Building shop have been received and the design of the sheetmetal, welding and blacksmith shop is in progress. Outside material storage and handling at 1717-H Building is under study to set up a safe and efficient method of handling heavy boiler plate, sheetmetal, bar-stock, and pipe.

G. Events Influencing Costs

Overtime amounted to 79.1 manhours of overtime during the month, or less than one per cent of total hours available.

Completion of 60 splitter assemblies which have been set up as spare parts stock are expected to have a temporary adverse effect on costs.



Manager, H Reactor Operation
IRRADIATION PROCESSING DEPARTMENT

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F REACTOR OPERATION
SEPTEMBER - 1956

F REACTOR OPERATION - GENERAL

I. RESPONSIBILITY

As of September 1, 1956, F Reactor Operation assumed responsibilities as defined in Irradiation Processing Department functional charts dated September 1, 1956.

II. ORGANIZATION

No changes occurred in the exempt roll during the period.

III. FORCE REPORT

	<u>SEPTEMBER 4</u>			<u>SEPTEMBER 30</u>			<u>CHANGE</u>
	<u>NE</u>	<u>E</u>	<u>TOTAL</u>	<u>NE</u>	<u>E</u>	<u>TOTAL</u>	
Adminis. and Pers. Dev.:	1	3	4	1	3	4	---
Processing:	35	8	43	35	8	43	---
Power:	69	8	77	67	8	75	- 2
Radiation Monitoring:	10	4	14	10	4	14	---
Maintenance:	92	15	107	92	15	107	---
General:	1	1	2	1	1	2	---
	---	---	---	---	---	---	---
TOTAL:	208	39	247	206	39	245	- 2

IV. SAFETY EXPERIENCE

No disabling injuries or incidents were reported during the month.

A formal clerical safety and security meeting program was established for Irradiation Processing Department clerical personnel located in F Area.

Civil Defence shelter location signs were installed in the 184 Building on September 11, 1956.

A practice evacuation was conducted at 10:05 a.m. on September 29, 1956.

V. PERSONNEL ACTIVITIES

R. K. Gange, Maintenance Engineer - Instruments, attended a vendor's demonstration in Richland on September 27, of a communication system that might be adaptable for the Maintenance Operation.

H. D. Lenkersdorfer, Technical Graduate assigned to F Maintenance Operation, developed a method of suspending a charging machine from a monorail on the 105-F Building "C" elevator.

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PERSONNEL ACTIVITIES (Continued)

S. L. Nelson, Manager - F Processing Operation, participated in the preparation of material for the Reactor Handbook to be published by the Atomic Energy Commission.

W. J. Gartin, Analyst - F Processing Operation, participated in the organization and teaching of the first session of a vocational course in Reactor Engineering Fundamentals being offered by the General Electric School of Nuclear Engineering.

R. McDonald, Supervisor - F Power Operation, conducted a group of 36 women employees from the 700-1100 Areas on a tour of the F Power facilities on September 11, 1956.

J. R. Jacobson, Technical Graduate assigned to F Processing Operation, was drafted into the United States Army and therefore terminated on September 21, 1956.

VI. NON-ROUTINE REPORTS ISSUED

- A. "'C' Elevator Charge Machine Modifications", dated September 27, 1956; from H. D. Lenkersdorfer to R. M. Scott.
- B. "F Reactor Operation Radiation Occurrence Investigation", dated September 11, 1956, author W. G. Westover. (Lapse of control during stuck charge removal.)

VII. 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.

F PLANT ADMINISTRATION AND PERSONNEL DEVELOPMENT OPERATION
SEPTEMBER - 1956

FUNCTIONAL ACTIVITIES

A. Administrative Activities

Salary records have been established and reviewed.

Week end and holiday coverage assignments were established for September, October, November, and December, 1956.

B. Personnel Development

A questionnaire on supervisory training programs was developed and distributed to exempt personnel.

C. Cost Control Activities

The FY-1957 overtime budget has been reviewed. Current forecasts are 3.1 per cent of available man-hours as compared to 3.6 per cent previously budgeted.

E. Landlord Activities

Initial procedures were established for administration of area landlord functions. A space occupancy survey was completed and a report issued showing space allocation and landlord billings as of September 4. A coding system was established for recording landlord expenditures with costs incurred under these codes to be liquidated through the monthly rental charge to tenants for space occupancy.

Removal of the MS-6 Building (a temporary construction warehouse) by the off-Plant purchaser was complete at month end.

Building alterations were made to 1709-F Building to provide offices and work area for Drafting Operation personnel and this facility moved into the space provided.

F PROCESSING OPERATION
SEPTEMBER - 1956

FUNCTIONAL ACTIVITIES

A. Production

Time operated efficiency (forecasted at 59.8 per cent) reached 72.3 per cent during September because of the absence of ruptured slugs, scrams, and other unscheduled outages. This permitted the achievement of a reactor input production of 127 per cent of forecast. Equilibrium power levels were restricted by the 100 C outlet water temperature limit which has been established for individual tubes. A decrease in the inlet water temperature near month end permitted a slight increase in reactor level.

B. Operating Experience

1. Operating Continuity

<u>Outage Date</u>	<u>Outage Hours</u>	<u>Reason</u>
9-2-56	199.4	Tube Replacement

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2. Equipment Experience

Tube Replacement - A total of 100 new tubes was installed during the month. Four of these were installed in channels 0285, 0594, 0683, and 1083, which had been left empty on previous outages. Channel 0955 was left empty after the tube was removed on September 8, 1956, and is ready for replacement on a future outage. One new problem tube (2257) was encountered during the month. It had been reported to be empty on a previous outage but an obstruction was found and attempts to retube the channel were unsuccessful. The calculated replacement rate for the maintenance portion of the work was .942 hours per tube.

Stuck Charges - During regular charge-discharge operations, stuck charges were encountered on tubes 0667 (cored), 0691 (cored), and 0955 (regular). Another charge (4265 - cored) was discharged only after the application of 1200 pounds force on the front to break it loose.

Tube 0955 was removed by pushing the tube and charge together through a dummy gunbarrel and breaking it into sections with the "D" elevator. The charge from tube 0667 was removed by back seating at 5000 pounds and pushing from the front at forces up to 4000 pounds. The empty tube was isolated from the water system and blanked off in preparation for replacement at the next outage. The charge was removed from tube 0691 by removing the ribs downstream of the stuck slug and pushing the slug out through the deribbed section. Forces up to 16,000 pounds were required to accomplish this. Previous attempts to push out the tube and charge together at 18,000 pounds force had been unsuccessful.

Leak Testing - One hundred thirty-six old tubes between rows six and 20 were pressure tested during the month. Five minor Van Stone leaks were found and corrected. Tube 1495 failed to hold pressure during testing and the rear Van Stone separated from the tube when the rear nozzle was removed for inspection. The tube was discharged and isolated from the water system in preparation for removal at a future outage.

The water collection rate dropped to a comparatively low level of seven gallons or less per day during September.

"B" Test Hole - The water-cooled thimble was removed from "B" test hole during the September outage and the empty channel was sealed off.

Miscellaneous Outage Work - Miscellaneous outage work completed during the month included the following items:

- a. Twenty-seven tubes were probologged; four of these were cut in special lengths and saved for corrosion studies.
- b. Graphite chips were vacuumed from the bottom of VSR channels 23 and 34.
- c. The old graphite stringer was removed from channel 3773. The channel was left empty for installation of a new stringer on a future outage.

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Miscellaneous Outage Work (Continued)

- d. Horizontal rod water impulse lines were flushed out and cleared of rust.
- e. The Grove valve annunciator trips were reset to 55 psi on the high trip and 45 psi on the low trip.

C. Improvement Experience

1. Projects

CG-558 - Reactor Plant Modifications for Increased Production - As a part of this project, the 105-F emergency downcomer line was relocated to permit installation of the new effluent piping. The old 1608 discharge line which emptied into the effluent line at a point underneath the cushion corridor was blanked off and removed from service.

2. Processing Improvements

Reduction of Gas Losses - During the month, a major effort was made to reduce the high gas losses that had been experienced at F Reactor in previous months. New boots were installed on leaking bellows on the rear of tube 1393 and the front of tube 0475. A pair of very sensitive gas pressure gauges was installed to measure the differential pressure between the reactor gas and the surroundings. This permitted a reduction in the differential pressure from .4 inches of water to .15 inches of water, and a considerable reduction in gas losses. At month end the average gas loss had dropped to approximately 16,000 cubic feet per day.

D. Events Influencing Costs

- 1. The F Processing Operation used 196.5 man-hours of overtime during the month. In addition, 21 man-hours of overtime were used for loading of the gamma pit buckets for the Irradiation Testing Operation.
- 2. The steps taken to reduce gas consumption (mentioned under "Improvements" above) will result in a considerable decrease in gas costs.

F POWER OPERATION
SEPTEMBER - 1956

FUNCTIONAL ACTIVITIES

A. Operating Experience

Water quality was maintained with a pH of 7.0 on the west side and a pH of 7.3 on the east side of the filter plant, as specified in Production Test 105-554-E, Revision I.

A longitudinal fracture of a six-inch cast iron pipe in the sanitary water service to Buildings 182 and 183 resulted from excavation activities of Construction forces at 1:16 p.m. on September 19, 1956, and temporary repairs were completed at 9:30 p.m.



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Operating Experience (Continued)

A semiannual survey of the coal storage pile was completed on September 25, 1956.

B. Equipment Experience

The gantry crane installed for Construction use on the roof of 181 Building was not secured after use by Construction and was discovered on September 10, during a routine inspection by Power personnel to be laying in the east end of the intake bay. It is presumed that the crane was moved by high winds on September 9. Construction forces are making repairs.

The monolith baffle for No. 3 Boiler was repaired on September 5, 1956. The baffle was damaged by a broken soot element.

Third-party inspection of No. 4 Boiler was completed on September 18, 1956, by J. P. Jones, a representative of the Travelers Indemnity Insurance Company.

The 24-inch sewer line from the 185 Building hot wells was blanked with concrete at the manhole connecting this sewer with the 190 hot well sewer.

C. Improvement Experience

1. Project CG-558 - Reactor Plant Modification for Increased Production - Work continued throughout the month.
2. Project CG-616 - Installation of Acid Feed Equipment - L. H. Hoffman Construction Company started excavation work on September 11, 1956.
3. Project CG-618 - Replacement of Steam Line Support Poles - Replacement activities were started on September 21, 1956.
4. Project CA-650 - Replacement, Repair, and/or Removal of Valve Houses - Work was started on September 26, 1956, by L. H. Hoffman Construction Company forces.
5. Project CA-690 - Roof Repairs - Building 190-F - Repairs to the southwest section of the 190 tank room were started on September 11, 1956, and completed by month end.

D. Events Influencing Costs

1. A total of 146.7 hours of overtime was required during the month.
2. Seasonal raw water conditions resulted in a chemical cost reduction.
3. Power and water treatment facilities operated at reduced rates for approximately 26 per cent of the period due to reactor outage, which will reflect a reduction in chemical and coal costs.

F RADIATION MONITORING OPERATION
SEPTEMBER - 1956

FUNCTIONAL ACTIVITIES

A. Radiation Occurrences

Exposure (of 165 mrad) was incurred by a Radiation Monitor, when an irradiated fuel element was withdrawn beyond the biological shield instead of the anticipated perf. The significance of this lapse of control lies in the potential for a major radiation over-exposure which would be present if an irradiated fuel element were splined from a central core tube in the same manner.

B. External Exposure

The average background level on the rear face varied from 15 mrad at the end of the elevator to 35 mrad in front of the process tubes. The average exposure rate received by personnel working on the rear face was 50 mrad/hr. The exposure rate to Maintenance personnel working close to the face of the unit was in the range of 150 mrad/hr.

The highest dose rates encountered during the month originated on the rear face. The dose rate to personnel during the removal of the stuck charge in 0691 was a maximum of seven rads/hr. to personnel. The removal of the guillotine created dose rates of up to three rads/hr. to personnel with a maximum dose rate present on the jaws of the guillotine of 18 rad/hr. The guillotine was moved to the 10-foot roof before adequately being washed down on the rear face causing a contamination spread on the roof.

C. Contamination Experience

There were two cases of contamination spread outside a radiation zone and both involved the removal of tools and equipment through the cushion chamber to the washpad. Contamination of up to 3000 c/m was promptly isolated and removed.

One case of skin contamination to 2000 c/m was encountered. Decontamination was readily accomplished.

Air-borne contamination was maintained below the applicable permissible limits for respiratory protection required. No masks were worn during the broaching operation in the September tube outage.

D. Events Influencing Costs

Approximately 85 hours of overtime were required during the month.

F MAINTENANCE OPERATION
SEPTEMBER - 1956

FUNCTIONAL ACTIVITIES

A. Equipment Experience

1. Instruments

- a. Temperature Monitor Systems - 105-F - Design Change 121 involving the modernization of the Temperature Monitor system is in progress and is approximately 50 per cent complete.

Two new style Digi-Coder heads for the Flexowriter were received during the month from the Fisher Porter Company. From initial observations and follow-up, it is apparent that these new heads are inferior to the older type.

- b. Galvanometer System - 105-F - At the present time, only one ionization chamber associated with the reactor galvanometer system is installed in the "A" test hole.
- c. Five-Fold Counters - At the request of Radiation Monitoring, the five-fold hand and foot counters have been modified to three-fold counters. An additional counter has been added to record the total number of times that each hand and foot counter is used.
- d. Scales - Storage Area - 105-F - The quarterly check of the transfer area scales was made by a representative of the Toledo Scale Company during the month. Results were within acceptable limits.

