DECLASSIFIED
WITH DELETIONS

HW-57278-DEL

HW--57278-Del.

Th
of
DE92 016586

MONTHLY RECORD REPORT

IRRADIATION PROCESSING DEPARTMENT

70122

DECLASSIFIED
WITH DELETIONS

AUGUST, 1958

Received by OSTI
JUL 1 1992

By Authority of

Robert M. Jones 4/23/92
D. J. Bishop 5/15/92
J. H. Wells 5/15/92

Compiled by

IPD PERSONNEL

J. P. Derron
by M. Walker
5/12/73

September 19, 1958

RICHLAND, WASHINGTON

Work performed under Contract No. W-31-109-ENG-52 between
the Atomic Energy Commission and General Electric Company

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

R.

Signature and Date

[REDACTED]				MASTER
[REDACTED]				DECLASSIFIED
[REDACTED]				WITH DELETIONS

DECLASSIFIED
WITH DELETIONS

DISTRIBUTION RESTRICTED TO U.S. ONLY

DEL

DISTRIBUTION

Copy Number

1	W. E. Johnson
2	R. J. Schier
3	A. B. Greninger
4	H. M. Parker
5-6-7	AEC-HOO, J. E. Travis
8-9	AEC-Production Division, E. J. Bloch
10	AEC-SROO, R. C. Blair
11	300 File
12	Records Center

DECLASSIFIED

DECLASSIFIEDTABLE OF CONTENTS

General Summary	A-1 through A-6
<u>Research and Engineering Operation</u>	B-1 through B-40
Process and Reactor Development Operation	B-3 through B-14
Process Technology Operation	B-15 through B-21
Operational Physics Operation	B-22 through B-30
Irradiation Testing Operation	B-31 through B-35
Coolant Testing Operation	B-36 through B-38
Component Testing Operation	B-39 through B-40
<u>Production and Reactor Operations</u>	Ca-1 through Ch-6
Summary	Ca-1
B-C Reactor Operation	Cb-1 through Cb-10
D-DR Reactor Operation	Cd-1 through Cd-12
F Reactor Operation	Cd-1 through Cd-8
H Reactor Operation	Ce-1 through Ce-9
KE-KW Reactor Operation	Cf-1 through Cf-11
Production Operation	Cg-1 through Cg-6
Reactor Operations Statistics	Ch-1 through Ch-6
<u>Facilities Engineering Operation</u>	D-1 through D-20
<u>Employee Relations Operation</u>	E-1 through E-14
<u>Financial Operation</u>	F-1 through F-2

IRRADIATION PROCESSING DEPARTMENTSUMMARYMONTHLY RECORD REPORTAUGUST, 1958RESEARCH AND ENGINEERING OPERATION

Production tests covering the use of natural and enriched I & E fuel elements were terminated and I & E elements of appropriate dimensions were classed as standard production fuel elements. Test loadings of "old pile" size I & E fuel elements continued at D-Reactor.

Advanced reactor type fuel elements were charged into KER Loops 1, 3, and 4 on August 5.

A proposed solution to the problem of Van Stone failures resulting from stuck gunbarrels at F-Reactor was analyzed and a recommended pattern for cutting gunbarrels to transfer axial pressures from the tube to the biological shield was submitted.

A "hot-spot" investigation program was initiated; the frequencies of hot-spots have ranged from 0.5 to 13 per hundred. In general, rupture-prone lots have been found to have a high hot-spot frequency.

A study concerning the administrative control necessary to ensure safe handling of enriched fuel was completed and conclusions reported.

Inspection of selected rod channels in both K-Reactors by borescoping continued to support maintenance activities and provide data for evaluating the apparent movement of graphite. Detailed reports of observations have been issued.

Concentrated effort on the in-board examination of the Panellit gauge Bourdon tubes has resulted in detecting a leak percentage of 0.29 for the month.

PRODUCTION AND REACTOR OPERATIONS

Reactor input production for August was 2.1 per cent below forecast and output production was 3.4 per cent above forecast.

There were no increases in the maximum established power levels during August.

The overall time operated efficiency was 80.2 per cent (81.0 per cent forecast) with 79.1 per cent at the six old reactors and 83.6 per cent at the K's. Fifty-three reactor outages of which 27 were scrams occurred during August.

Twenty-three ruptures were removed from the reactors during August. Twenty of these ruptures were at the six old reactors: 12 were regular metal, 10 solid and two I & E, and eight were E-Metal, four solid and four I & E. The three K Reactor ruptures were regular metal I & E. Twelve of the 23 ruptures removed during August were stuck.

Significant items of equipment experience were:

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

1. One hundred six process tubes were installed.
2. Seven water leaks, six tube and one Van Stone, were corrected.
3. Further borescopic examination of the VSR and HCR channels in KE and KW Reactors has confirmed the graphite shifting previously reported and has shown it to be occurring on the far side as well as the near side.
4. The first rupture of a fuel element in a tube containing a poison spline occurred at D Reactor. Removal was accomplished without incident, using a maximum force of 9000 lbs.
5. Inspection of the far DR downcomer revealed considerable damage to welds, vent pipes and walls.

No disabling injuries, security violations or radiation overexposures were incurred.

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

FACILITIES ENGINEERING OPERATION

New Production Reactor

A preliminary project proposal requesting funds for initiation of the NPR design and construction program was submitted to HOO-AEC on August 29, 1958.

A meeting was held with the Architect-Engineer to review preliminary conclusions reached in their current evaluation of the latitude, within the prescribed initial capital cost limitation, for incorporating convertibility features into the heat dissipation system design. These preliminary results appear encouraging in this regard. A program of additional study by the A-E was also agreed upon.

Data were developed on the cost and effectiveness of a range of containment systems applicable to the NPR.

A document describing NPR responsibilities and relationships was issued for comment.

Meetings were held and planning continued on the subjects of spare parts, procurement of graphite and zirconium, and technical direction of certain phases of construction.

The first meeting of the Expansion Design Council was held and an information meeting was held with the Commission on NPR progress.

Leonard Precision Products Company reported the successful 37° flaring of New Production Reactor size moly-steel tubing using a newly developed flaring machine.

AEC-160 - Recirculating Gas Loop

The first of the three compressors with gas lubricated bearings has been successfully tested at its rated speed of 21,000 rpm.

General

Information was developed in support of preliminary project proposal preparation for engineering and design work on two existing reactor improvement items:

(1) provisions for confinement of radioactive particulate matter in reactor building exhaust air, and (2) plant modifications and additions to increase process cooling water flow rates. The proposal concerning reactor confinement was approved and project work was initiated during the month.

Zircaloy tubes number two and three were installed in C Reactor in tube channels 2775 and 3681 on August 20, 1958.

Three compact, portable, voice sending and receiving prototypes were received from the Army Signal Corps for evaluation in SWP rear-face communications.

The use of 200 Area facilities to decontaminate dummies has been reduced to operational practices.

A system of outage planning and measurement is being devised for 100-F Processing Operation.

Studies have been made and reported to Reactor Operations on 105 Building work zone lighting intensity and elevator response time.

Customer approval of Heat Treatment Facilities - 1717-H, Purchase Specification HWS-6416, was obtained.

Electrical design was completed on a system to photograph the 105-K Panellit trip indicating coordinate light system.

Additional interruptible power was ordered for September based on reduced river levels and increased temperatures, raising the total request to 28 megawatts. This is in addition to a firm power increase of six megawatts.

In conjunction with the AEC, arrangements were made with the Bureau of Reclamation to release colder water from Lake Roosevelt which resulted in a reduction of predicted peak temperatures in the river.

The Operations Research group completed a study designed to guide IPD in the establishment of spare parts stocks.