2. Electrical

- a. 105-F Building - Cluster lights were installed on the 10, 20, and 30 foot levels at the near and far catwalks. The new fixtures will reflect a definite cost savings since the discharge elevator will no longer be required to relamp the rear face area.

Progress has been made this month on the communication system revision, Design Change 109. This work is approximately 60 per cent complete.

3. Mechanical

- a. Ball 3X System - The Ball 3X vacuum pump drainline located on top of the 105-F Building was plugged on one branch to eliminate the possibility of flooding the Ball 3X wiring that is also installed on the top of the reactor.
- b. Weed Control - Weed removal operations have been carried out this month in an effort to dispose of weeds adjacent to each edge of the roadways throughout the area.

B. Shift Maintenance Activities

The major activities of the shift Maintenance personnel as applied to work in F Area was during the tube replacement outage of September 2 through September 10, 1956. For the larger portion of the period, the personnel reported to other areas for shutdown work.

C. Maintenance Engineering, and Planning and Scheduling

The following assignments have been made and are in progress:

1. Instrument Engineering

- a. Spare chamber No. 1 Galvanometer. Determine the necessary changes and design to provide a spare chamber in "B" or "D" test hole.
- b. Rigid mounting - Photo-electric cell and light source, "C" elevator - 105-F. Design mounting to prevent beam from shifting under conditions of vibration or flexing of the elevator.
- c. Instrumentation. Study - 105-F. Review existing instrumentation and the new instrumentation, Project CG-558, to determine what will be obsolete and if additional instruments, if any, will be required.
- d. Provide additional Beckman ranges - Design Change 99.
- e. Follow-up temperature control system - chiller - 146-FR.

2. Electrical Engineering

- a. Follow-up uniform modification of "Safety Circuit"; Design Change 157.
- b. Follow-up removal of excess wiring from No. 2 Safety Circuit - 105-F; Design Change 142.
- c. Rewire and modify chemical handling system - 183-F.
- d. Redesign the "D" elevator control in 105-F for geared limit switches; Design Change 134.
- e. Follow-up Beckman range interlock for start-up; Design Change 118 has been issued.
- f. Investigate and change ground detector systems to conform to HAPO standards.
- g. Calculate peak power demand loads to each of non-process buildings - 100-F.
- h. Study 440 Volt power feed to "C" elevator - 105-F.
- i. Revise accumulator annunciator - 105-F.

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Electrical Engineering (Continued)

- j. Rewire annunciator power circuits - 105-F.
- k. Study Beckman trip revision - 105-F; Design Change 148.
- l. Investigate U.B.R. relay system.
- m. Investigate T.O.C. protection - water area motors.
- n. Survey neutral grounds to determine multiple groundings on neutral wires - 100-F.
- o. Follow-up Design Change - Over potential test on 4500 hp motors - 190-F.
- p. Study instrument power supply - 105-F.

3. Mechanical Engineering

- a. Revise design of hydraulic tube pushing to incorporate improvements. Provide prints and follow-up building of two pushing machines.
- b. Provide the necessary engineering assistance to provide scheme for converting CO² storage tank.
- c. Revise design of underwater guillotine to correct malfunctions and excess wear on parts.
- d. Design carriage for present charge machine to permit charging two rows from one elevator position.
- e. Follow-up failure of "D" elevator counterweight sheave. Sheaves on design have been received.

4. Planning and Scheduling

- a. Productive Maintenance - Full effort is being expended with the available people to set up the Productive Maintenance Program. The files are now approximately 50 per cent complete.
- b. Work Order Control - The Work Order Control system was converted to McBee Keysort system.

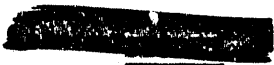
D. Events Influencing Costs

1. Overtime Usage

As a result of higher reactor operating efficiency, only 76 overtime hours were required to service the F Area facilities.

2. Spare Parts

No significant spare parts were requested to be established in Stores.


Events Influencing Costs (Continued)3. Material Expediting

A survey of the F Maintenance Operation indicates that during the past six months an average of 29 Purchase Requisitions have been expedited each month. This represented an approximate value of material ordered of \$4,100 per month. The total number of outstanding Purchase Requisitions is now up to 30, for a total approximate cost of \$4,800. The number of requisitions issued since reorganization is 18 and represents approximately \$3,000 in costs.


S. L. Nelson

S. L. Nelson, Acting Manager
F Reactor Operation
IRRADIATION PROCESSING DEPARTMENT

SLN:EWW:rs

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REACTOR OPERATIONS STATISTICS - PROCESSING
SEPTEMBER, 1956

	B	C	D	DR	F	H	KE	KW	Total
Input Production - Pu (% of Forecast)	88.9	101.6	133.9	128.1	126.6	122.9	100.4	106.5	110.2
Time Operated Efficiency (% Overall)	68.8	76.3	87.1	90.9	72.3	75.6	71.4	82.4	78.1

No. Reactor Outages	B	C	D	DR	F	H	KE	KW	Total
Scheduled	1		1	1	1	1	1	1	7
Unscheduled	3	2	4			5	2	2	18
Scrams	1	4	1			1	6		13
Other									
Total	5	6	6	1	1	7	9	3	38

Reactor Outage Hours	B	C	D	DR	F	H	KE	KW	Total
Scheduled	199.3		57.1	65.4	199.4	146.6	37.3	121.6	826.7
Unscheduled	25.6	170.7	35.7			29.2	163.3	5.0	434.5
Total	224.9	170.7	92.8	65.4	199.4	175.8	205.6	126.6	1261.2

Breakdown of Outage Hours	B	C	D	DR	F	H	KE	KW	Total
Charge - Discharge	19.2	42.8	28.4	25.8	65.8	29.2	90.5	95.6	397.3
Maintenance	1.5	10.9	17.5	9.0	4.4	19.3	5.4	19.9	87.9
Rupture Removal	12.0	103.6	11.2		10.8	8.5	81.6		193.7
Leak Testing	7.4		4.7						34.0
Tube Replacement	180.1		11.5		107.9	97.0			217.0
Project Work						5.5			197.1
Production Tests		6.8		23.7		3.5			34.0
Instrumentation & Circuitry	1.4	0.4	1.5			2.7	1.7	0.9	8.6
Start-up Preparation	2.8		4.8	6.9	5.2	4.4	4.5	5.3	33.9
Poison Discharge		6.2	5.7		5.3	4.7		4.9	26.8
Miscellaneous	0.5		7.5			1.0	21.9		30.9

No. Slug Ruptures - Total	B	C	D	DR	F	H	KE	KW	Total
Metal Discharged - Tons	44.3	86.6	25.8	39.9	29.4	39.3	160.9	92.3	518.3
Tubes Installed - On Replacement Program	0	0	0	0	100	99	0	0	199
Water Leaks	0	0	0	0	0	0	0	0	0
Tube	1	0	1	0	5	0	0	0	7
Van Stone									

Total Hours 397.3
Total % of Time 6.9
87.9 1.5
193.7 3.4
34.0 0.6
217.0 3.8
197.1 3.4
34.0 0.6
8.6 0.1
33.9 0.6
26.8 0.5
30.9 0.5

Total 12
518.3
199

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REACTOR OPERATIONS STATISTICS - SLUG RUPTURES
SEPTEMBER, 1956

Type Material	Tube No.	Type Rupture	Remov. Hrs.	Charge Date	Rupture Date	Act. Conc.	Lot No.	Removal Method			Remarks
								Chg. Quick Mach.	Hyd. Jack	Tube & Piece	
8" Reg.	4872-KE	Still in Tube	43.4	4-2-56	9-1-56	657	Z-127				x
8" Reg.	4573-KE	Split	0.5	5-2-56	9-1-56	560	Z-152	x			
8" Reg.	4771-KE	Split	0.5	4-2-56	9-1-56	664	M-130	x			
8" Reg.	4570-KE	Split	0.5	4-2-56	9-1-56	685	Z-129	x			
8" Reg.	4372-KE	Split	16.1	4-2-56	9-4-56	694	Z-119		x		
8" Reg.	1587-H	Side Failure	8.5	4-27-56	9-6-56	376	Z-137	x			
8" Reg.	2788-KE	Side Failure	12.2	3-7-56	9-9-56	743	K-249	x			
8" Reg.	4870-KE	Split	5.3	4-3-56	9-14-56	671	Z-127	x			
8" Reg.	1267-C	Slug Damaged During Removal	37.2	8-1-56	9-16-56	248	V-816				x
8" Reg.	2486-C	Side Failure	24.0	7-15-56	9-27-56	363	K-335		x		
PT-105-550-MT	4863-KE	Split	3.1	5-2-56	9-6-56	479	Z-144		x		Reg. Metal
PT-105-615A-63MT	1080-C	Unclassified	38.2	5-16-56	9-23-56	836	K-276				x

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REACTOR OPERATIONS STATISTICS - POWER (SHEET 1)

	100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW	TOTAL
<u>WATER FLOW DATA</u>									
<u>RIVER WATER (BLDG. 181)</u>									
TO RESERVOIR	40410		82322		42657	55060			220449
TO FILTER PLANT	75453		47600				122000	138200	383253
(C, DR, K)									
TOTAL	115863		129922		42657	55060	122000	138200	603702
TOTAL	5005.3		5612.6		1842.8	2378.6	5270.4	5970.2	26079.9
<u>RESERVOIR WATER (BLDG. 182)</u>									
TO FILTER PLANT	39793		56900		37700	51100			
TO COND SYSTEM	617		10390		4960	3960			
TO EXPORT SYSTEM	0		15032		0	0			
TO EXPORT SYSTEM	-		15032		-	-			
TO EXPORT SYSTEM	-		649.4		-	-			649.4
<u>FILTERED WATER (BLDG. 183)</u>									
TO POWER HOUSE	398		630		310	250	38	16	
TO PROCESS	34000	70000	46200	47600	36400	47900	115900	129600	
TO DR			910		220	150		50	
TO F & S SYSTEM	162		390						
<u>PROCESS WATER (BLDG. 180)</u>									
TO REACTOR	33600	69600	45800	47200	36000	47500	115500	129200	524400
TO PROCESS	46200	95000	49900	51100	46800	56100	146300	146600	628000
TO DR	1451.5	3006.7	1978.6	2039.0	1555.2	2052.0	4989.6	5581.4	22654.4
TO F & S SYSTEM									
<u>RIVER DATA</u>									
ELEVATION (MSLFT.)	390.9		382.4		368.8	374.3			385.1
(MAX)									
(MIN)	387.0		379.7		366.0	371.8			381.8
(AVG)	389.1		380.5		367.3	372.8			383.1
TEMPERATURE	65.0		65.5		66.0	66.0			65.1
AVG ° F									

REACTOR OPERATIONS STATISTICS - POWER (SHEET 2)

	100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW	TOTAL
<u>WATER TREATMENT DATA</u>									
AT BLDG. 182									
MM GALS									
BLDG. 183	1719.4	3257.3	2458.0	2056.3	1628.6	2207.5	5270.4	5970.2	24567.7
MM GALS									
<u>CHEMICAL CONSUMPTION</u>									
CHLORINE (BLDG. 182)	0		0		0	0			0
LBS									
(BLDG. 183)	13120	35610	21700	14250	17310	15300	40300	54200	211790
LBS									
AVG PPM	.9	1.3	1.1	.8	1.3	.8	0.9	1.1	1.0
LIME	0	0	0	0	0	0			0
LBS									
AVG PPM	-	-	-	-	-	-			-
CAUSTIC									0
LBS									
AVG PPM									
ALUM	88800	143700	118700	103600	92120	114400	351300	348100	1360720
LBS									
AVG PPM	6.2	5.3	5.8	6.0	6.8	6.2	8.0	7.0	6.6
ACTIVATED SILICA	0	0	0	0	0	0	0	0	0
(AS SiO ₂)									
LBS									
AVG PPM	-	-	-	-	-	-	-	-	-
SULPHURIC ACID	138644	269132	180200	154200	84645	154500	360200	363600	1705121
LBS									
(AS 100%)	9.7	9.9	8.8	9.0	6.3	8.4	8.2	7.3	8.3
AVG PPM									
DICHROMATE	23200	51550	32500	34300	24900	29300	82300	92100	370150
LBS									
PURGE MATERIAL CONSUMPTION									
LBS	0	0	0	0	50.0	1200	0	0	1250

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REACTOR OPERATIONS STATISTICS - POWER (SHEET 3)

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ANALYTICAL DATA		100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW
<u>RAW WATER</u>									
PH	PH AVG	8.08	8.08	8.21	8.24	8.30	8.25	8.05	7.84
IRON	PPM MAX	-	-	-	-	-	-	-	-
	PPM AVG	-	-	-	-	-	-	-	-
TURBIDITY	PPM AVG	4.2	4.5	3	4	4.1	3.0	4	4
	PPM AVG	13.0	6.0						
<u>FINISHED WATER</u>									
PH	PH AVG	7.00	7.02	6.89	7.02	7.04	7.02	7.01	7.02
IRON	PPM MAX	-	-	-	-	-	-	-	-
	PPM AVG	-	-	-	-	-	-	-	-
TURBIDITY	PPM AVG	.003-.004	.004-.005	.003	.004	.003	.004	.004	.003
Cl ₂ RESIDUAL	PPM AVG	.06	.08	.13	.07	.05	.06	.05	.05
DICHROMATE	PPM AVG	1.88	1.90	1.9	1.9	1.9	1.9	1.7	1.8
CHLORIDES	PPM AVG					.75	.6	0.7	0.7
<u>STEAM DATA</u>									
GENERATED (MAX)	LBS/HR	249000	374000	201000	181000	88000	71000	1005000	159000
(NOR)	LBS/HR	228370	352000	189905	157000	-	-	927275	-
(AVG)	LBS/HR	182700	329068	149839	131417	39161	29625	793024	68786
TOTAL	M LBS	131543	236929	106906	94620	28196	21330	569998	49526
TO PLANT	M LBS	111550	200915	90656	80238	25376	19197	483359	44573
COAL RECEIVED	TONS	6586	13477	6351	5481			31895	
CONSUMED	TONS	8156	15820	7311	5941			37228	
IN STORAGE	TONS	20315	3800	23124	24123			71362	
GEN. STEAM/LB. OF COAL		8.06	7.49	7.31	7.96			7.66	
OIL RECEIVED	GALLONS								1186880
CONSUMED	GALLONS								489070
IN STORAGE	GALLONS								1463607
GEN. STEAM/GAL. OF OIL									101.3

ELECTRICAL DATA

TOTAL GENERATED KW HRS.