An Instrument Specialist Selection Test was prepared. This test is to be used in connection with the qualification of people in the Instrument craft.

Craft training included classes in connection with Zone Temperature Monitoring, Moisture Monitoring, and Blueprint Reading.

DECLASSIFIED

DECLASSIFIED

HW-57278

EX-101

EMPLOYEE RELATIONS OPERATION

BS/MS recruitment and exempt transfer and placement activities continued at a high level; however, PhD recruitment decreased in accordance with the normal seasonal trend. One additional Educational Loan was approved bringing IPD's total for the year to three. Favorable feedback has been received from participants attending first presentations of three courses: "Secretarial Proficiency", "Techniques of Interviewing", and "Human Behavior". All IPD termination clearances and exit interviews will be handled by Relations & Utilities Personnel Practices Operation. Thirteen additions to payroll and forty-seven removals were processed during the month. With the concurrence of Security Procedures and Practices, hand counting of classified document copies in the duplicating offices will be eliminated at month end. This will save approximately 60 man hours per month. All arrangements have been made for next month's Quarter Century luncheon.

Communication activities for August included publication of six Management News Bulletins, two "Memos From the General Manager", one Health Bulletin, August issue of the Monogram and one Round Table Guide. One OPG and seven Advices were issued during the month. Two Management Information Meetings and four training meetings were held during August.

G. E. Company was upheld, by Arbiter Sutermeister, in its discharge of an IPD Utility Operator last October for deliberate exposure of his badge. Nineteen grievances were filed during the month, fourteen of which were on jurisdiction and overtime distribution. Two jobs for assignment to plant maintenance forces were approved by HCO-AEC Labor Standards Board.

Proposed plans were developed for individual-type salary reviews for the Department during CY-1959. A draft to improve the performance appraisal system has been prepared. Information for the Northwest Area Wage Survey was furnished Relations & Utilities Operation. A cost-of-living increase (0.59%) became effective July 28.

Two IPD employees won first and second prizes in the June Safety Slogan Contest put on by the Department of Labor and Industries. IPD Disabling Injury No. 58-5 occurred on August 13 when a Technical Graduate received severe burns when the metal pusher pole he was using contacted a 13.8 KV line. Serious accident No. 58-12 occurred August 15 in K-Area when an employee leaned forward to examine the rods more closely and the chain broke causing him to slip; however he caught himself and suffered no injuries. Serious accident No. 58-13 occurred August 27 in D-Area when a pipefitter journeyman drove a fork lift over a floor grating which buckled but was prevented from falling by existing pipes in the trench. No injury was sustained but two gratings had to be replaced.

A helium tank car received in 100-H Area had some defective valves. Valve trouble has been encountered at various other times and an attempt for corrective action is being taken with the Bureau of Mines. Procedures for handling tank car shipments of chlorine are being formulated.

IPD's Fire Department responded to two fire alarms during the month, description as follows: on 8/12/58 - smoke from a Rock Crusher in the vicinity of Priest Rapids mistaken for fire; on 8/31/58 - an electric motor on an air conditioner in the 1702-D Bldg., became overheated - no fire. IPD's Fire Department assisted

the Army in fighting a large fire August 23, 24 and 25 in the Saddle Mountains which covered an area of 40,000 acres. Seven classes were held for 102 members of other IPD components on the following subjects: The Chemox Mask, The Scott Air Pack, Fire Fighting Equipment and procedures to be followed when responding to a fire.

FINANCIAL OPERATION

All invoices against IPD contracts are now being routed from Accounts Payable (R & U) to IPD Financial for reimbursability review. IPD Financial also secures the administrator's approval of the invoices.

A Product Cost representative conducted a meeting in F Area to present a revised distribution procedure for interruptible electricity.

A study was concluded for Employee Compensation Operation of clerical procedures used in maintaining and issuing the department organizational directory. A revised system was recommended and had been adopted.

The Specialist - Auditing prepared a report for the HAPO General Manager which summarized the action taken or to be taken to implement agreements made with the GE Traveling Auditors.

DECLASSIFIED

DECLASSIFIEDIRRADIATION PROCESSING DEPARTMENTMONTHLY REPORT OF INVENTIONS OR DISCOVERIESAUGUST 1958

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

NameTitle

None

None

Acting General Manager
IRRADIATION PROCESSING DEPARTMENT

WK MacCready:dkf

RESEARCH & ENGINEERING OPERATION

AUGUST 1958

VISITORS AND BUSINESS TRIPS

K. W. Newman of Turco Products, Inc., Los Angeles, Calif., visited HAPO to discuss contamination problems, 8/8/58.

F. C. Steiner of KAPL, Schenectady, N.Y., visited HAPO to follow up the KAPL-120 decontamination, 8/14-15/58.

J. C. Bowman, E. P. Eatherly, P. J. Hastings and R. L. Mansfield of the National Carbon Company, Cleveland, Ohio, visited HAPO 8/18-19/58, and W. T. Elston and M. Redmount of Speer Carbon Co., Niagara Falls, N.Y., visited HAPO, 8/27-28/58. Both groups discussed graphite development work and radiation damage.

D. H. Curtiss visited vendors in Connecticut, New Jersey, Pennsylvania, New York and California regarding zirconium tube fabrication, 8/3-17/58.

R. W. Pitman visited the Mouat Industries, Columbus, Montana and the Cascade Fire Equipment Co., Yakima, Wn., to observe the manufacturing of sodium dichromate, 8/6-7/58.

W. R. Conley visited the Palmer Filter Equipment Co., Erie, Pa., Roberts Filter Mfg. Co., Darby, Pa., and the Reading Anthracite Co., Pittsburgh, Pa., to consult on anthracite filter media, 8/10-15/58.

P. C. Walkup and F. W. Van Wormer visited the Argonne National Laboratory, Lemont, Ill., to attend the Heat Transfer Conference and confer with ANL officials, 8/17-24/58.

P. A. Carlson, L. W. Lang and R. O. Brugge visited the Savannah River Plant, Augusta, Ga., for a technical exchange visit, 8/25-27/58. Mr. Brugge visited the Bettis Plant of Westinghouse Elec. Corp., Pittsburgh, Pa., 8/28/58, and Mr. Lang visited the National Lead Feed Material Processing Center, Fernald, O., 8/29/58.

DECLASSIFIED

ORGANIZATION AND PERSONNEL**DECLASSIFIED**

	<u>Permanent</u>		<u>*Rotational</u>	
	<u>July</u>	<u>Aug.</u>	<u>July</u>	<u>Aug.</u>
Management and Administration	5	5	-	-
Process & Reactor Development	38	39	6	7
Process Technology	41	41	3	3
Operational Physics	19	18	7	6
Irradiation Testing	20	21	1	0
Component Testing	20	18	0	1
Coolant Testing	26	25	1	1
	<u>169</u>	<u>167</u>	<u>18</u>	<u>18</u>

* Includes summer personnel

Process & Reactor Development: L. T. Hagie, Senior Engineer, transferred from FPD, 8/1/58.

Operational Physics: W. H. Wolf, Summer Employee, transferred to the Rotational Training Program, 8/1/58. R. W. Jacobson, Summer Employee, resigned, 8/22/58. D. T. Houser, Engineer II, resigned, 8/29/58.

Irradiation Testing: M. E. Murray, Engineering Assistant, transferred from Component Testing, 8/4/58.

Component Testing: Tessie D. Ley, Steno-Typist, resigned, 8/1/58. M. E. Murray, Engineering Assistant, transferred to Irradiation Testing, and T. D. Smith, Engineering Assistant, transferred to Coolant Testing, 8/4/58. D. W. Horne, Engineering Assistant, transferred from Coolant Testing, 8/4/58.

Coolant Testing: D. L. Rokkan, Engineer II, transferred to F Reactor Operation, IPD, 8/1/58. T. D. Smith, Engineering Assistant, transferred from Component Testing, 8/4/58, and D. W. Horne, Engineering Assistant, transferred to Component Testing, 8/4/58.

PROCESS AND REACTOR DEVELOPMENT OPERATIONReactor FuelsPresent Reactor Fuels TechnologyI & E Program

Production tests covering the use of natural and enriched uranium I & E fuel elements in C and the K reactors were terminated and I & E elements of the following dimensions classed as standard production fuel elements:

	<u>C Reactor</u> <u>Natural</u>	<u>K Reactor</u> <u>Natural</u>	<u>C & K Reactors</u> <u>Enriched</u>
Designation	C II N	K II N	C II E and K II E
Canned O. D.	1.460"	1.474"	1.454"
Canned I. D.	.375"	.375"	.375"
Core O. D.	1.370"	1.384"	1.370"
Core I. D.	.481"	.481"	.481"
Canned Length	8.965"	8.965"	6.640"
Core Length	8.325"	8.325"	6.00"

Self-Supported Fuel Elements

Three charges of self-supported elements were discharged from B reactor prior to reaching goal as the result of a re-evaluation of element quality. Investigation of current attachment problems indicated that the Al-Si in the dip brazed elements is apt to fuse and penetrate the can under the support. This condition is not readily perceptible by non-destructive examination and was found in occasional pieces of previous manufacture produced for irradiation in the ribless tubes at B reactor. Studies necessary to correct the problem are underway.

Zircalloy - Clad I & E Enriched Elements

Contract No. DDR-48 has been approved locally and sent to NYO-AEC for their approval. It covers the development of the technology required for cladding enriched I & E pieces with zircalloy-2 by the co-extrusion process. This work is to be completed within nine months of receipt by NMI of the fully approved contract. Since the OD/ID ratio is outside that of normal extrusion practice it will be necessary to develop special techniques to form and clad the small central hole. Material procurement for this contract was initiated.

Advanced Reactor Fuel TechnologyZircalloy Cladding by Coextrusion

Modification No. 2 to DDR-34 has been approved by GE-HAPO and HOO-AEC and forwarded to NYO-AEC for their approval. This modification calls for fabrication of the following amounts of material within 90 days after receipt by NMI of the fully approved contract modification:

1. 30 lineal feet of KER size natural uranium rod and

DECLASSIFIED

DECLASSIFIED

DEL

2. 30 lineal feet of KER size 2 w/o zirconium-natural uranium alloy rod and tube.
3. 25 lineal feet of KER size natural uranium tube and tube.
4. 25 lineal feet of KER size 2 w/o zirconium-natural uranium alloy tube and tube.

This material is sized so that irradiation in the KER loops will give approximately equal bulk water temperatures in each of the annuli. The material will be fabricated in various lengths and will be closed by welding at HAP0.

Status of KER Loadings

Loops 1, 3 and 4 were charged during the reactor outage of August 5. Current loadings are:

Loop 1

Two Zircaloy-2 jacketed seven-rod cluster elements and six stainless steel jacketed four-rod cluster elements containing UO_2 are being irradiated in KER Loop 1 under PT IP-146-A.

Loop 2

Irradiation of the Zircaloy-2 jacketed enriched four-rod cluster elements and the aluminum jacketed Doe and Mint elements under PT IP-172-A is continuing.

Loop 3

Two three-rod Zircaloy-2 jacketed cluster elements, one two feet long and one three feet long, four Zircaloy-2 jacketed four-rod UO_2 cluster elements and one Zircaloy-3 jacketed Pu-Al four-rod cluster elements are being irradiated, under PT IP-186-A.

Loop 4

Aluminum jacketed Doe alloy elements and a thermocouple element are being irradiated in Loop 4 under PT IP-190-A. This test is intended to provide significant aluminum corrosion data at the highest temperature available in the loops.

Reactor Physics

Present Reactor Physics Technology

Neutron Temperatures - Exposure - Isotope Separation Measurements

The effective neutron temperature, i.e., energy, in an operating reactor is an essential piece of information for the prediction of product yield since neutron absorption cross sections are very energy-dependent. The determination

of effective neutron temperatures is proceeding along several avenues both in HLO and in IPD. Two means of approach currently being followed in IPD are 1) integral exposure and isotope determination methods and 2) filter-foil-activation measurements. Results of initial measurements under 1) when coupled with simple theoretical models yielding very satisfactory numbers are described below:

PT 105-615A-63-MT authorized the monitored irradiation in C reactor of I & E and solid slugs and subsequently isotope separation and spectroscopic analysis. The pertinent data are:

<u>Slug</u>	<u>Ave. Exposure E</u> <u>(Two Columns)</u>	<u>Discharge Conversion</u> <u>Ratio</u>
1.370" x 0.479" I & E	577.85 $\pm$ 5.16 MWD/T	511.32 $\pm$ 5.89 gmPu/Ton U 0.8849 $\pm$.013 gmPu/MWD
1.336" Solid	528.54 $\pm$ 4.72 MWD/T	456.79 $\pm$ 3.15 gmPu/Ton U 0.8642 $\pm$.0097 gmPu/MWD

Mass Spectrographic Data

<u>Isotope</u>	<u>% Composition</u>	
	<u>I & E</u>	<u>Solid</u>
Pu ²³⁹	94.84 $\pm$ 0.11	95.01 $\pm$ 0.08
Pu ²⁴⁰	4.84 $\pm$ 0.09	4.68 $\pm$ 0.06
Pu ²⁴¹	0.31 $\pm$ 0.02	0.30 $\pm$ 0.02
Pu ²⁴²	0.01	0.00

(Uncertainties are for 95% confidence limits)

Using a simple, one-term, Gumprecht exponential expression for the isotope buildup equations and suitable constants an expression can be derived for the ratio of Pu²³⁹ to total plutonium which is a function of T_n the effective neutron temperature (entering in the ratio of cross sections). The effective neutron temperature (employing Westcott cross sections) for both slugs during their irradiation turns out to be $245 \pm 20^\circ\text{C}$ within the framework of our Model. The above value compares very favorably with values obtained from a semi-empirical expression presently recommended for lattice design scoping, namely

$$\bar{T}_n = 240 \pm 20^\circ\text{C for the solid}$$

$$\bar{T}_n = 260 \pm 20^\circ\text{C for the I & E}$$

Maximum Specific Power Generation in 7-Rod Cluster in ETR

Power generation for a seven rod natural uranium fuel assembly (0.533 inch rods clad with 30 mil Zr-2) in the P7 Test hole of the ETR was calculated. The calculated maximum specific power was 83 KW/ft.

DECLASSIFIED

DECLASSIFIED

DEL

In-core Flux Monitor

The specifications (HW-57097) for the proposed in-core flux monitor have been prepared. In addition, detail prints of the SRO wire traverse system and air ion chamber system have been received. The BMI proposal to develop and build a prototype in-core flux monitor has also been received. The SRO prints and the BMI proposal are being evaluated.

Analog Solution to the Two-Group Diffusion Equations

Work has been underway in setting up the two-group equations for K-pile using new two-group constants. The fast group cross sections are weighted from thermal energies to 10^7 ev (ANP Data). Thirty-six additional coefficient potentiometers were obtained this month for the computer which increases the finite difference mesh network to approximately 22 points, which should be sufficient to define the flux in the outer regions.

No computer calculations have been made to date. The analog is scheduled for this problem the week of September 2.