1584800

3175200

CG-5

REACTOR OPERATIONS STATISTICS - RADIATION MONITORING
SEPTEMBER, 1956

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	IPD Sept. Total
Special Work Permits Issued	23	58	96	77	15	54	19	8	350
Routine & Special Surveys	518	720	682	256	546	617	407	426	4172
Air Samples	78	130	43	32	94	111	36	25	549
Hand Contamination Cases	0	1	2	0	0	2	1	0	6
Skin Contamination Cases	1	6	1	0	1	2	1	0	12
Contaminated Injuries	0	0	0	0	0	0	0	0	0
Vehicles Contaminated	2	1	0	4	1	2	0	1	11
No. of Cases of Personnel Clothing Contamination	2	2	3	0	1	3	4	1	16
No. Cases Contamination Spread Outside of Radiation Zones	1	1	1	2	4	2	4	3	18
Lapse of Control (Reactor Oper.)	0	4	1	0	3	0	4	1	13
No. Employees for Whom Dose Rates \geq 3 rads/hr were established	1	4	0	0	4	0	4	0	13
No. of Hours Training Others Attendance at Meetings for Training Others	5	3	32	32	3	25	22	21	143
	40	19	4	3	3	10	46	46	171

REACTOR EFFLUENT DATA

No. of Effluent Calculations	90.0	90.0	118.0	120.0	76.0	135.0	79.0	104.6
Ave. Beta Dose Rate (mrads/hr)	8.5	11.2	4.6	13.2	4.1	7.7	5.7	7.5
Ave. Gamma Dose Rate (mr/hr)	11.2	10.2	9.6	24.6	7.8	11.5	9.6	18.7
Ave. Total Dose Rate (mrads/hr)	19.7	21.4	14.2	37.8	11.9	29.2	15.3	26.2
Ave. Integrated Dose in 24 hrs	519.8	508.2	337	927	295.3	446.7	371	628.8
Max. Integrated Dose in 24 hrs	1064.9	679.5	485	1034	487.2	691.2	341	783.3
Max. Integrated Dose in 24 hrs in 1956	1064.9	704.0	544	1034	921.6	865.5	658	783.3

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PRODUCTION OPERATION

HW-45717

SEPTEMBER, 1956

I. RESPONSIBILITY

The Production Operation was organized and assumed its new functions and responsibilities in the Irradiation Processing Department on September 4, 1956, in accordance with the overall HAPO reorganization. No changes occurred in September.

II. FUNCTIONAL ACTIVITIES

A. Production Forecasting, Scheduling, and Analysis

1. Production Forecasting

A program was developed for the use of enriched uranium (0.94% U-235) for fringe enrichment. Quantities of metal required were forecasted and necessary action initiated to set this program in operation by January, 1957.

2. Production Scheduling

a. Discharge Concentration

The intolerable rupture rate experienced at KE Reactor early in the month prompted a discharge concentration cut of 150 MWD/ton. Recent production forecasts were based on a cut of 300 MWD's beginning in September, but the complete reduction has been delayed temporarily.

A similar 150 MWD/ton cut was made at B Reactor in conjunction with the Project CG-558 outage. This cut was made in the direction of a full 300 MWD/ton cut programmed for the post CG-558 operation.

Discharging of material at 450 MWD/ton at C Reactor and less than 800 MWD/ton in certain high power tubes at D, DR, F and H Reactors was continued to keep the rupture rate low.

b. Process Tube Replacement Program

Two 100-tube outages (F and H Reactors) occurred during September. These replacements have reduced the backlog of tubes having a calculated corrosion above critical index to approximately 350, which are mostly fringe tubes where the calculated index has not been a true measure of the actual tube condition.

c. Low G/T Program

The final discharge necessary to complete the HAPO commitment for high isotopic purity product was completed during September.

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d. Off-Plant Shipping

The following off-plant shipments were accomplished during September:

3. Operations Analysis

Document HW-45724, "Optimum Reactor Maximum Tube Outlet Temperature" was essentially completed during the month. In addition, HW-45130, "Status Report Reactor Tube Replacement", was completed and issued; preparation of this report had been started prior to the reorganization.

B. Computing and Machine Records

The IBM accounting machine, installed to replace an older machine in August, has been programmed for all routine work. Utilizing the new machine, tabulated data reports can be prepared in one-half to two-thirds of the time formerly required. A greater variety of reports and report formats may now be realized because of the flexibility of the new machine.

Another IBM card sorter was installed during September to supplement the operation of the existing sorter. Because a majority of card handling operations are preceded by a sorting operation, the availability of two sorters relieves a data processing bottle-neck.

During September, the monthly production data provided for the Process Analysis Operation were expanded to include the month-end status of reactor loadings, the loading changes during the month, and duplication of tube-by-tube source data.

Listing of the status of non-heat producing tubes was added to the routine information supplied to the Pile Physics Operation for reactivity evaluation studies. As a by-product, this listing has already proved a valuable aid in detecting discrepancies between Production Operation and Reactor Operation tube-by-tube records.

The production calculations for all reactors are now based upon three sets of tube temperature data a month per reactor, compared to one set every two months per reactor a year ago. This increase in the amount of source data, combined with intensive editing of the data, permits more accurate product and tube corrosion calculations. Variations in tube temperature distributions are more closely approximated and significant errors in source data are detected and corrected.

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HW-45717

C. Reports, Statistics & S.S. Accountability

1. Reports and Statistics

a. Daily Reporting

Effective with the reorganization, September 4, the procedure for preparation and distribution of the Daily Production Report was changed. Previously, each reactor had called the information to H Reactor (on 12-8 shift) where the data were compiled and forwarded to the Operations Sub-Section office by 8:00 A.M. The information is now delivered to the office of Plant Administration and Personnel Development in each area, and telephoned from there to the Reports and Statistics office between 8:00 A.M. and 9:00 A.M. As a result of this change it was necessary to orient personnel in report content and procedures, and to develop an additional form suitable for supplying an abbreviated "quickie" report to the IPD General Manager and Production Operation management.

During the month the distribution list for the complete Daily Production Report was expanded as required to meet the needs of the five Reactor Operations, the Research and Engineering Operation, and the Facilities Engineering Operation.

Responsibility was assumed for telephoning Daily Report information to the office of the HAPO General Manager, and to the AEC Production Office in the 700 Area.

b. Monthly Reporting

A tentative format for the combined Production and Reactor Operations monthly report was developed in cooperation with the Plant Administration and Personnel Development offices of the five Reactor Operations.

A Production Summary with explanations of variance from forecast was prepared for management on September 24, projecting production estimates and experience to month-end.

The final Monthly Report (August) for the former Operations Sub-Section was prepared.

c. Production Statistics

Two production statistics Chart Books were developed for limited circulation each morning. One is delivered to the IPD General Manager and the other is used within the Production Operation. Input and output production and overall time operated efficiency as compared to forecast are shown, along with rupture, water collection and outage-hour data.

Preliminary study was given to the derivation and reporting of time operated efficiency on an "innage" basis. In this, adjustment is made for scheduled outage time such as that required for charge-discharge, tube replacement, and project work.

A program was initiated during the month to improve the quality of recorded historical data. Considerable effort was devoted also to improved methods of graphically presenting data, particular attention being given to charts depicting individual reactor performance.

d. Radiation Protection Indexes

Preliminary consideration was accorded the problem of devising for IPD management significant indexes of radiation protection experience and performance in the several Reactor Operations. Using 100 Areas film badge personnel exposure data for January through August 1956, as supplied by the Radiation Protection Operation, a number of charts were prepared relating these data to plant variables. Close liaison is being maintained with the Radiological Engineering Operation in this effort.

e. Miscellaneous Services

Numerous miscellaneous information services were performed during the month. These largely involved supplying current and historical production data, forecasts, and operating information to IPD management, the Reactor Operations, the Fuels Preparation Department, and Operations Research.

Several functions which were carry-over items from August under the Operations Sub-Section were completed. These included (1) issuing an operator overtime list and supplying the Financial Operation with the necessary records for issuing subsequent overtime reports; (2) preparing a holiday pay authorization letter for Monthly Payroll; (3) issuing a Minor Injury Report, and (4) supplying tube replacement data to the Financial Operation.

Miscellaneous administrative functions were performed for the Production Operation. These included office space forecasts, budget matters, monthly report consolidation, etc.

2. S. S. Accountability

Contact was maintained with the S.S. Accountability Operation in Relations & Utilities, relative to the progress of arrangements for the transfer of the 100 Areas S.S. Accountability Unit to the Production Operation of the Irradiation Processing Department.

D. Essential Materials

Rail and truck receipts of essential materials in September were as follows:

Rail car loads for I. P. Department	505
Rail car loads for other departments	211
Truck shipments for I. P. Department	<u>302</u>
Total Units Received	1018

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In addition to the routine duties involved in the procurement and delivery of essential materials, the following items were included in the essential material activities during the month:

1. A request was made through the Purchasing & Stores Operation for six government-owned chlorine tank cars to be used in supplying liquid chlorine to the KE and KW Reactor Operation. The new chlorine contract effective November 1 includes a \$5.00 per day demurrage charge after thirty days on vendor-owned cars. Savings resulting from the use of government-owned cars should approximate \$300 per month.
2. Two helium cars were released from service during the month as a result of lower helium gas consumptions, leaving four cars to be held on plant or enroute.
3. Arrangements were made for the semi-annual coal pile surveys to be made by the Field Survey Operation in the 100, 200, and 300 Areas.
4. The essential materials clerk spent considerable time in the training of new Power Operations clerks in the D and H Reactor Operations.
5. A work order was issued to the F Maintenance Operation to prepare the three and one-fourth ton carbon dioxide truck, obtained from government surplus, for service as a mobile storage tank to be available for use in any of the Reactor Operations as needed.
6. The day-to-day scheduling of sulfuric acid tank trucks to the temporary storage tanks in the D, DR, F and H locations was continued.

III. ORGANIZATION AND PERSONNEL

A. Organization

There were no changes in September.

B. Force Summary

	<u>As of Sept. 30</u>			<u>Sept. 4 Total</u>	<u>Net Change</u>
	<u>Exempt</u>	<u>Non- Exempt</u>	<u>Total</u>		
Production Forecasting, Scheduling & Analysis	6	5	11	11	0
Computing & Machine Records	2	3	5	5	0
Reports & Statistics	2	2	4	4	0
Essential Materials	1	1	2	2	0
Production-General	1	1	2	2	0
Totals	12	12	24	24	0

Safety and Security

All personnel in the Production Operation attended a safety and security meeting during the month. Two minor injuries were reported. No security violations were reported.

D. Personnel Activities

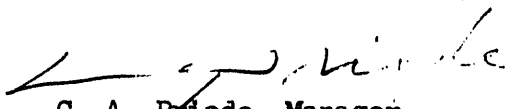
There were no off-site trips by personnel of this Operation, and no off-site visitors.

E. Non-Routine Reports Issued

<u>Document No.</u>	<u>Title</u>	<u>Author</u>
HW-45130	Status Report Reactor Tube Replacement, dated 9/4/56	J. R. Young

F. 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.


C. A. Priode, Manager
Production Operation

CAP:TWH:frs

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HW-4571

FACILITIES ENGINEERING OPERATION

September 1956

SUMMARY

The transfer of personnel from the various sections to Facilities Engineering Operation to implement the HAPO reorganization of September 1, 1956, was a major effort during the month. New change of status forms for 73 exempt employees were prepared and submitted to Salary Administration to complete the transfers.

Construction completion status of major process facilities at the end of September was as follows:

<u>Project Number</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
CA-512	100-K Area Facilities, Revisions Nos. 3 and 4	100%	100% ^a
CA-512	1706-KER Recirculation Facilities	98%	98%
CG-558-I	Reactor Plant Modifications	69%	74%
CG-558-II	Reactor Plant Modifications	21%	22%
CG-600	100-C Alterations	25%	1%

The 100-B Area outage for the accomplishment of work under Project CG-558 started on September 26, 1956. The work is tentatively scheduled for completion by November 10, 1956.

There were 19 project proposals under preparation at the end of the month. One was submitted to the Commission during September.

A report, "Summary and Evaluation of HAPO Design Concepts for Reactor Plants to Produce Plutonium and Electricity", HW-45671, compares data from the six studies on dual purpose reactors made in the last three years, including the latest supplementary production reactor, and evaluates the design concepts.

An interim evaluation report of a Supplementary Production Reactor concept, including the recovery of electric power as a means of reducing plutonium unit cost, was issued as HW-45089.

A preliminary design study of the basic engineering problems associated with design and construction of a heavy water moderated and cooled reactor, currently being considered as a plutonium re-cycle demonstration reactor, is reported in HW-45548.

a Complete except for revisions and start-up items.