Loop Studies

The analog program for the NPR primary loop was used this month in an attempt to obtain a transfer function (gain vs. frequency) or frequency response curve for the primary NPR loop. The disturbances introduced into the system were in the form of direct reactivity (± 40 ih) disturbances or fluctuations in inlet water ($\pm 10^\circ\text{C}$) temperature. However, the range of frequencies covered (1/100-1 cps) did not give enough information to determine the complete transfer function adequately. The program is continuing.

Lattice Physics Formulae for Pre-Scoping Design Calculations

For the rapid survey of many different reactor lattices in a design study, it is necessary that the designer resort to less elegant methods of calculations than those the reactor physicist would use in correlating experimental data with theory. As faster computers with larger memories come into service, the methods of the designer and the physicist will converge.

At the present time a lattice physics program originally assembled by Astley and modified by Mansius to be more versatile and inclusive of better methods is adequate for cylindrical one-region fuel geometries. Means of extending the program to include more complex geometries such as cluster-rod, tube and rod and concentric tubes is being documented in a report, HW-56987. Ultimate precision is not guaranteed for the survey methods outlined, but whenever possible comparison of results with experimental data or with more accurate calculations are made to indicate the degree of accuracy.

Reactor Engineering

Present Reactor Engineering Technology

I & E Fuel Element Design

Basic formulation involving flow, heat split to hole and annulus, temperature

unbalance, and corrosion have been applied to the design of a proposed I & E fuel element for the K reactors. Laboratory testing of flow split and total flow were completed, and were in good agreement with the predicted values. Data obtained to date from test charges in the reactor indicate that the heat split between hole and annulus is also in reasonable agreement with predicted values.

F Reactor Shield Strength

Stuck gunbarrels at F Reactor have resulted in numerous Van Stone shear failures. One proposed solution to this problem involves cutting the gunbarrel transversely at the first close fitting donut ring inside the front shield. This results in the axial load due to internal pressure in the process tube being transferred to the biological shield rather than being absorbed by the tube itself.

An analysis was made to determine the maximum number of tubes whose axial load might be transmitted to the shield without shield damage. Based on failure of welded joints in the shield, it was concluded that up to 650 gunbarrels might be cut. These should be located in a symmetrical manner; for example, a rectangular pattern 26 tubes wide by 25 tubes high.

Inspection of DR Reactor Far Downcomer

As part of the program to raise bulk effluent temperature limits, an inspection of the DR far downcomer was made. This downcomer had been in service for about six months since the Project CG-558 modifications were made.

Significant weld cracking was observed in the welds joining the I-beam support clips to the downcomer wall on the 1st, 7th, and 8th trays from the top, and the three vent pipes between the 2nd and 4th trays had broken loose from their supports, wearing a hole through the downcomer wall below the 2nd tray.

The downcomer had been inspected a year ago. At that time, a few weld cracks on the 7th and 8th trays had been found, and those on the 8th tray were re-welded.

It is evident that significant downcomer damage has occurred during the period of operation at higher flows and temperatures. Repair of this damage is underway and programs are in progress to inspect and instrument downcomers to determine the cause of the damage.

Surface Roughness of Slugs and Process Tubes

An analysis of flow and pressure drop data through process tubes and fuel element charges has been made to determine the equivalent roughness values (ϵ) of the wetted surfaces. For the annulus flow with solid slugs a roughness value of 25×10^{-6} ft. was found. For the annulus flow with I & E slugs, $\epsilon = 5 \times 10^{-6}$ ft. or less and 45×10^{-6} ft. or less for the hole flow.

It was concluded that slug junctions have a negligible effect on tube pressure drop.

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

Correlation of Corrosion Data

New corrosion data from 14 charges from B reactor has been correlated and corrosion rates compared with values predicted by the currently used empirical corrosion equation. There is close agreement between actual and predicted values except in the case of new process tubes. Actual rates in new tubes are 20 to 40 percent higher than predicted values.

When the variation of temperature around a slug is considered, it is found that almost 50 percent of the total jacket corrosion occurs in the 90° top sector of the jacket. This modified method reduced much of the scatter in the data, and gave predicted results in close agreement with actual rates in new tubes, rather than the high values mentioned above.

The variation of tube outlet temperature from day to day has been considered in some calculations, and results indicate that about 2/3 of the total corrosion occurs on days when the outlet temperature was higher than the average outlet temperature. This corresponds to about 47 percent of the total exposure time.

BDF Size Zircaloy Process Tubes

A no cost purchase order was negotiated with Allegheny Ludlum Steel Corporation for development work on BDF size zircaloy process tubes of three alternate geometries. The geometries are (1) standard cross section ribbed tube, (2) tube with 6 bumper ribs, 30 mills high on the I.D., and (3) smooth bore ribless tube. Zirconium allocation of 1000 pounds of sponge costing about \$11,000 and 500 pounds of scrap, carried at no cost, were authorized.

Advanced Reactor Engineering Technology

NPR Process Tubes

A no cost purchase order commitment was negotiated with Chase Brass and Copper Company for further development on NPR tube fabrication. Chase will examine extrusion development, surface quality, and ultimate permissible degree of cold work. Metal costs to General Electric will be about \$13,000.

Graphite

Discussions were held with visitors from National Carbon Company on graphite development work for the NPR. National Carbon will furnish samples of graphite fabricated from new cokes for irradiation testing.

Radiological Engineering

Radiation Control Experience

There were no overexposures to radiation during the month. No lapses of radiation control were formally investigated.

The average extrapolated year end exposure for Radiation Monitors dropped from 3140 mr at the end of 26 weeks to 2960 mr at the end of 29 weeks. At the end of 33 weeks, the extrapolated exposure was 2970 mr.

Twenty-four Reports of Lapse of Radiation Control were issued during the month. There were eleven cases of spread of contamination to the skin or personal clothing which contributed significant exposure to employees. There were five cases in which employees received uncontrolled exposure to radiation as results of the following situations: 1) sampling irradiated water without adequate monitoring; 2) exposure to a beam from a process tube without monitoring; 3) transfer of highly contaminated tools without monitoring; 4) failure of a ball valve while testing a charging machine of new design; and 5) exposure of personnel to high dose rates under operating conditions using controls set up for shutdown conditions.

Five lapses occurred in which there was a spread of high level contamination outside radiation zones, or high dose rates existing outside radiation zone boundaries. Two cases involved highly contaminated pickup tongs left hanging on the monorail in the storage area. The others involved: 1) a gas leak which permitted irradiated reactor atmosphere gas to spread into normally accessible areas of the building; 2) spread of contamination to the roadway between 105 building and the burial ground when a graphite stringer failed to go all the way into the burial can; and 3) a highly contaminated ball valve left outside a radiation zone.

Other lapses involved work on a job under SWP control, but without establishing a radiation zone, and without adequate contamination control; and two cases in which employees failed to wear badges and pencils while working in radiation zones.