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The engineering and economic studies of low temperature power recovery from an existing reactor were reported in HW-45471. Results confirmed earlier indications that the recovery of power from existing reactors, though technically feasible, cannot be justified on purely economic bases.

Completion percentages for the design of reactor and reactor buildings on Project CG-654, "Advance Reactor Design", are summarized as follows:

	<u>Beginning of Month</u>	<u>End of Month</u>
Drawings	39%	46%
Criteria	63%	73%
Testing	31%	39%
Overall Weighted Percentage	47%	55%

On the water system and supporting facilities, Kaiser Engineers have submitted preliminary rough draft flow diagrams to illustrate their current conceptions of project requirements.

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I. RESPONSIBILITY

The responsibilities of the Facilities Engineering Operation, established on September 1, 1956, by reorganization of the Hanford Atomic Products Operation, remained unchanged at month end. The components of the new operation are as follows:

- Equipment Development Operation
- Project Engineering Operation
- Plant and Industrial Engineering Operation
- Principal Engineers
- Engineering Auxiliaries Operation
- Project Maintenance Operation
- Process Design Operation

II. ACHIEVEMENT

A. Equipment Experience

Four boilers, three air receivers, and miscellaneous unfired pressure vessels were examined by an inspector from the Travelers Insurance Company during the past month. All equipment inspected was found to be in good order.

One more rebrazed coupling was installed in a fluid drive unit in 190-C during the month. A total of eight units are now so equipped.

The custodianship of equipment and material for the welding school in the 2709-E facility was transferred to the Construction Engineering Operation through the Plant Accounting Operation.

B. Improvements

No inventions or discoveries were reported. A separate Report of Inventions is attached.

Solution density tests for 10,000 hp slip regulators at K-Plants were completed. The 0.8% density determined by these tests is permitting wider electrode spacing and improved balance at higher loading without exceeding starting current limitations. Load balance of two and one-half percent by test is being achieved (15% permissible) at current motor speeds.

A new brush, Grade T-698, has been installed for trial in the 10,000 hp No. 1 KE motor. The brush has good self-lubricating qualities and is expected to solve the problem of excessive brush wear. Testing is being continued.

A solution was proposed in document HW-39953 to prevent corrosion of 3X balls by passing dry make-up gas through the hoppers. This was successfully tried in 105-F.

The experimental graphite broaching tool made of a different tool steel and specifying a precise heat treatment and nitriding was sent to the heat treaters for final work. Expected delivery is the second week of October.

A graphite reboring tool, to be used in straightening channels in distorted graphite stacks, has been successfully operated in out-of-pile tests. A report of its operation is being prepared.

C. Events Influencing Costs

Overtime labor for Project Maintenance forces for the month of September amounted to 511 hours. Increased labor costs over August will result.

Reorganization of warehousing and shop facilities will increase expenditures in excess of past experience.

D. Plant Improvement and Expansion

1. Status of Project Proposals

a. Project Proposals Submitted to the Commission

CG-616, Revision No. 3, "Installation of Acid Feed Equipment, 100-B, C, D, DR, F, and H Areas."

b. Project Proposals in Preparation

CG-579, Revision No. 1, "Effluent Water Monitoring Improvements, 100-C Area."

CG-638, Revision No. 1, "Alum Activated Silica Water Treatment, Phase II."

CG-651, Revision No. 1, "Continuous Charge-Discharge, C Pile Demonstration Unit."

CG-669, Revision No. 1, "Water and Gas Leak Locating Equipment, All 100 Areas."

CG-689, "Slug Saw and Etching Equipment."

CA-696, Revision No. 1, "Coal Car Shake-Outs, 100-B, D, F, H, and 200 Areas."

CA-697, "Fire Protection Facilities, 1717-B, D, F, H, and 1704-H Buildings."

CA-698, "Public Address System, 100-B, D, F, and H Areas."

CG-704, "Design, 100-K Area Outfall Structure Replacement."

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- R-89000, "Condensate Removal Facilities, 105-C Gas System."
- R-89001, "Modification to One Recirculation Test Loop for Boiling Studies, Building 105-KE and 1706-KER."
- R-89002, "Automatic Synchronizing Equipment, 165-KE and KW Power Generators."
- R-89003, "Ventilation Improvements for 100-K Area Water Plant Facilities, 165 and 190 Buildings."
- R-89005, "Increased Electrical Service, 189-D Building."
- R-89006, "Filtration of Reactor Building Exhaust Air, 105-B, C, D, DR, F, H, KE, and KW."
- R-89008, "Repairs to Power House Chimneys in the 100 Areas."
- R-89009, "Laboratory Facilities for Radiochemical Analysis."
- R-89011, "100-K Area Coolant Back-Up."
- (No Number), "Modification to Proportional Counters for Period Indication, 105-B, C, D, DR, F, and H Buildings."

2. Plant Engineering

a. Maintenance Program

Assistance is being given the Maintenance Operation in setting up the McBee Keysort system of work order accounting to provide more accurate maintenance work load information.

Assistance was given in establishing a productive maintenance system in the 100-K Areas. Work is being continued to expand this to all other 100 Areas.

b. Standards Engineering

Twenty-nine Stock Adjustment Requests were processed during the month, and the approximate value of these additions to the Spare Parts Inventory Account is \$47,895.

c. Assistance From Principal Engineers and Others Within F.E.O.

Work was essentially completed on a study aimed at reducing personnel waiting time at 1701-F Building during the eight-to-four shift badge and pencil issuance period. The recommendations will also be applicable in 1701-B, D, H, and K.

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Necessary agreements have been reached to perform 13.8 kv staged system fault tests within the period October 29 to November 14, 1956, if completion of B plant Project CG-558 is accomplished. All details are arranged and test specifications are ready for issue.

All motors and regulators are being made ready for increased water flow, including complete installation of Epoxy cells and flexible buses, adjustment to new solution densities, and adjustment of electrodes.

The "relay and fuse coordination study" for B-C plant being developed by Construction Engineering Operation has been reviewed and is ready for issue. Work will be started immediately on similar study for D-DR Area.

Investigations were initiated to determine if it is possible to collect and sell at a profit the fly ash now wasted by the HAPO steam power plants. It is expected that the cost of collecting equipment and its operation will be a deciding factor.

Process Design Operation people were provided with information regarding the significance of the Gore Bill hearings as they might affect future reactor studies at HAPO.

Process Design Operation representatives were counseled in regard to the wording and intent of design criteria to be submitted to Kaiser Engineers on Project CG-654.

The Chief, Nuclear Engineering Section, Hanford Operations Office, AEC, was advised regarding the contents of document HW-45671 and probable continuity of atomic power service from dual purpose plants.

Process Design Operation representatives were counseled regarding the reliability of power systems as determined by a study of probabilities of failure of individual pieces of apparatus. This consultation consisted chiefly of reference to a recent paper in Electrical Engineering dealing with the subject.

The draft of a chapter for the AEC Reactor Handbook dealing with site selection and layout of nuclear plants was reviewed and commented on at the request of Construction Engineering personnel.

Guidance was given to plant forces in developing a voltage regulation guide and training manual issued for post CG-558 operation.

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Assistance was given in the noise abatement problem in 165-K Control Room. Installation of acoustic floor covering on a portion of the floor in the rooms reduced the noise by approximately one and one-half decibels. Inadequacy of the acoustic wall covering was indicated. A temporary installation of glass fiber strips on the walls of one control room is planned as a test for reduction of reflected and direct noise, and as a further evaluation of the floor covering.

d. Suggestion Evaluation

Changes in procedures for obtaining field approval of suggestion evaluations were made to meet requirements of the new organization.

The backlog of suggestions incompletely evaluated increased from 228 on September 1, 1956, to 253 on September 25, 1956, chiefly as a result of increased submissions and delays experienced in obtaining field approvals of evaluations. Nine suggestions are awaiting award payment. During each month of the past quarter, suggestions received exceeded all months of the previous year. The average rate of receipt was 107 per month, as compared to the previous highest average of 88 per month in the previous quarter. This unanticipated increase in suggestions, plus additional administrative work transferred from the central suggestion office, has necessitated an immediate study to determine the engineering and clerical needs to meet optimum time in evaluating suggestions.

e. Drafting Services

The summary of services provided is as follows:

	<u>Drawings Involved</u> (Total Number)
New Engineering Drawings - 12 Subjects	49
Minor Design Changes - 9 Subjects	24
As-Building - 4 Subjects	14
Blueprint File Service	
Drawings and BPFs Filed	657
Drawings and BPFs Refiled	300
Drawings and BPFs Retired	81

3. Design and Development

The results of a preliminary feasibility study and economic analysis of expansion of water plants at K Area indicate that the flow rate can be increased to 175,000 gpm, but that economic justification depends on reactor operating requirements in effect after modification. It is recommended that the studies necessary to more precisely define the net production gains be made, and that work be

initiated on the formal Plant and Equipment Analysis Report in support of such expansion.

Preliminary design study has been given to the basic engineering problems associated with design and construction of a heavy water moderated and cooled reactor concept.

An interim evaluation report of a Supplementary Production Reactor concept, derived as a standard of comparison for proposed modifications to increase the production rate of existing Hanford reactors, has been issued. The design includes the recovery of electricity as a means of reducing plutonium unit cost.

Equipment has been designed and a prototype is being fabricated which will prevent inadvertent flushing of poison pieces from the poison column control facility, Project CG-558.

Designs were completed and work initiated to provide a tube removal mock-up facility. It will be used in developing improved equipment and procedures to permit tube removal rates of 50 tubes per day.

Development continued on means of reducing gas losses at the various reactors. At DR, H, and C Reactors, one source of the leakage occurs at the O-ring joints which seal the expansion bellows to the reactor face and to the gunbarrel. Injection of General Electric non-melting silicone grease to the O-ring channel sealed the joint in mock-up tests. Three grease fittings were installed at the rear face of H Reactor, and silicone grease injected in the first on-pile test, with an installation and injection time of approximately five minutes per fitting.

Two-inch ribless KER Zircaloy-2 tubing has been flared one-quarter of an inch at a 30° angle without radial cracks by employing preliminary annealing.

Fabrication of a hydraulic model of the "water wall" process piping system having potential application to advanced reactor design is proceeding.

Results of engineering and economic studies of low temperature power recovery from an existing reactor are reported in HW-45471. The study confirmed indications of previous work that, although technically feasible, the recovery of power from existing reactors cannot be justified on purely economic bases.

4. Project Maintenance

The following is a resume of Project Maintenance September assignments compared to those of August, 1956.

	<u>Aug.</u>	<u>Sept.</u>
a. Number of active projects and major work orders.	14	17
b. Number of individual installations.	64	79
c. Total of unexpended dollars.	906,668	637,368

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HW-45717

5. Status of Approved Projects

INDEX

<u>Project No.</u>	<u>Title</u>	<u>Page No.</u>
CA-512	1952 Reactor Expansion - 100-K Area Facilities	D-10
CA-512	1952 Reactor Expansion - 100-K Area Facilities - 1706-KER	D-11
CA-548	New VSR Test Tower	D-11
CG-558	Reactor Plant Modifications for Increased Production - Phase I	D-12
CG-558	Reactor Plant Modifications for Increased Production - Phase II	D-13
CG-579	Effluent Water Monitoring Improvements - 100-C	D-14
CG-583	Moisture Monitoring System for Detection of Leaking Process Tubes - 100-B, D, DR, F, and H Areas	D-14
CG-584	Moisture Monitoring System for Detection of Leaking Process Tubes - 105-C	D-15
CG-600	100-C Alterations	D-15
CA-615	Mechanical Maintenance Shop Centralization - 100 Areas	D-16
CG-616	Installation of Acid Feed Equipment - 100-B, D, DR, F, and H	D-16
CG-618	Replacement of Steam Line Support Poles - 100-B, D, and F	D-17
CG-622	Replacement of Discharge Chute Liners - 100-B, D, and F	D-17
CG-638	Alum Activated Silica Water Treatment Facility - Phase II	D-18
CA-639	Painting of DE Water Plant Structures	D-18
CG-642	Continuous Charge-Discharge Equipment - C Reactor	D-18
CA-649	FY 1956 Water Tank Replacement	D-19
CA-650	Replacement, Repair, and/or Removal of Valve Houses - 100-B, D, and F	D-19
CG-651	Continuous Charge-Discharge Equipment - C Pile - Demonstration Unit	D-20
CG-654	Advance Design - Reactor Plant	D-20
CG-656	Installation of Raw Water Cross-Tie - 105-C	D-21
CG-663	Steam Auxiliaries for the 165-K Steam Generators	D-22
CG-665	Metal Loading Facilities - 100-B, D, DR, F, and H	D-23
CG-666	Zone Temperature Monitoring - 100-B, C, D, DR, F, and H	D-23
CG-667	Improved Space Utilization - 105-B, D, and F Buildings	D-24
CG-669	Water and Gas Leak Locating Equipment - All 100 Areas	D-24
CG-674	Water Plant Component Test Loop - 1706-KE	D-24
CG-678	Laboratory Facilities for Special Irradiation Studies	D-25
CG-684	Adequate Fresh Air Systems - 105-B, D, DR, F, and H	D-25
CA-690	Roof Repairs - 190-D, and 186-D Buildings	D-25
CG-694	Auxiliary Oil Pumps - 100-C	D-26
AEC-160	Recirculating Gas Loop	D-26

512 - 1952 Reactor Expansion - 100-K Area Facilities
 Project Engineer: C. E. Love

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:			98%
Field Progress:			
F.P.	8.72%	100%	25%
C.O.	43.30%	99%	90%
P.F.	47.98%	99%	77%
Total		99%	78%

Average Manpower:		Approx. Accumulated Manpower: (man-days)
F.P.	4	F.P. 321
C.O.	10	C.O. 4687
P.F.	8	P.F. 4582

Directive Completion Date: May 1, 1955
 Total Authorized Funds: *\$155,070,000 - GE \$26,330,000 - AEC \$128,740,000
 Total Estimated Cost: *\$155,070,000

The revised schedule has been prepared, but submission to the Commission has been delayed at their request pending review of project funds.