Lapse of Radiation Control
Distribution by Reactor and Operation

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	<u>IPD Totals</u>
Processing	0	1	1	2	0	1	1	1	
Maintenance	0	0	1	0	2	1	1	3	
Supplemental Crews	1	0	0	2	0	0	0	0	
Research & Engineering	0	2	0	0	0	0	1	0	
Facilities Engineering	0	1	0	0	0	0	0	0	
Central Maintenance	0	0	0	0	0	1	0	0	
Reactor Area	1	1	0	2	0	0	0	0	
Assigned Totals	<u>2</u>	<u>4</u>	<u>1</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>24</u>
IPD Unassigned									0

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

Effluent Water Statistics

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

Activity in the River Water at Pasco-Kennewick

May	1.4% MPE _{GI}	28% off-plant limits
June	0.6% " "	12% " " "
July	0.4% " "	8% " " "

DECLASSIFIED

DECLASSIFIED

Activity in Pasco Sanitary Water

May	0.3% MPE _{GI}	6% off-plant limits
June	0.2% " "	4% " " "
July	0.2% " "	4% " " "

Activity in Kennewick Sanitary Water

May	0.6% MPE _{GI}	12% off-plant limits
June	0.12% " "	3% " " "
July	0.06% " "	1.2% " " "

Activity in Raw Water at 100-F Area

May	5.2% MPE _{GI}	52% plant limits
June	1.4% " "	14% " " "
July	1.0% " "	10% " " "

Activity in 100-F Sanitary Water

May	1.0% MPE _{GI}	10% plant limits
June	0.3% " "	3% " " "
July	0.4% " "	4% " " "

Average Reactor Effluent Activity Output

	<u>August 1958</u>	<u>July 1958</u>	<u>August 1957</u>
100-B	18 x 10 ³ μ c/sec	23 x 10 ³ μ c/sec	16 x 10 ³ μ c/sec.
100-C	17 " " "	39 " " "	32 " " "
100-KW	34 " " "	33 " " "	35 " " "
100-KE	44 " " "	47 " " "	13 " " "
100-D	16 " " "	18 " " "	14 " " "
100-DR	9 " " "	13 " " "	11 " " "
100-H	19 " " "	19 " " "	17 " " "
100-F	22 " " "	21 " " "	16 " " "

Radiation Control Standards and Procedures

Drafts of new radiation control procedures have been prepared as follows:

Procedure 4.3 - Determination of personnel dose from skin or clothing contamination.

This procedure describes the information which should be obtained in cases of high level skin or clothing contamination to allow the dose rate to be estimated accurately, methods for obtaining the dose rate estimate, and procedures for submitting the source for autoradiographing where necessary.

Procedure 4.5 - Standard smear technique.

This procedure describes a standard method of performing smear surveys, to improve the reproducibility of results obtained by this survey method.

Protective Clothing

A plastic supplied air hood was submitted to the Industrial Hygiene Operation for evaluation as a possible substitute for other respiratory protective equipment in the discharge areas. The air supply line and the exhaust valve assemblies were unsatisfactory, but the deficiencies should be easily remedied.

Instrumentation

Remote Area Monitors

Final approval was obtained from the AEC to purchase the Remote Area Monitoring Equipment from Victoreen Instrument Company. A Purchase Order was issued on August 6, 1958, for the procurement of this equipment. The Victoreen Company has promised delivery of the first two systems within 30 days which means that they should be on plant around the first week in September. The remaining six units were promised within 90 days which means that they should be delivered early in November.

Pocket Dose Alarms

Field testing of the Pocket Dose Alarms continued, but the amount of useful data collected was very small. The main hindrance to an effective testing program is the high alarm point (70 mr) of the units and the understandable reluctance of supervisors to permit workers to receive this dose in one shift. The tests indicate that the actual 70 mr alarm point represents more than 100 mrad estimated exposure. The distributor from whom these instruments were purchased has agreed to change the point of these instruments so that they agree with Hanford calibration results. All of these instruments have been collected and will be shipped to the vendor shortly for recalibration to an actual 50 and 100 mr alarm point.

Liquid Waste Disposal

Decontamination of Reactor Piping

No pile piping decontamination tests were conducted during August. Laboratory results of waste solution from a through-pile test at 105-DR on June 16 were received. The concentrations of radioisotopes were essentially the same as those found at 105-KE and 105-KW. There is evidence that on July 6 an unknown but considerable amount of residual contamination in 107-K trench was removed and introduced into the river. Five crossheaders were decontaminated using 4500 pounds of Turco 4306-B. The small burden of radioactive materials was supposedly set up to be released directly to the river without neutralization over the several hours required for the test. Instead it was later found that it is impossible for 100-K storage basin water to go directly to the river but instead was released to the crib. About July 15, Regional Monitoring Operation reported readings on gamma pencils floated in the river at White Bluffs, Hanford, and about 4 miles below Hanford during the week ending July 10, to be more than three times normal. None of the routine spot samples subjected to radiochemical analysis indicated unusual conditions. This incident caused a minimum of difficulty because of the high river flow rate, but could have been critical during a low river flow rate period. A detailed procedure for the decontamination of the rear crossheaders at 105-KW under Production

DECLASSIFIED

DECLASSIFIED

FW-57278

Test Authorization IP-173-AE was written. It includes provision for neutralizing the spent solution before it reaches the trench.

Reactor Effluent Water Activity Control Study

Samples have been obtained from Crab Creek and from four locations in the Columbia River between Grand Coulee Dam and Rock Island Dam to study the concentration of the elements zinc, phosphorus, arsenic and uranium. The Crab Creek samples are being analyzed by spectrographic methods. If this method is not sensitive enough for non-activated samples, further samples will be activated. Beginning September 1, refinery grade sulfuric acid will be supplied to 100-F Area in sufficient quantity to allow them to use this in place of smelter grade acid for a month or more. No special test is planned, but routine measurements will show if the output rate of Zn-65, P-32 and As-76 is changed appreciably.

Routine Measurement of Radioisotopes in Reactor Effluent Water

Beginning August 1, the routine sampling frequency for effluent water was changed from biweekly to weekly and the analysis scheme was changed as follows: Each sample will be analyzed for gross beta activity, manganese-56, zinc-65, phosphorus-32, arsenic 76, neptunium-239, sodium-24, and scandium-46. The following determinations will be made once a month for each reactor: rare earths, yttrium 90 & 93, copper-64, chromium-51, barium-140, calcium-45, strontium-89, strontium-90 and iodine-131. Routine measurements indicated an unusual and unexplained condition in the reactor effluent water at 100-F. Concentrations of several radioisotopes seem higher and more erratic than expected, but phosphorus-32 concentrations were 10 to 40 times higher than at any other reactor during the latter part of July and early August which is current on the basis of reported analyses. The reason is not as yet firmly established.

TABLE I
PRODUCTION TESTS - FUEL DEVELOPMENT

Test Number	Type Metal	Tubes	Reactor	Goal Exposure	Current Exposure	Remarks
IP-56-A	Low Hydrogen Dingot U Elements	111	DR, F	Variable 500		Semi-production scale testing of low hydrogen dingot uranium fuel.
IP-68-A	Solid Natural U Elements with Controlled Void	0	DR	500,700		Evaluation of void area effect on fuel element performance. Test irradiation complete.
IP-80-A	M-388 Clad Solid Natural Elements					Test discontinued pending process modifications.
IP-81-A	BWTL Regular Elements in 1245 Alloy	1245	D	Variable 500		Provides for quantity charging of BWTL elements.
IP-84-A	Projection Solid Natural Elements		B	400 through 700		Preliminary evaluation of self-supported fuel elements. Test discontinued pending process modifications.
IP-95-A	Lead Dip, 1.445" OD I&E Natural	12	D	500 and 800	200	Provides for preliminary testing of I&E elements in D Reactor.
IP-109-AC	Enriched 1.474" OD I&E		KE, KW	Variable		Production test terminated.
IP-123-A	7-Rod Stainless Steel jacketed 1.3% enriched clusters.	1	KE	2500 MWD/T	177C	Charged 5-6-58 in KE front-to-rear test hole. Fuel elements are instrumented to measure uranium temperatures.

HW-57278

DECLASSIFIED

SECRET

TABLE I (Cont.)

<u>Test Number</u>	<u>Type Metal</u>	<u>Tubes</u>	<u>Reactor</u>	<u>Goal Exposure</u>	<u>Current Exposure</u>	<u>Remarks</u>
IP-124-A	M-388 Clad Nat. Solid Elements	0	B			Test discharged. Some further probe work authorized pending justification.
IP-146-A	Co-extruded Zr-2 Jacketed 7-rod clusters Nat. Ur.	1	KE	1000	70 MWD/T	Charged in KER Loop 1, August 5.
IP-148-AC	1.454" OD Enriched I&E Fuel		C, KE	Variable		Production test terminated.
IP-168-A	1.450" OD Natural I & E	8	C	Variable 800		Long term corrosion monitoring and refinement of operating limits.
IP-172-A	4-rod coextruded Zr-2 jacketed enriched cluster elements, doe alloy and mint corrosion pieces.		KE	2000 MWD/T	1005	
IP-178-A	1.474" OD, I&E, Natural	15	KE, KW	Variable 800		Provides for irradiation testing of K III elements and water mixers, and long term tube corrosion monitoring.
IP-186-A	Zr-2 jacketed 3-rod cluster elements 2 and 3 ft. long	1	KE	1000		Charged in KER Loop 3 on August 6.
IP-190-A	Aluminum jacketed doe elements.	1	KE	40 day	14 day	Charged KER Loop 4 on August 6.

PROCESS TECHNOLOGY OPERATION

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

Reactor	Limit	Basis
B	Bulk outlet temperature limit (equivalent to 965 kw regular metal tube power)	Prevention of coolant boiling in downcomer
C	I & E E-Metal corrosion limits (equivalent to 1070 kw regular I & E tube powers)	Fuel element failure control - prevention of the rapid corrosion of I & E E fuel elements
D	985 kw for highest powered tube	Fuel element failure control
DR	925 kw for the average of the ten highest powered tubes	Fuel element failure control
F	955 kw for the average of the ten highest powered tubes	Fuel element failure control
H	Bulk outlet temperature limit (equivalent to 885 kw maximum tube power)	Prevention of coolant boiling in downcomer
KE	I & E natural corrosion limit (equivalent to 1270 kw regular I & E tube power)	Fuel element failure control - prevention of the rapid corrosion of natural I & E fuel elements.
KW	I & E E-Metal corrosion limit (equivalent to 1200 kw regular I & E tube power)	Fuel element failure control - prevention of rapid corrosion of I & E fuel elements

H Reactor I & E Loading

Process Improvement Transition Authorization IP-3-I was issued to authorize the full scale charging of I & E fuel elements into H Reactor. The initial charging of I & E's was made on August 8.

I & E Enriched Uranium Conversion - Old Reactors

Process Improvement Transition Authorization IP-4-I was issued to authorize the use of I & E enriched fuel elements at the B, D, F, DR, and H Reactors.

DECLASSIFIED

HW-57278
DECLASSIFIED

Irradiated Fuel Element Examination

To date, about 1200 fuel elements have been visually examined under the "hot-spot" investigation program. Hot spot frequencies have ranged from a low of 0.5 per hundred to a high of 13 per hundred on a rupture prone E Metal lot. In general, rupture-prone lots have been found to have a high "hot-spot" frequency. Evidence of "hot-spot" formation by cocking has been found and "hot-spots" have been found which were apparently caused by fuel element warpage. No conclusion as to the effect of bond quality on hot spots has been reached.

WATER TREATMENT

Experimental Filter Plant Studies

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

Anthracite Filter Media

W. R. Conley visited various suppliers of anthracite filter media in order to determine the feasibility of obtaining special quality material for IPD use.

Plant Assistance Work

Data were obtained and recommendations were made on chemical treatment of the water during the month. Studies were made of filter maintenance problems and recommendations for action were made.

PROCESS STANDARDS

HW-46000-B, Process Standards - Reactor

One new and two revised Standards were issued during the month. These were:

Process Standard H-010 - "Storage and Handling of Unirradiated Enriched Slugs"

Process Standard H-020 - "Handling of Irradiated Enriched Slugs"

The above Standards were revised to provide new storage and handling provisions for unirradiated and irradiated enriched slugs. The revisions will permit more efficient handling without relaxing safety.

Process Standard H-030 - "Shipment of Enriched Slugs"

The new Standard contains limits and restrictions pertaining to irradiated slug shipments. Formerly, shipping specifications were in Standard H-020, "Handling of Irradiated Enriched Slugs" but the volume of enriched slug shippage has increased to the point where nuclear safety considerations are best served by providing a separate, more detailed Standard for this operation.

HW-46000-H, Process Standards - Reactor

One new and two revised Standards were issued during the month. These were:

Process Standard H-010 - "Storage and Handling of Unirradiated Enriched Slugs"

Process Standard H-020 - "Handling of Irradiated Enriched Slugs"

Process Standard H-030 - "Shipment of Enriched Slugs"

Revisions to the above Standards were identical to those issued in HW-46000-B, above.

HW-46000-K, Process Standards - Reactor

One new and three revised Standards were issued during the month. These were:

Process Standard A-022 - "Tube Outlet Water Temperature Limits - TQA CORROSION"

After reviewing the limits for enriched I & E slug charges at K Reactors, the revision was issued to permit a 5° increase in TQA CORROSION limits for the enriched charge containing 38 E and 6 natural slugs.

Process Standard H-010 - Storage and Handling of Unirradiated Enriched Slugs"

Process Standard H-020 - "Handling of Irradiated Enriched Slugs"

Process Standard H-030 - "Shipment of Enriched Slugs"

The above Standards were identical to those issued in HW-46000 B, above.

PROCESS CHANGE AUTHORIZATIONS

Twelve Process Change Authorizations were issued during the month to permit temporary relaxation of Process Standards - Reactor, HW-46000 and two were issued to permit temporary relaxation of Process Standards - Water Plant, HW-27155 Rev1. These were:

PCA #8-62 - "Bulk Outlet Temperature Limit, B, D, DR, F and H Reactors"

The PCA permitted an increase of 0.5° C in the bulk outlet temperature limit at the above reactors. This was possible after a re-evaluation of the bulk outlet temperature limit philosophy led to the conclusion that the limit should be based on the average barometric pressure rather than the minimum. The basic philosophy of operating the reactor to preclude risk of effluent piping damage remains unchanged.

PCA #8-63 - "Oiled Panellit Sensing Lines - B Reactor"

Oil having a higher viscosity than permitted in Standards was inadvertently used in the sensing lines to dampen Panellit gauge fluctuations. This resulted in over-damped gauges or gauge response times less rapid than believed necessary for trip protection under Standard TAI limits. The PCA was issued

DECLASSIFIED

DECLASSIFIED

DEL

specifying the reduced TAI limits and restrictive low trip pressures that shall be observed when operating with the over-damped Panellit gauges.

PCA #8-64 - "Operational Charge-Discharge Facility - C Reactor"

Water supply was lost to an empty process tube in the Operational Charge-Discharge Facility when cavitation resulted in a front connector failure. The PCA was issued to stipulate operating conditions and inspection procedures to preclude future occurrence of similar incidents.

PCA #8-65 - "Rear Connector Failure - H Reactor"

The PCA was issued to permit H Reactor to continue operating with a leaking rear connector. Limiting Panellit pressure stipulations were imposed to maintain Panellit gauge protection against low flow in the tube.

PCA #8-66 - "Oiled Panellit Gauge Sensing Lines - B Reactor"

The PCA extended the provisions of expiring PCA #8-63. PCA #8-63 stipulated conditions under which the reactor could continue operating with over-damped Panellit gauges.

PCA #8-67 - "KER Loop #2, - KE Reactor"

Repairs to the automatic dump valve on Loop #1 of the KER facility were scheduled for the next outage. Since the KER Loops dump to the effluent system automatically if flow drops to 10 gpm, the PCA permitted by-passing the automatic dump valve trip under stipulated conditions while the repairs were made. This eliminated a potential hazard to personnel working on the effluent system.