* Does not include 1706-KER Facilities

Plant Forces:

Modification of ventilation in Building 183.1 KE and KW is now complete. The Commission has notified Project Engineering to prepare a requisition for 16 sets of gates for replacement in K Area 30" backwash valves. With these 16 sets of gates installed, all 48 sets of gates in the backwash systems will have been replaced. The Roberts Filter Company has agreed to provide the gates and will negotiate with the vendor (Chapman Valve) and the Commission at a later date.

A requisition for 6700 Model JD-500F mercury switches for replacement in K Area pressure monitoring system was received from Process Design. Procurement will be expedited and installation will proceed as vendor's production and Panellit shop scheduling will permit.

Construction Operation

An estimate in amount of \$24,030 (less contingencies, field engineering, and overheads) for installation of beta monitoring system was submitted. A Work Order will be issued to Construction Operation when all materials are received. The mechanical equipment is expected to be shipped prior to October 15.

Work on repair of the 107 tank foundations in 100-K Area was completed September 21, 1956, with minor cleanup exceptions.

Temperature monitoring controller enclosure in 105-KW was completed except for touch-up painting. Work is proceeding in 105-KE.

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HW-45717

CA-512 - 1952 Reactor Expansion - 100-K Area Facilities (Con't)

Fixed Price Contracts:

Contract AT(45-1)-1137 Dowtherm System

The Dowtherm Unit, storage tank, filling pump, and air compressor bases have been set. Excavation has started for the sump pump drain line and plug valve.

Contract AT(45-1)-1157 Acid Feed System

L. H. Hoffman Construction Company has been awarded this contract. Work was started on September 14, 1956. Excavations for tank foundations, neutralization pits, and underground water lines have been completed.

CA-512 - 1952 Reactor Expansion - 100-K Area Facilities - 1706-KER Rec. Loop
Project Engineer: C. E. Love

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:			100%
Field Progress:			
F.P.	57 % *	100% *	99% *
C.O.	42.5%	98%	97%
P.F.	0.5%	85%	85%
Total		98%	98%

Average Manpower:

F.P.	12
C.O.	0
P.F.	5

Approx. Accumulated Manpower: (man-days)

F.P.	4781
C.O.	2900
P.F.	50

Directive Completion Date: December 31, 1956
 Total Authorized Funds: \$2,430,000 - GE \$1,880,000 - AEC \$ 550,000
 Total Estimated Cost: \$2,430,000

* A revised schedule reflecting this information has been submitted to the Commission for approval.

Final tests have been run in loops No. 1 and No. 4 and the other two loops are scheduled to be completed during the last half of September.

All work is complete in Cell No. 4.

CA-548 - New VSR Test Tower

Project Engineer: J. C. L. Chatten

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%

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548 - New VSR Test Tower (Con't)

Directive Completion Date: April 1, 1957
 Total Authorized Funds: \$ 125,000 - GE \$ 10,500 - AEC \$ 114,500
 Total Estimated Cost: \$ 125,000

The project was advertised for bids September 18, 1956.

Copies of a revised Directive and a new Work Authority have been received by the General Electric Company from the Commission reflecting the changes incorporated into revision No. 2 of the project proposal.

CG-558 - Reactor Plant Modifications for Increased Production - Phase I

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
F.P.	40.82%	89%	93%
C.O.	51.28%	53%	54%
P.F.	7.88%	69%	74%
Total		69%	74%

<u>Average Manpower:</u>		<u>Approx. Accumulated Manpower: (man-days)</u>
F.P.	60	F.P. 40,882
C.O.	321	C.O. 99,425
P.F.	0	P.F. 5,062

Directive Completion Date: December 15, 1957
 Total Authorized Funds: \$ 25,900,000
 Total Estimated Cost: \$ 25,900,000

The Process Design effort on this project is complete except for miscellaneous design revisions and field liaison activities.

190 Pumps Impeller Tests

Additional cavitation tests have been made on the high lift pumps being installed by the CG-558 Project. The impeller of the pump tested had been modified by the vendor, but indications of potentially damaging cavitation were again obtained at the design operating point. No immediate solution is available. The tests indicate that the pumps are safe to operate for the periods required to meet production schedules while finally acceptable pump impellers are being obtained. Plastic impressions of the surfaces of the impeller vanes have been taken to provide a record of the condition of the surfaces prior to being placed in service.

Project Maintenance

100-B Area - The first major outage for CG-558 was started in 100-B Area on September 26, 1956.

100-D Area - The ITE gear is being re-insulated by the vendor; estimated to be complete in three weeks. All 190-D cable has been pulled in. Installation of third main transformer is proceeding.

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HW-45717

CG-558 - Reactor Plant Modifications for Increased Production - Phase I (Con't)

Project Maintenance (Con't)

100-H Area - The toggle valve installation in H Area was completed September 15, 1956.

Construction Operation

Two 183 process pump cases have been scrapped by the vendor for porosity.

The burial pit to be used for burial of contaminated equipment from the 105-B Building is complete.

CG-558 - Reactor Plant Modifications for Increased Production - Phase II

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
F.P.	56.00%	31%	29%
C.O.	40.81%	10%	15%
P.F.	3.19%	2%	11%
Total		21%	22%

Average Manpower:

F.P. 172
C.O. 156
P.F. 0

Approx. Accumulated Manpower: (man-days)

F.P. 17,258
C.O. 14,863
P.F. 158

Directive Completion Date: February 28, 1958

Total Authorized Funds: \$ 11,200,000

Total Estimated Cost: \$ 11,200,000

The Process Design effort on this project is complete except for miscellaneous design revisions and field liaison activities.

Project Maintenance

Work in the H Area is temporarily stopped while crews are working in other areas.

Construction Operation

The excavation for the effluent line in the 105-F exclusion area is essentially complete. The 60 inch pipe from the exclusion area fence to the crossover point of the old and new lines was installed.

Eight of the new cubicles are in place in the 151-F, and tie-in of two of these is under way.

Fixed-Price Contractor

Excavation for the 181-H to 183-H raw water lines has been started.

The work in the 190-H Annex is progressing. All of the pump bases have been poured. The overhead crane is in place. The grounding loop is complete.

579 - Effluent Water Monitoring Improvements - 100-C
 Project Engineer: J. W. Hedges

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Field Progress:			
P.F.	100%		
Total		80% *	80%
Average Manpower:	Approx. Accumulated Manpower: (man-days)		
P.F. 0		P.F.	960
Directive Completion Date:	September 1, 1956		
Total Authorized Funds:	\$168,000		
Total Estimated Cost:	\$168,000		

No work was accomplished during the last half of September because critical crafts were assigned to higher priority work.

Revision No. 1 to the project proposal, requesting an extension of time to February 1, 1957, is being rewritten to conform with the prescribed format.

* Based upon the revised schedule now being routed for approval.

83 - Moisture Monitoring System for Detection of Leaking Process Tubes - 100-B, D, DR, F and H

Project Engineer: H. A. Zweifel

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
P.F.	100%	95%	85%
	Approx. Accumulated Manpower: (man-days)		
		P.F.	3500
Directive Completion Date:	December 31, 1956		
Total Authorized Funds:	\$293,000		
Total Estimated Cost:	\$293,000		

There has been no additional progress on this project because of higher priority work.

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CG-584 - Moisture Monitoring System for Detection of Leaking Process Tubes - 105-C
Project Engineer: H. A. Zweifel

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
P.F.	100%	100%	85%
Average Manpower:	Approx. Accumulated Manpower: (man-days)		
P.F. 0		P.F.	750

Directive Completion Date: December 31, 1956
 Total Authorized Funds: \$69,000
 Total Estimated Cost: \$72,000

There has been no progress on this project because of higher priority work.

CG-600 - 100-C Alterations
Reactor Project Engineer: J. W. Hedges
Water Plant Project Engineer: J. P. Langan

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Field Progress:			
C.O.	83.8%	26%	1%
P.F.	16.2%	19%	2%
Total		25%	1%
Average Manpower:	Approx. Accumulated Manpower: (man-days)		
C.O. 4		C.O.	380
P.F. 0		P.F.	8

Directive Completion Date: July 1, 1957
 Total Authorized Funds: \$765,000
 Total Estimated Cost: \$765,000

Work on the installation of sluice gates in the 1904-C diversion box has been held up pending receipt of a revised design.

Shipment of the first 190-C process pump is expected during the first week in October. Process Design is preparing TC piping drawings.

Present electrical switchgear, subject to repair, will be used for the 183-C pump motor starter. Process Design has re-confirmed its adequacy.

GA-615 - Mechanical Maintenance Shop Centralization - 100 Areas
 Project Engineer: J. H. Hoage

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
F.P. (F. H. Lohse)	61%	79%	79%
C.O.	17%	47%	59%
P.F.	22%	59%	64%
Total		69%	72%

Average Manpower:		Approx. Accumulated Manpower: (man-days)	
F.F.	5	F.P.	263
C.O.	3	C.O.	117
P.F.	1	P.F.	229

Directive Completion Date: February 28, 1957
 Total Authorized Funds: \$92,000 - GE \$42,000 - AEC \$50,000
 Total Estimated Cost: \$92,000

Construction Operation completed installing an electric power line to the building.

The painters are preparing for interior painting.

The plumbers are working on the sanitary sewer connections.

CG-616 - Installation of Acid Feed Equipment - 100-B, D, DR, F, and H Areas
 Project Engineer: M. G. Patrick

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Field Progress:			
F.P.	96.4%	23%	25%
C.O.	3.6%	50%	75%
Total		24%	26%

Average Manpower:		Approx. Accumulated Manpower: (man-days)	
F.P.	21	F.P.	710
C.O.	2	C.O.	140

Directive Completion Date: October 1, 1956
 Total Authorized Funds: \$400,000
 Total Estimated Cost: \$443,200

Revision No. 3, requesting additional funds of \$43,200, was informally approved by the Commission Review Board on September 27, 1956.

Excavation has started in F and H Areas. In DR Area two 19,500 gallon acid storage tanks are now on their foundations and work is progressing on the erection of the head tank.

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CG-616 - Installation of Acid Feed Equipment - 100-B, D, DR, F, and H Areas (Con't)

By October 1, one of the two inter-tie lines from C to B should be completed. The neutralizing pit, tank foundations, and car spot in D Area have been poured. Forms for the pump bases and trench are finished and ready for concrete pour.

CG-618 - Replacement of Steam Line Support Poles - 100-B, D, and F

Project Engineer: J. H. Hoage

	<u>Weighted</u>	<u>Scheduled</u> *	<u>Actual</u> *
Detailed Design:		100%	100%
Field Progress:			
C.O.	100%	72%	75%
Average Manpower:	Approx. Accumulated Manpower: (man-days)		
C.O. 12		C.O.	1101

Directive Completion Date: November 15, 1956
 Total Authorized Funds: \$110,000
 Total Estimated Cost: \$110,000

* Schedule based on November 15, 1956, completion date.

All poles have been replaced in 100-B. Pole banding, cross arm replacement, and line regrading will be done following completion of the pole placement in 100-F Area.

CG-622 - Replacement of Discharge Chute Liners - 100-B, D, and F Areas

Project Engineer: G. T. Haugland

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Field Progress:			
P.F.	100%	75%	75%
Average Manpower:	Approx. Accumulated Manpower: (man-days)		
P.F. 0		P.F.	1640

Directive Completion Date: July 1, 1957
 Total Authorized Funds: \$172,000
 Total Estimated Cost: \$172,000

Work at 100-B and D is complete.

No work at F pending a suitable shutdown. Present planning indicates work will be completed during CG-558 outage.

638 - Alum Activated Silica Water Treatment Facility - Phase II

Project Engineer: M. G. Patrick
 Design Engineer: H. W. Heacock

Directive Completion Date: April 1, 1957
 Total Authorized Funds: \$275,000
 Total Estimated Cost: \$275,000

All work on this project has stopped until results of in-pile tests on "Separan" are evaluated. The stop charge notice issued March 30, 1956, has not as yet been rescinded.

CA-639 - Painting of DR Water Plant Structures

Project Engineer: J. A. McCool

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
F.P. (Tri-State Painting Co.)	100%	100%	100%

Approx. Accumulated Manpower: (man-days)
 F.P. 660

Directive Completion Date: August 31, 1956
 Total Authorized Funds: \$75,000 - GE \$8,500 - AEC \$66,500
 Total Estimated Cost: \$75,000

This contract was completed on September 19, 1956. The final inspection was held on September 19, 1956, and the work was accepted without exceptions.

The contractor's cooperation and quality of work has been above average throughout the job and the work was completed one week ahead of schedule.

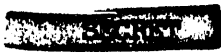
CG-642 - Continuous Charge-Discharge Equipment - C Reactor

Project Engineer: J. C. L. Chatten
 Design Engineer: H. W. Heacock

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		73%	73%
Directive Completion Date:	Design is scheduled for completion by November 1, 1957.		
Total Authorized Funds:	\$200,000 (interim authorization)		
Total Estimated Cost:	Not established		

Detail design is proceeding on schedule. Final completion is dependent on installation, operation and evaluation of the 112-tube charge-discharge system being installed under Project CG-651.