PCA #8-68 - "Temperature Monitoring During Start-Up - K Reactors"

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

PCA #8-69 - "Emergency Steam Pump Controls During H Reactor Shutdown"

During the first two hours after shutdown, when loss of electrical pumps could quickly result in boiling in the process tube, the Standards require automatic change-over to steam pumping if electrical pump failure occurs. The PCA authorized placing the steam pumps on manual operation one hour after shutdown on July 20, thus permitting an early start on scheduled pump tests. These tests had to be performed with the reactor valved for normal operation in order to (1) provide valid test conditions and (2) eliminate a potential personnel hazard if automatic operation of steam pump caused

a pressure surge with process tubes open. These conditions can only be met during the first two hours after shutdown without unnecessarily extending the outage. Conditions to ensure adequate emergency cooling water supply were specified.

PCA #8-70 - "Tube Inlet Pressure Monitoring on OC-DF Tubes - C Reactor"

Operational Charge-Discharge Facility Standards specify monitoring of Panellit gauge pressures during operation of the facility which limits the pressure range to the span of the gauge dial. This range will not effectively monitor the pressures to be used in testing the facility. To allow complete observance of the entire test pressure range which may be experienced in the Operational Charge-Discharge Facility, the PCA authorized use of tube inlet pressure monitoring. Pressure conditions indicative of flow stoppage that would be cause for shutdown were specified.

PCA #8-71 - "Water Leak - D Reactor"

During the July 25 outage, leak testing of the entire reactor failed to locate a suspected leak and after start-up the collection rate remained above the amount permitted by Standards. Since it was apparent the leak was of a nature difficult to locate by conventional means, the PCA permitted continued operation until an increase in water collection rate indicated a high probability that the leak could be found. The specified operating conditions included a maximum allowable leak rate.

PCA #8-72 - "Number 14 Horizontal Rod - C Reactor"

On July 28 the cooling water supply was lost to #14 HCR during operation at C Reactor, necessitating immediate shutdown and withdrawal of the uncooled rod. Before a rod can be returned to service under these conditions, the Standards require visual inspection of the rod for possible damage. Based on graphite temperatures, power level at the time of the incident, rod withdrawal time and rod construction, it was highly unlikely that the rod reached a temperature where damage would occur. To avoid loss of production resulting from inability to use #14 rod, the PCA was issued to define a testing procedure that would permit safe return of the rod to service without a visual inspection. Inspection of the HSR on the next minimum outage was specified.

PCA #8-73 - "V-73 Impulse Line Repair During Shutdown - KE Reactor"

The Standards require 16 ball hoppers in service during a reactor outage. During repair of a leaking impulse line on the V-73 valve VLP trip it was advisable to either lock out or block the Ball 3X relays on the 16 active hoppers to preclude the possibility of an inadvertent ball drop while work on the leaking impulse line was in progress. The PCA permitted blocking the relays to the active hoppers during the period work was being performed. Conditions requiring manual insertion of the balls were specified.

DECLASSIFIED

PCA #8-74 - "Process Water Sectionalizing Valve - H Reactor"**DECLASSIFIED**

H Reactor was experiencing electrical trouble in the 190 Building and one possible source was the bus under-voltage relays. It was desired to make several pump changes during reactor operation in an attempt to isolate the trouble. The status of the pump discharge cone valves was such that there was a possibility that switching pumps would cause a pressure surge in the 105-H Panellit gauges that could scram the reactor if the flow balance valve remained closed. Normally this valve is only permitted open during period of unbalanced (2 - 4) pump configuration, thus preventing production losses that could be associated with grossly unbalanced riser pressures. Since the risk involved is small during the short period involved and the potential production loss is high in changing the pumps with the flow balance valve closed, the PCA permitted opening the flow balance valve during the pump changes.

PCA #8-75 - "Seismoscope, C Reactor"

At B, D, DR, F and H Reactors, actuation on the seismoscope initiates #1 Safety Circuit scram. At C Reactor the seismoscope initiates a Ball 3X drop. The basis for this difference was predicated on the fact that the ball recovery system at 105-C made recovery much less costly than at the older reactors. The current condition of the ball recovery equipment at C Reactor is such that complete renovation has been scheduled (Project CG-741) and, until project completion, recovery from a ball drop at C Reactor will be as costly as at the other reactors. Hence, the PCA permitted transfer of the seismoscope from the #3 Safety Circuit to the #1 Safety Circuit until the renovation of the 3X recovery system is completed.

TEST AND DESIGN CHANGE REVIEW

The following proposals were reviewed and recommended for Managerial approval:

Production Tests	7
Process Improvement Transition Authorizations	2
Development Tests	5
Design Changes	3

PROCESS ASSISTANCE

A study was completed to determine the amount of administrative control necessary to ensure safe handling of enriched slugs and prevent inadvertent assembly of any critical mass. A report containing a detailed discussion of the margins of safety, consequences of making errors and the necessity for instruction and enforcement of safe handling practices was written. Since this is a common problem, copies of the report were sent to all Processing Operations Managers.

GRAPHICS

Graphics services prepared 70 graphs, charts and visual aids for various IPD and HLO components.

RUPTURE EXPERIENCE

<u>Failure Date</u>	<u>Tube No.</u>	<u>Lot No.</u>	<u>Type Metal</u>	<u>Exposure</u>	<u>Type Failure</u>
8-4-58	4077 KW	KJ-082-A	8" I&E Nat.	799	Side Hot Spot
8-4-58	1554 H	KE-802-A	6" Solid E ⁽¹⁾	841	Split Longitudinal
8-5-58	0981 C	CJ-052-E	8" I&E Nat.	436	Side Other
8-7-58	1454 H	KE-012-A	6" Solid E ⁽¹⁾	841	Split Longitudinal
8-8-58	3579 B	KA-120 A or KA-128-A	8" Regular	445	Side Hot Spot
8-8-58	1275 F	KA-139-A	8" Regular	315	Side Hot Spot
8-9-58	2582 C	KG-055-E	6" I&E E ⁽¹⁾	661	Inside Other
8-10-58	3776 F	KA-126-A	8" Regular	310	Side Hot Spot
8-12-58	2366 DR	KA-121-A	8" Regular	284	Side Hot Spot
8-13-58	0569 H	KE-057-A	6" Solid E ⁽¹⁾	265	Side Hot Spot
8-14-58	2680 D	KA-103-C	8" Regular ⁽³⁾	440	N.A.
8-15-58	4985 KW	CJ-042-A	8" I&E Nat.	770	Inside Other
8-15-58	2775 C	KJ-090-E	8" I&E Nat.	568	Side Other
8-16-58	1465 DR	KA-121-A ⁽²⁾	8" Regular	298	N.A.
8-17-58	2162 B	KA-137-A	8" Regular	358	Side Hot Spot
8-18-58	3566 DR	CA-849-A	8" Regular	421	Side Hot Spot
8-19-58	2176 C	KG-118-E	6" I&E E ⁽¹⁾	215	Side Hot Spot
8-24-58	4259 KE	SJ-611-A	8" I&E Nat.	729	N.A.
8-26-58	1676 C	KG-118-E ⁽²⁾	6" I&E E ⁽¹⁾	254	Side Hot Spot
8-28-58	3672 F	KA-126-A ⁽²⁾	8" Regular	425	N.A.
8-28-58	3463 B	KA-124-A ⁽²⁾	8" Regular	425	Side Other
8-31-58	2480 C	KG-084-E	6" I&E E ⁽¹⁾	~800.	N.A.

(1) 0.94% enrichment.

(2) The second ruptured slug to be sustained in this lot..

(3) Bluntnose truline.

Legend:

Side Hot Spot - Failure probably caused by accelerated corrosion in a localized region of high temperature.