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CG-642 - Continuous Charge-Discharge Equipment - C Reactor (Con't)

The following tests are in progress: (1) Elevator ventilation.
(2) Additional gun barrel shielding.
(3) Discharge chute functional test.
(4) Sliding block charging machine.

CA-649 - FY-1956 Water Tank Replacement

Project Engineer: J. A. McCool

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
F.P. (W. E. Caldwell)	100%	0% *	0% *
Directive Completion Date:	February 28, 1957		
Total Authorized Funds:	\$58,500 - GE \$12,000 - AEC \$46,500		
Total Estimated Cost:	\$58,500		

* Field work is scheduled to start October 1, 1956. Fabrication of materials is progressing at the contractor's shops, and is approximately 22% complete.

CA-650 - Replacement, Repair, and/or Removal of Valve Houses - 100-B, D, and F

Project Engineer: J. A. McCool

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
F.P. (L. H. Hoffman)	100%	4%	0%
Directive Completion Date:	December 31, 1956		
Total Authorized Funds:	\$65,000 - GE \$3,500 - AEC \$61,500		
Total Estimated Cost:	\$65,000		

A progress schedule, submitted to the Commission by the contractor, was approved on September 14, 1956. The contractor is having material fabricated by a sub-contractor.

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HW-45717

CG-651 - Continuous Charge-Discharge Equipment - C Pile - Demonstration Unit
Project Engineer: R. G. Knirck

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	99%
Field Progress:			
P.F.	100%	10%	10%

Approx. Accumulated Manpower: (man-days)
P.F. 186

Directive Completion Date: September 30, 1956
Total Authorized Funds: \$ 225,000
Total Estimated Cost: \$ 288,000

All information required for the preparation of a revision to the project proposal has been forwarded to the Appropriations and Project Proposal Unit.

Project Maintenance is installing relay panels in No. 2 electric equipment room, prefabricating valve racks, and installing duct and conduit runs.

Purchasing Liaison reports indicate that ball valve delivery will be on schedule. Purchase Orders have been placed for the Pressure Monitor Duct and Control Console. Low bid was submitted by Instrument Laboratories, Seattle, Washington, and completion promised in 10 to 12 weeks.

CG-654 - Advance Design - Reactor Plant

Project Engineer (Water Plant): W. C. Royce
Project Engineer (Reactor): C. E. Love
Process Design Engineer: J. R. Carrell

Project Preparation Complete: 100% Preliminary Design Complete: 100%

Total Authorized Funds: \$ 500,000
Total Estimated Cost: \$ 500,000

All non-scope moderator drawings were approved during the month. A set of preliminary physical specifications was prepared and issued as HW-45569. This completes the moderator portion of the work.

A prototype ball-joint process tube connector with metal-to-metal seals was tested. Some leakage was noted so an investigation of alternate sealing materials was instigated.

The Design Criteria, HW-42132, and the Flow Monitor Instrument Engineering Diagram, SK-1-2360, have been revised and are ready for Project Council approval.

Seven building ventilation system drawings were approved, completing the drawing requirements for the building ventilation system. The approval of two storage area arrangement drawings and two metal handling facilities drawings completes the work on the handling of charging tubes during loading, storage, and charging of the reactor.

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HW-45717

CG-654 - Advance Design - Reactor Plant (Con't)

Document HW-45540, "J Reactor Power Level Limitations", which indicates the estimated power level limitations by the various components of the J pile, has been issued. The results of these studies indicate that the 2400 MW rating for start-up (aluminum tube) conditions remains satisfactory and that no limitations exist in the reactor design to power levels on the order of 3800 to 4000 MW. Determination of the design power for the higher temperature (zirconium alloy tube) conditions will await results of studies by Kaiser Engineers of the cost of heat dissipation system debottlenecking.

Information and data has been furnished to Kaiser Engineers, throughout the month, as required in their prosecution of preliminary design. On September 11, 1956, Kaiser Engineers presented preliminary work sheets delineating their approach to the problem. Their approach paralleled Process Design's views on the subject. Status of Process Design portion of the project (70%) is as follows:

	<u>Weighted %</u>	<u>Percent Complete</u>	
		<u>Month's End</u>	<u>Last Month</u>
Scope Criteria	40	73	63
Drawings	30	46	39
Testing	30	39	31
	TOTAL	55	47

CG-656 - Installation of Raw Water Cross-Tie - 105-C

Project Engineer: J. C. L. Chatten

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
C.O.	100%	10%	38%
Average Manpower:		Approx. Accumulated Manpower: (man-days)	
C.O. 2		C.O. 76	

Directive Completion Date: February 1, 1957
 Total Authorized Funds: \$ 27,500
 Total Estimated Cost: \$ 27,500

The far side high tank sensing line was relocated during a 105-C outage September 17, 1956.

The run (60' approximately) of 12" pipe has been placed in its designed location.

All material is on hand for job completion.

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HW-45717

CG-656 - Installation of Raw Water Cross-Tie - 105-C (Con't)

Project will be delayed at this reported stage of completion until an extended outage occurs at 105-C (5 to 10 days), during which the cross-tie installation will be completed. Such an outage has not been scheduled.

CG-663 - Steam Auxiliaries for the 165-K Steam Generators

Project Engineer: D. M. Diediker

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		98%	98%

Directive Completion Date: August 1, 1957

Total Authorized Funds: \$ 555,000

Total Estimated Cost: \$ 555,000

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CG-663 - Steam Auxiliaries for the 165-K Steam Generators (Con't)

Detailed design is essentially complete. All tracings are complete except for equipment foundation and tie-in details. These details will be completed on receipt of vendors' certified drawings for engineered equipment.

CG-665 - Metal Loading Facilities - 100-B, D, DR, F, and H Areas
Project Engineer: J. C. Major

Directive Completion Date: November 1, 1957
Total Authorized Funds: \$150,000
Total Estimated Cost: \$150,000

Detailed equipment drawings are expected to arrive from the vendor on September 26, 1956. In the meantime, preliminary design is underway on the equipment foundation, and drawings will be modified, if necessary, upon receipt of vendor's drawings.

CG-666 - Zone Temperature Monitoring - 100-B, C, D, DR, F, and H
Project Engineer: G. L. Swezea

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		65%	67%
Field Progress: *			
C.O.	48%	1%	1%
P.F.	52%	1%	1%
Total		1%	1%

Average Manpower:		Approx. Accumulated Manpower: (man-days)
C.O. 2		C.O. 57
P.F. 1		P.F. 47

Directive Completion Date: January 1, 1958
Total Authorized Funds: \$900,000
Total Estimated Cost: \$900,000

Project craft forces have pressure tested the wyes and pigtails in preparation for the 105-B major outage. Fabrication of signal leads, complete with electrical connectors, is in progress.

Construction Operation Forces have completed the preliminary work required to core drill the rod room walls at 105-B and H.

The installation schedule for this project is being routed for approval within the General Electric Company.

* Based on tentative schedule.

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DECLASSIFIED HW-45717

CG-667 - Improved Space Utilization - 105-B, D, and F Buildings
Project Engineer: W. P. Nicklason

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design: (W. C. Nickum & Sons)		10%	10%
Directive Completion Date: September 30, 1957			
Total Authorized Funds: \$212,000			
Total Estimated Cost: \$212,000			

The Architect-Engineer is working on his portion of the design.

CG-669 - Water and Gas Leak Locating Equipment - All 100 Areas
Project Engineer: C. L. Owen

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	61%
Field Progress:			
P.F.	100%		53%
Total		N.S.	53%

Directive Completion Date: October 31, 1956
Total Authorized Funds: \$112,000
Total Estimated Cost: \$112,000

Work on the jet portion of the project was stopped at 105-B and DR because of an installation conflict with Project CG-558. Other portions of the project are continuing.

CG-674 - Water Plant Component Test Loop - 1706-KE
Project Engineer: C. E. Love

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		72%	55%
Directive Completion Date: December 31, 1957			
Total Authorized Funds: \$125,000			
Total Estimated Cost: \$125,000			

Design is continuing and four drawings of the equipment have been issued for comment.

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HW-45717

CG-678 - Laboratory Facilities for Special Irradiation Studies

Project Engineer: D. M. Diediker

Directive Completion Date: October 1, 1957
Total Authorized Funds: \$ 45,000
Total Estimated Cost: \$ 45,000

Detailed design, which will be performed by an Architect-Engineer, has not been started.

CG-684 - Adequate Fresh Air Systems - 105-B, D, DR, F, and H

Project Engineer: H. A. Zweifel

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	95%
Field Progress:			
P.F.	100%	2%	1%
Average Manpower:	Approx. Accumulated Manpower: (man-days)		
P.F. 2		P.F.	2

Directive Completion Date: June 1, 1957
Total Authorized Funds: \$ 88,500
Total Estimated Cost: \$ 88,500

Work started during the week of September 10, 1956, with some minor electrical work on installation of starting switches for the compressors.

Air compressors and motors, after-coolers, and pressure reducing valves are now on order. The order for the air receivers is expected to be placed by September 21, 1956. Bids on the air hose reels have been reviewed and the order should be placed by September 21. This will complete the orders for engineered items.

CA-690 - Roof Repairs - 190-D, F, and 186-D Buildings

Project Engineer: J. H. Hoage

	<u>Weighted</u>	<u>Scheduled</u> *	<u>Actual</u>
Detailed Design:		100%	100%
Field Progress:			
F.P. (C. C. Hill)	100%		25%
Average Manpower:	Approx. Accumulated Manpower: (man-days)		
F.P. 5		F.P.	70

Directive Completion Date: January 15, 1957
Total Authorized Funds: \$28,000 - GE \$ 4,500 - AEC \$23,500
Total Estimated Cost: \$28,000

* Schedule not available from contractor. The F Area portion of the work is estimated at 25% of the total.

CA-690 - Roof Repairs - 190-D, F. and 186-D Buildings (Con't)

The contractor began work at 190-F on September 11, 1956, and completed it on September 20, 1956.

CG-694 - Auxiliary Oil Pumps - 100-C

Project Engineer: J. P. Langan

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		100%	100%
Total Estimated Cost:	\$ 80,000		

The directive was received by Contract Administration with a change in the source of funds. This change must have approval from General Electric Company management.

AEC-160 - Recirculating Gas Loop

Project Engineer: M. G. Patrick

	<u>Weighted</u>	<u>Scheduled</u>	<u>Actual</u>
Detailed Design:		Not Scheduled	5%

Total Authorized Funds: \$ 60,000 (Interim Authorization)

Contacts have been made with various suppliers of compressor equipment in regard to the engineered equipment needed for this project.

Detailed design for this project, which is being provided by Construction Engineering Operation, is being delayed by lack of specifications on engineered equipment.

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DECLASSIFIEDF. Significant Reports Issued1. Routine

General Manager's Monthly Project Report, by D. K. Warner, August, 1956.

Project Section Monthly Report, by J. S. McMahon, August, 1956.

Monthly Management Report, by J. S. McMahon, dated September 26, 1956.

Semimonthly Project Status Reports, by T. H. Lyons, dated September 14, 1956, and October 2, 1956.

Project Preparation Status Report, dated September 28, 1956.

2. Non-Routine

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-45671	"Summary and Evaluation of HAPO Design Conceptions for Reactor Plants to Produce Plutonium and Electricity", September 25, 1956.	W.J. DOWIS
	This report compares data from the six studies on dual purpose reactors made in the last three years, including the latest supplementary production reactor, and evaluates the design concepts.	
HW-45002	"Vertical Safety Rod Improvement Program", September 9, 1956	G.E. Wade
HW-42133(RD)	"Outlet Temperature Monitor System", September 13, 1956.	W.A. Richards
HW-42143	"Ventilation Control System, September 13, 1956.	W.A. Richards
HW-42581	"Physics Considerations for Project 0654", September 7, 1956.	E.R. Astley
HW-45540	"J Reactor Power Level Limitations", September 13, 1956.	D.L. Condotta
HW-45548	"Preliminary Investigation of D ₂ O Demonstration Reactor", September 17, 1956.	D. Marinos
HW-45559	"A Test Program for Hydraulic Design Criteria", September 14, 1956.	J.T. Norgord

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HW-45717 (CONF)

- HW-45567 "The Creep of Zircaloy-2 Process Tubes", September 17, 1956. H.B. Burgess
- HW-45569 "Preliminary Physical Specifications for Moderator Raw Materials", September 28, 1956. D. Marinos
- HW-45611 "Discussion of the Economic Justification for an Expansion of the K Reactor's Water Plant", September 18, 1956. D.L. Condotta
- HW-45648 "100-K Area Water Plant Expansion Study, Feasibility Report", September 26, 1956. M.H. Schaack
- Unclassified, "Recirculation Gas Loop Temperatures and Pressure Drop", September 24, 1956. D. L. Condotta
- Confidential, "Plant and Equipment Analysis Report", Undocumented September 4, 1956. G.E. Wade
- HW-45471 "Economic Study of Power Recovery from Hanford Reactors Waste Heat", September 7, 1956. E.L. Etheridge
W.J. Mundt
- Unclassified, "Requested Engineering Services", September 17, 1956. C.R. Barker
T.M. Clement

III. ORGANIZATION AND PERSONNEL

A. Organization

J. T. Norgord, summer employee from the faculty of the Mechanical Engineering Department of the University of Idaho, Moscow, Idaho, terminated September 14, 1956.

J. W. Scoggins has been appointed Supervisor, Engineering Inspection, vice R. W. Copeland who is accepting optional retirement effective October 31, 1956.

A. J. Karnie, Senior Engineer, was transferred to the Fuels Preparation Department effective September 15, 1956.

B. Force Summary

	<u>Beginning of Month</u>			<u>End of Month</u>			<u>Net Change</u>
	<u>Exempt</u>	<u>Other</u>	<u>Total</u>	<u>Exempt</u>	<u>Other</u>	<u>Total</u>	
Employees on Payroll	179	126	305	175	118	293	-12
Technical Graduates			<u>11</u>			<u>17</u>	<u>+ 6</u>
		<u>Totals</u>	<u>316</u>			<u>316</u>	<u>- 6</u>

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Following are changes during the month.

	<u>F.E.O.</u>	<u>Technical Graduates</u>
Payroll Additions	2*	
Payroll Removals	8	
Transferred Into Operation	1	6
Transferred From Operation	5	

* The two payroll additions, effective on September 4 and September 11, 1956, were included in the beginning-of-month figure of 305.

C. Safety Experience

One medical treatment injury (laceration of finger on a file drawer) was sustained during the month. Safety meetings were held by all components of Facilities Engineering Operation.

D. Security Experience

Security meetings were held by all components of Facilities Engineering Operation. Three open-file security violations occurred during the month.

E. Radiation Experience

No exposure exceeding the maximum permissible limit was recorded.

A series of radiation orientation meetings were conducted in 100-B Area to acquaint personnel in Project Engineering and Equipment Development with the radiation hazards of 100 Area work.

F. Personnel Activities

1. Visitations

C. A. Munro attended an A.S.M.E. Lubrication Conference at Atlantic City on October 8-10, 1956.

H. R. Hughes, Utilities Engineering Operation Engineer, attended a conference of the A.I.E.E. for one day in Portland, Oregon.

D. B. Hagen, Industrial Engineering Operation Engineer, is attending a company-sponsored instructors training course in Motion Time Survey at Schenectady, New York. This is in preparation for application of such activity in the Irradiation Processing Department.

J. W. Green attended meetings of the "Instrument Society of America" in New York City from September 15 to September 21, 1956. He also conferred with the Bristol Instrument Company at Waterbury, Connecticut, regarding a flow monitoring problem from September 22 to September 26, 1956.

[REDACTED]

R. D. Schilling visited Seattle, Washington, from September 21 to September 26, 1956, for engineering inspection of vendor-fabricated components for the CG-651 Project. He also engaged in engineering discussions with electronic component fabricators.

2. Training

Engineers B. C. Benedictson, D. B. Hagen, W. W. Walker, and W. W. Porter were given orientation by being assigned to shifts of the Operations and Power groups in the 100 Areas.

3. Other Activities

The transfer of personnel from the various sections to Facilities Engineering Operation was one of the major efforts of the month. New change of status forms were prepared and submitted to Salary Administration for 73 exempt employees. Currently personnel information on all employees is being collected to establish it in a central location.

Arrangements were made by W. J. DOWIS for the delivery of two technical papers at the forthcoming Engineering Joint Council meeting in Philadelphia, in March, 1957, and some work was done on a paper, "Problems of Making Major Repairs to Production Reactors", which may possibly be given at the same session by E. E. Weyerts or W. J. DOWIS.


MANAGER
FACILITIES ENGINEERING

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HW-45717

REPORT OF INVENTIONS
FACILITIES ENGINEERING OPERATION
IRRADIATION PROCESSING DEPARTMENT
September, 1956

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

Inventor

Title

None



MANAGER
FACILITIES ENGINEERING

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EMPLOYEE RELATIONS OPERATION

September 1956

PERSONNEL PRACTICES

I. General

Many statistics, ultimately to be included in this report, are not available at this time. This is due to many of the problems of clarifying and securing statistical information consistent with reorganized components, and to the fact that we were not manned for some of our functions until mid-September. Those statistics which are presented should be viewed in the light of the limitations imposed by existing conditions; they are indicative, however, of the scope of activities in which we are engaged.

II. Technical Personnel Placement

A. Ph.D. Needs within I.P.D.

An initial survey indicated the need for five Ph.D.'s during the coming year, four in Facilities Engineering, and one in Research and Engineering. One off-plant Ph.D. is currently under consideration for one of these openings.

B. B.S. - M.S. Needs

We are anticipating a forecast of technical manpower needs for the coming year during October. Several components are delayed in submitting this information due to manpower budget limitations; however, spot checks have been made to determine the immediate needs of the various groups in order to take action on currently available candidates.

C. Experienced Technical Candidates

The total number of active cases being centralized by IPD is nine. Other candidates of interest to IPD and centralized by other departments number five. A breakdown of these candidates is shown in the tabular summary. Three offer letters have been processed with one acceptance. We are awaiting a reply on the other two. Two candidates were interviewed where no interest within IPD or other departments was shown. Sign-off letters have been sent to these two candidates.

D. Active Transfer Cases

There are six active transfer cases within IPD. There is one additional case of interest in IPD outside the department. All active transfer cases showing their up-to-date histories are indicated in the tabular summary. Rechecks have been or are being made as to any change in status resulting from reorganization. Two active transfer cases have been satisfied due to changes in job assignment after reorganization.

E. Inactive Transfer Cases

There were four cases where employees from other departments were referred to IPD. In all these the employee's present assignment following re-

organization resulted in sufficient satisfaction to remove any possible transfer request at this time. There were seven other transfer requests within IPD that resulted in inactive status primarily due to lack of further interest by the employee for additional action at this time.

ACTIVE EXPERIENCED CANDIDATES

<u>Centralized</u>		<u>Degree</u>	<u>IPD Int.*</u>	<u>No IPD Int.</u>	<u>Offer Made</u>	<u>Offer</u>		<u>Current Status</u>
<u>IPD</u>	<u>Other</u>					<u>Accept.</u>	<u>Reject.</u>	
x		BS-ME	x		x			Awaiting reply
x		BS-EE	x		x			Awaiting reply
x		---	x		x	x		Await. employment with FE
x		EA-ARCH	x					Await. extent of interest
x		BS-ME	x					Await. requisition
x		BS-PHYS	x					Await. PDS for further int.
x		AB-EDUC						Checking on IPD interest
	HLO	MS-PHYS	x					Await. call for interview by HLO
	FPD	BS-GEN.						Checking on IPD interest
	CPD	BA-MGMT.	x					Await. CPD to bring in for interview
	CPD	BA-ENGL.	x					" " " " " "
	CPD	BS-ME	x					" " " " " "
x		BS-EE		x				Reject. letter sent 9/18/56 indicating no interest
x		BS-EE		x				Reject. letter sent 9/20/56

TRANSFER REQUESTS PROCESSED

<u>Requests</u>	<u>Approved</u>	<u>Int. In</u>		<u>Int. Shown</u>	<u>Present Status</u>
<u>IPD</u>	<u>Other</u>	<u>IPD</u>	<u>GE Other</u>		
	CPD				Employees interest is at present job (inactive)
	FPD				" " " " " "
	FPD				" " " " " "
x		Yes	APED	Yes	Accepted offer - leaving HAPO
x			North Amer.		Presently satisfied (inactive)
x			APED	Yes	Awaiting offer - now satisfied with present job
	CPD				Checking on employee's intent & interest in IPD
x			KAPL		Awaiting KAPL interest
x		Yes	ANP	Yes	Accepted offer - leaving HAPO
x			APED	No	Notified - presently satisfied (inactive)
x			ANP	No	" " " "
	R&U				No interest in IPD - employee notified
x			ENST		Is satisfied with present assignment in IPD
x			APED	No	Rechecking his present status on request
x			APED		(Inactive)
x			APED		Rechecking following reassignment of position
x			APED	No	New organization offered more interest (inactive)
x			APED	Yes	Did not accept offer (inactive)
x			North Amer.	Yes	Shows interest in other GE plant - looking for spot
x			North Amer.	Yes	Reassigned within IPD & employee is satisfied - did not accept offer of No. American

*Abbreviation for "interest".

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F. Military Reactivates

We are currently processing two such cases. One is awaiting information on service experience, the other has been sent an interest letter and basic terms of a salary offer. We are awaiting a formal offer and requisition on the second candidate before an offer letter is processed.

G. Personnel Development Program

Until the anticipated mid-October arrival of the Specialist-Professional Personnel Development, placement of Technical Graduates on rotational assignments within IPD has been handled by this office. Six reassignments have already been processed between September 17 and 25. Three of these involved personal interviews by, and counselling on the part of the Specialist-Technical Personnel Placement.

An up-to-date record is being processed on the present Technical Graduate assignments within IPD. The central Technical Graduate office has forwarded a pre-reorganization record of assignments which is being checked out as to current placement. It has been necessary to request the other operating groups in IPD to forward up-to-date information on the assignment of Technical Graduates. Three of the operations have sent in status reports to date. It is anticipated that this Technical Graduate record will be completed by October 5, contingent upon the return of the necessary data from the various operations.

III. Employment

With the personnel files not arriving in the area until September 21, and our one clerk not arriving until September 25, we are not in a position to submit any significant statistics at this time.

Records are being established, however, to permit daily reporting (probably starting October 8, 1956) of payroll additions and removals for the IPD, as well as periodic summaries of personnel movements.

Much time and effort has been devoted thus far to the development of procedures which are simplified yet provide for uniformity between departments. The most pressing procedures, now becoming fairly well clarified, are those involving terminations and transfers.

All open requisitions for non-exempt personnel were reviewed earlier in the month, and all except those against which transfers were being processed, were cancelled. Since that time the various IPD components have re-submitted nine requisitions covering a total of 29 openings. The great majority of these cover clerical and secretarial openings, and most are for replacements.

IV. Employee Benefits and Services

No statistics are available for the Irradiation Processing Department at present. Plans are in process to obtain statistics on participation in all the Benefit Plans from IBM as of September 1, 1956 for bases from which to chart our progress.

Files on IPD personnel have been obtained from the former centralized plant files and are being organized and set up for the following:

- Military Reserve
- Selective Service, Veteran and Non-Veteran
- Patent Agreements
- Pre-retirement
- Retired Personnel

Information, prices, and procedures on Employee Purchases articles are being accumulated in our files. Transactions have been handled on two items and information supplied to individual employees on four additional items.

One optional retirement request has been received and the procedure initiated for completion by November 1, 1956.

Two educational loans, initiated prior to reorganization have been completed. Procedure is being set up to process the entire loan procedure for IPD employees.

No IPD employees have expired in September. The Company business with the heirs of Margaret N. Schafer, who expired August 31, was completed on September 25 with the mailing of the Life Insurance benefits to her beneficiaries.

One question and answer meeting for 30 people in 100-H Maintenance was conducted on request regarding Insurance Medical benefits.

V. Mail and Duplicating Services

Large mailings handled during the month included: the Management News Bulletin, 15 Organization and Policy Guides, Monthly Safety Topic, Telephone Directory Supplement, GESA Bulletin, and the September issue of the Monogram. This communications material was addressographed and delivered by 100-H Area personnel. In addition, two collating and enveloping jobs were handled during the month.

All changes of address have been processed and noted on mail boards in both 100-H and 100-K. A special mail delivery was established to the office of the General Manager, Irradiation Processing Department, in order to provide pickups at 10:15 a.m. and 2:15 p.m. daily.

At the request of the Manager, Personnel Development and Communications, an additional addressograph list was established in order to permit distribution of personnel development material to managers and supervisors. Addressograph tabs ordered by direct purchase were received on September 24, and all addressograph plates were immediately tabbed to provide the aforementioned list.

One Model 1250 offset press was received from Relations and Utilities, Office Equipment during the month. It should materially assist in handling additional work loads created by reorganization. As an example of the trend in work loads in the 100-H Duplicating Office, during the month of August a total of 113,742 copies were duplicated as compared to a total of 155,105 copies during September. Work loads in the 100-K Duplicating Office have increased somewhat due to requirements of additional personnel in 100-B Area. However, these work loads are being handled adequately with existing personnel and equipment.

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STATISTICS (AUGUST 25 - SEPTEMBER 24, INCL.)

DUPLICATING

Orders Received	738
Orders Completed	724
Orders on Hand	9
Xerography Masters Made	695
Total Masters Handled	2,371
Total Copies Reproduced	155,105

MAIL

Pieces of Registered Delivery Mail	2,604
Pieces of Postal Mail	425
Pieces of Regular Mail	342,000
No. of Addressograph Impressions	2,695

PERSONNEL DEVELOPMENT AND COMMUNICATION

Communication Activities

Good progress was made in establishing channels of contact within and outside the department to maintain uninterrupted flow of the more essential information in the early stages of transition to the decentralized operation. Where possible this was accomplished through the medium of standard forms that could be evaluated currently as having continued usefulness over the long term. Thus a number of communiques received broad and appropriate department distribution through the following forms which were prepared: Management News Bulletin, IPD News Letter, Union Relations Information, and Accident Prevention Hi-Lights. As a necessary prelude to the distribution of such information, mailing lists were established and tabbed on the addressograph for all exempt employees, office addresses, non-exempt employee home addresses, etc.

Distribution of the G.E. News within the 100 areas was revised to a system believed to be more compatible with the desires of day shift employees. Arrangements were made with the KE-KW Reactor Operation for a dry run October 2 with AEC, Washington representatives of a proposed press tour to be held at a later date.

The communication specialist left for New York during the last week of the month to participate in a ten-day communication training course.

Personnel Development

Principal attention was devoted to reactivation of the G.E. Supervisory Selection Program in the department and to the disposition of training courses formerly given on a centralized basis by the Education and Training Section.

Complete evaluation of all existing files and information on the selection program was begun as a first step in determining its present status; to acquaint the inexperienced evaluator with its philosophy, content and application; and to permit planning of its extension within the department. This evaluation was

nearing completion at month-end, as was location of folders that were missing from the record file. There are presently evaluation folders of 153 IPD personnel in the active file. It has not been possible to make an exact determination but it is estimated that a majority of these require re-evaluation to comply with reasonable standards. This phase of the program must be given first attention. By month-end four re-evaluations were completed and it became apparent that full time of the evaluator for a minimum period of 30 work days would be required to bring the program up to a current status. Following this, new nominations to the program can be accepted for evaluation.

Discussions were held with personnel development representatives from other HAPO departments to determine which of the present "in stock" training programs should be retained and presented centrally by Personnel Development Specialists in Relations and Utilities. Though this requirement will vary between departments, for IPD there appear to be four courses where such factors as limited demand at present, specialized instructor requirements and multi-department contributions make centralized presentation attractive. This includes: (1) New Exempt and Supervisory Orientation, (2) HOBOS I and II, (3) Principles and Methods of Supervision and Leadership, and (4) Practical Business Writing (presently titled "Report Writing").

The other courses, some 16 in number, will be decentralized. As mentioned previously assistance will be necessary in the form of instructors from other department components if any substantial number of these courses are to be offered within IPD during the next calendar year. A more precise determination of actual requirements can be made through course attendance record cards for all exempt people in the department, but this compilation cannot be started until presently unavailable clerical assistance is obtained for this component. In any event some delay will be experienced until qualified instructors can be trained.

At the close of this period a meeting is scheduled with the Managers of Personnel Development and Administration in each of the five reactor operations areas to apprise them of problem areas confronting this activity, to assess the availability of manpower in their components that can be devoted to personnel development functions, and from this and related analyses delineate those manpower development avenues that can be pursued most profitably.

Plans were also being developed for presentation of the new Non-Exempt Personnel Development Program to IPD supervision. Careful advance preparation is necessary to ensure complete supervisory understanding of this program (which supplants the former rating system), its acceptance by the non-exempt people, and reasonably uniform application on a HAPO-wide basis.

SALARY AND WAGE ADMINISTRATION

All exempt positions in IPD have been officially established and records and authorizations completed for the staffing of these positions at proper salaries. Original authorization papers are on file with IPD Personnel Accounting (below Level 3). Level 3 and above authorizations are on file with HAPO General Manager. New position titles and abbreviations have been furnished to IBM and will appear on the October payroll run. Information pertaining to authorized position titles and levels was issued to the HAPO General Manager and to other managers concerned. One new position was established during the month to fill the need for an intermediate step of progression between non-exempt and the existing Specialist, Materials Control position.

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Mechanics have been set up to handle the approval and processing of merit increases through the use of IBM sheets thus reducing the necessary paper work to a minimum.

A revised procedure was established for the processing of changes of status of non-exempt personnel. This revised procedure was required to fill the needs of the centralized records to be maintained by the Relations and Utilities Department as well as to expedite handling and to fill the needs for records to be retained by IPD.

A specialized coding of all exempt IPD employees showing title, function, supervisory level and work description has been forwarded to Personnel Accounting to be included in a special HAPO report which will be consolidated by the Relations and Utilities Salary Administration and forwarded to Consolidated Payroll Reports and Statistics in Schenectady, for use in preparing overall Company salary information.

Organization Directories and Functional and Structural Organization charts were issued to selected local personnel. Due to numerous requests for copies for other HAPO departments and for off-site distribution, additional copies of the Organization Directories are being readied for distribution.

HEALTH AND SAFETY

Personnel

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees	4	2

Accident Statistics

Disabling Injuries	0
Frequency	0
Severity	0
Medical Treatment Injuries	75
Frequency	* 2.00
Estimated Man-Hours Worked	356,306

*This is considerably lower than we estimated (3.20) and is well below the 1954 performance.

Fire Statistics

Two operational fires, both in B - Losses \$15.00

Security Violations

Four security violations were reported:

- Two - 100-D - Research and Engineering
- Two - 700 - Facilities Engineering

General

The roster and training procedures for Rescue Crews are being brought up to date.

The Civil Defense program is being amended to provide additional bus services for evacuation purposes.

October is considered "Fire Prevention Month" and programs are being sponsored in all Operations.

Eleven safety meetings and seven new-employee orientations were attended by Specialists-Safety.

Plans for a new Supervisory Safety Training Program are in progress.

We have frequently assisted each newly formed Health and Safety operation establish its structure, objectives and methods during this month. Two-way communications plans are established and a monthly meeting is to be held to exchange ideas.

One of the most significant accomplishments involved the outage at B which required coordination between the work forces for this operation, Facilities Engineering, Construction Operation and probable outside contractors' participation. Several meetings were held to discuss the safety aspects of this hazardous operation.

The establishment of the IPD - Central Safety Council was completed and the first meeting was held September 14, 1956. The results of this meeting involved specific changes in certain procedures, reports and planning and these are now incorporated within our usual procedures.

An agreement has been reached to remove one of the two railroad crossings directly in front of Construction Operation. One spur has been inactive for some time. This will eliminate a stop by all D and H buses. Work should be completed in 45 days.

Highway markings at railroad crossings on roadways recently re-surfaced will be re-established within 30 days. This is of importance to our Department as most of the highway affected is in our immediate vicinity.

FIRE PROTECTION

Organization and Personnel:

	<u>Employees</u>	<u>Exempt</u>	<u>Non-Exempt</u>
Beginning of month		11	41
Transfers in		0	0
Transfers out		0	0
Terminations		0	0
New Hires		0	0
End of month		11	41

Fire Responses:

HAPO.....	3	Loss.....	0
Construction.....	1	Loss.....	\$10.00
Private.....	1	Loss.....	\$100.00

Description of Fires:

Private Vehicle - Parking Lot - 100-D Area - Outer Area - 8:05 a.m. - 9/5/56: Mechanical defects caused fire in brake lining of privately owned vehicle.

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located in 100-D parking area. Fire extinguished with CO₂, drum further cooled with water. Private loss \$100.

Construction Engineering - Construction - Minor Construction - White Bluffs - 6:20 p.m. - 9/13/56:

Construction employees left torch burning in a tarp and plywood enclosed sand dryer in the Minor Construction area. Tarp ignited causing minor damage. Loss \$10.

Irradiation Processing - B & C Reactor Operation - Power - 100-B Area - 6:33 p.m. - 9/17/56:

Spontaneous ignition in coal pile, 100-B Area, near 181 building. Slight damage to wooden timber supporting steam line. No loss.

Irradiation Processing - B & C Reactor Operation - Power - 100-B Area - 11:29 a.m. - 9/22/56:

Spontaneous ignition of old coal dust, 100-B Area, near 181 building. No loss.

Irradiation Processing - Near Intersection of Rts. No. 1 and 2 and Two Miles South of Intersection on Rt. 2N - Outer Area - 1:34 p.m. - 9/26/56:

Grass fires covered four distinct areas in these vicinities. Ignition probably caused by heat lightning. No loss.

Drills Held During September

Outside drills.....	50
Inside drills.....	40
Feet of hose used on drills.....	7,500
Feet of ladders used on drills.....	448

Meetings

<u>Type of Meeting</u>	<u>No. of Meetings</u>	<u>No. Attending</u>
Information	4	40
Round Table	4	40
Security	4	39
Safety	8	80

Fire Extinguisher Activities

Inspected.....	575
Installed.....	10
Delivered to New Locations.....	5
Seals Broken.....	17
Serviced.....	412
Weighed.....	293
Gas Masks Inspected.....	3
Gas Masks Serviced.....	10
Hand Lines Inspected.....	23
Hose Boxes Inspected.....	10

General

The 100-B Fire Station was closed on August 31, with all equipment and personnel assigned to the White Bluffs Fire Station until September 3.

Fire Protection operation was decentralized on the 11:15 p.m. to 7:15 a.m. shift on September 3. All equipment and manpower re-assigned without incident.

On September 21 a meeting was held with all supervisors to discuss any problems created by the reorganization; these were solved by the group with minor changes of procedure recommended. Standards and measurements were discussed along with delegation of authority under the new organization.

Officers are attending a First Aid Instructors course in Richland to supplant instructors transferred in the reorganization.

Ford panel 1D-5528 was excessed; Chevrolet panel truck 1D-479 received as a replacement.

UNION RELATIONS

A long-standing jurisdictional dispute between the construction Electricians and Pipefitters regarding installation of panel boards was apparently settled on September 20. On September 21, a potential dispute between construction contractors and the Teamsters, Operating Engineers, and Cement Finishers was averted by tentative agreement to extend the time for accepting the Ching Panel recommendations for settlement of the issues between these parties regarding isolation pay, bus transportation and other conditions. The "status quo" agreement expired on September 12, but it now tentatively has been extended until July 12, 1957.

On September 17, employees who are members of Instrument Craftsmen's Guild, No. 24546, voted to become affiliated with the International Brotherhood of Electrical Workers as soon as the necessary administrative details can be worked out. This probably means that the Instrument employees will be granted a charter as a separate local in the IBEW and will retain their jurisdictional claims along the same lines as at present. The affiliation should bring about better harmony between the Electricians and Instrument employees due to their being a part of the same International. It may, however, cause the Pipefitters and other crafts to void previous understandings with ICG and attempt to claim some of the work now being performed by Instrument employees.

An arbitration hearing was conducted by impartial arbitrator John S. Harlow, a Seattle attorney, in the dispute with the Hanford Atomic Metal Trades Council involving a one-day disciplinary layoff given each of two Mechanics in Transportation Operation. The Council contended that the discipline administered was not justified and endeavored to reduce the discipline to a Warning Notice. The Arbitration Committee consisted of one member representing the Company, one representing the Council and impartial arbitrator Harlow. After hearing all testimony, the Committee voted two to one that the disciplinary action taken by the Company in this instance was warranted. The significance of this case lies in the fact that it represents the initial test of new contract language requiring that the Company arbitrate disciplinary penalties.

Publicity of Union Relations activities in the Department was started with the first issue on September 25 of "Union Relations Information" for management of the Irradiation Processing Department. While these reports will be patterned after similar HAPO-wide bulletins issued in the past, it is planned that they will be prepared and distributed only within IPD.

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IRRADIATION PROCESSING
GRIEVANCE STATISTICS
SEPTEMBER 1956

A total of 11 grievances were received and three Step II grievance meetings were held. The following is a breakdown of the status of these grievances:

	<u>Unit</u>	<u>Non-Unit</u>
Received this month	11	0
Received this year	166	1
Step I		
Answer unsatisfactory	10	0
Answer satisfactory	1	0
*Pending time limit	4	0
Settled this month	1	0
Step II		
Discussed this month	6	0
**Pending time limit	0	0
Settled this month	0	0
Total Settled this month	1	0

*Step I grievances which the Council indicated their desire to discuss at Step II but not scheduled are considered settled at Step I after three months.

**Step II grievances which the Council formally indicated their intention to arbitrate but have taken no further action are shown settled at Step II after three months.

Subject of September 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>Fac. Eng.</u>	<u>Res.& Eng.</u>	<u>Prod.</u>
Jurisdiction			2	3						
Ratio Agreement	1									
Overtime Distribution		1		1						
Manpower Coverage		1	1							
Detail Procedure		1								
TOTAL	1	3	3	4	0	0	0	0	0	0
<u>Non-Unit</u>	0	0	0	0	0	0	0	0	0	0

FINANCIAL OPERATION

September, 1956

Administrative Planning

A total of 28 Organization and Policy Guides and 73 Advices were issued either prior to or during the month. Plans were initially scoped for the development of a Plant Defense Manual which will include such items as Evacuation, Plant Defense, Rescue, and Contamination Control. A shuttle service for the 100 Areas was inaugurated to augment shortage of personnel transporting vehicles. However, because of lack of enough passengers using the vehicles, consideration was being given at month end of discontinuing the service.

General Accounting

Temporarily two employees doing Facilities Engineering cost work are loaned to Product Cost for training in handling Facilities Engineering cost work. One employee has been loaned to Construction Engineering-Finance to aid in the handling of CWIP cost work for IPD. Irradiation Processing Department was budgeted this fiscal year \$8,100 for non-reimbursable expenditures chargeable against the fee. At September 30, 1956 the invested value in IPD was \$579,190,000 and chiefly represents asset of plant and equipment of \$358,000,000 and inventories of \$212,300,000. Gross plant and equipment is \$479,000,000 with a reserve for depreciation of \$121,000,000. Changes in asset accounts amounted to \$80,480.

Product Cost & Budgets

Responsibilities remained unchanged except for personnel temporarily assigned for Facilities Engineering Costs and Equipment Not Included in Construction Projects report. Detail statements of FY 1957 operating cost estimates and reallocation of budget funds according to the new IPD organization were issued.

Personnel Accounting

Personnel Accounting activities were decentralized to each of the new components effective October 1. Base salary rates for all non-exempt employees except Business Graduates and Technical Graduates were increased by 3% effective October 1. Also effective were increases in shift differential for all non-exempt employees, and isolation pay and area differential increases for all employees who are eligible.

Budgets & Measurements

Work effort was directed primarily toward the orientation in absorbing material previously developed by the Measurements program. Primary delegations were held with a large number of management, supervisory, engineering and Measurements personnel.

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Auditing

Audit coverage for the period September 1, 1956 through July 31, 1957 was approved for submission to the AEC. A report was issued covering the physical verification of the AEC Radium transferred from the Hanford Laboratories Operation to Irradiation Processing Department.

Procedures

Assumed responsibility for analyzing clerical procedures and practices, including forms design and control and serving in an advisory capacity with SS Accountability Operation of Relations & Utilities Operation for a period of 90 days from September 1. Began a study of procedures and forms used in authorizing work to be performed for or by Irradiation Processing Department. At present this study consists of a review of the present work order system.

END

**DATE
FILMED**

8 / 7 / 92