Split Longitudinal - Uranium cleaved along the axis of the slug.

Side Other - Failure probably caused by localized corrosion penetration; e.g. pinhole penetration or other unknown mechanism.

Inside Other - Similar to Side Other except occurring on inside surface.

N.A. - Information not available.

DECLASSIFIED

OPERATIONAL PHYSICS OPERATIONPILE PHYSICS ASSISTANCE

The major operational physics problems during the month were associated with ruptures and scrams. A total of 19 ruptures occurred during the report period, mostly in natural uranium. Flux peaking, high tube powers, and high exposures are believed to be the major factors leading to the increased rupture frequency. Flattening efficiency has been lowered slightly in some cases as a result of efforts to reduce flux peaking. Twelve natural uranium flux traverses obtained at KE pile showed a peaking up to 24% over the chopped cosine. H pile traverse results indicate an overall reduction in flux peaking from 35% previously to 7% presently above a cosine. This was accomplished by E column displacements and changes in the HCR configuration.

TABLE I

SUMMARY OF OPERATING DATA OF PHYSICS INTEREST
FOR THE MONTH OF AUGUST, 1958

<u>Pile</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>
ECT* in August	1400	1550	1455	1480	1455	1560	2440	2440
12 Mo. Avg. ECT	1420	1590	1430	1480	1420	1555	2420	2420
Equil. Scram Time**	28-35	25-30	16-23	17-32	25-30	25-30	20-22	10-15
No. of Scrams	1/1	4/4	2/2	0/0	2/2	2/2	1/1	1/1
and Recoveries #	8/4	3/3	3/3	0/0	1/1	5/4	0/0	4/1
No. of Non-Scram Outages ##	4/0	3/1	3/2	4/0	1/0	3/0	2/1	4/1

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

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

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

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

B Pile (W. R. Smit)

Production was limited by thirteen outages; tube power limits were not reached.

B Pile (Continued)

Leaking bourdon tubes in the Panellit system caused most of the scrams experienced. A daily inspection was initiated and several faulty gauges were replaced.

On 7-25-58 a scram occurred 30 minutes after recovering from a previous scram. During the second recovery attempt the actual rising period of 15 seconds was mis-evaluated at 40 seconds. The No. 1 galvanometer did not respond properly due to severe flux skewing, and a low level trip on the No. 4 Beckman shut the reactor down for a minimum outage.

The graphite coefficient as a function of weighted residual exposure has been modified for minimum outages. The new function, $C_g = 0.36 + .585 \bar{E} \times 10^{-3}$, raises the hot reactivity at current operating conditions by about 50 ih.

C Pile (R. D. Carter)

Pile power was limited by the I & E corrosion limit.

On July 28 the rod water hose on No. 14 HCR ruptured, causing a shutdown. Recovery was successful using No. 13 rod as a replacement. After repairing the hose, it was considered advisable to "swap" rods. The exchange was uneventful, and operation continued until a rupture on August 5 caused a shutdown. During the time that No. 13 rod was in use a flux distortion to the bottom nearly caused tubes to go over temperature limits; this was prevented only by flushing two tubes in the Operational Charge-Discharge zone.

One successful "quickie" occurred on August 9. However, the shutdown was from a non-equilibrium condition and the recovery took 52 minutes.

On August 17 a faulty controller in 190-C Building indicated a pressure drop (non-existent) and scrambled the unit.

A number of Panellit scrams have occurred - mostly during start-ups. These come mainly from oscillating gauges.

The rate of rise meter which draws its signal from the octant chamber system is still not sufficiently reliable for operational use.

D Pile (D. T. Houser and A. D. Vaughn)

During the month D reactor experienced three shutdowns for two solid natural uranium ruptures and a water leak. One of the ruptures was sustained in a tube containing 28 feet of spline and running near limits. The water leak occurred in a tube charged with solid E metal; it had not yet been determined whether a slug rupture occurred in the tube, or whether the leak was caused by tube corrosion.

The total control safety requirements have made it necessary to use a modified poison start-up procedure after 35-40 hours down time. This has resulted from the 68 tubes of enrichment now charged in D pile. With proper planning of long outages, it should not be necessary to discharge any more uranium at below goal exposure than would normally be required for a temporary poison start-up. The use of spline start-ups would minimize this problem.

DECLASSIFIED

DECLASSIFIED

D Pile (Continued)

As of report time there were 729 tubes charged with I & E metal in D pile. The average observed reactivity loss per tube was 0.13 inhours. This average was obtained from equilibrium data taken after three shutdowns, during which I & E replaced solid natural uranium. The following table shows comparisons of equilibrium reactivity status during consecutive operating intervals:

D PILE I & E REACTIVITY DATA

Date of Evaluation	7-3-58	7-22-58	8-12-58	8-22-58
No. of I & E Tubes	0	250	380	729
Change (ih)(accumulated)	-	-47	-26	-94
Loss/tube (ih) "	- -	0.188	0.068	0.129
Enrichment (ih) (total)	110	135	145	163

Because of the uncertainty in the exact amount of reactivity loss per tube of I & E charged, enrichment additions have not been optimum from the standpoint of flattening. The fact that the solid natural uranium charges, being close to goal exposure and robbed of water by the I & E's, run hotter also reduces flattening efficiency during the change-over period.

The fission chamber is still out of service and will remain so until spare parts are available.

No. 3 Beckman has been locked out of the safety circuit all month. It is still tripping at regular intervals and from unexplained causes.

DR Pile (D. I. Monnie)

The four outages this month were caused by solid natural uranium ruptures. On 7-31-58 the reactor was shut down for a rupture in tube 2563, a new tube charged on 7-19-58. The reactor was shut down on 8-12 and 8-16 for ruptures in tubes 2366 and 1465 respectively. Both of these ruptures were from lot KA121A and the remaining 84 tubes in this lot were discharged during the outage of 8-16-58. After the discharge, E was reduced to 175 MWD/T. On 8-18 a rupture occurred in tube 3566. A leaking process tube accompanied the rupture and over 100 ih of water was present in the pile at start-up.

Fifty I & E charges were loaded on 7-31-58 to pilot the I & E program.

During the start-up on 8-7-58 the sub-critical chamber on the PC didn't work properly, but it was repaired during the subsequent outage. The Flexowriter has not been working satisfactorily for the past month; some trouble has been experienced in accuracy of printed readings with errors up to 10°C. Both the power recorder and Flexowriter were inoperative on 8-18 during PCCF discharge operations; however, no trouble was encountered.

The rear face Beckman was used to obtain a traverse on a regular metal tube No. 2265 during the outage of 8-12-58. This tube was adjacent to the rupture that caused the outage. The traverse indicated a front-to-rear flux distribution

DR Pile (Continued)

that was peaked upstream but not higher than a "chopped" cosine; comparison has not been made in this case to individual slug "weasel" readings.

The PbCd charged in the PCCF for flattening purposes has been displaced 64 inches upstream in an attempt to flatten the front-to-rear flux distribution.

F Pile (C. E. Bowers and R. A. Chitwood)

Two ruptures marred an otherwise successful operating period during the report month; as a result, tube power limits were cut slightly during the high-inlet-temperature period to restrict pile power.

The Flexowriter seems to be dependable again. After a period of several weeks in which disagreement of as much as $\pm 7^\circ$ were noticed between the Flexowriter and the Brown Temperature Recorder, the difference has been reduced to $\pm 1^\circ$ as the result of a "crash" maintenance program on the system.

A study of the graphite coefficient has been initiated utilizing the new 650 machine program. An attempt is being made to relate the coefficient to weighted residual exposure and helium concentration by the usual formulae.

H Pile (G. R. Gallagher)

Pile flattening was reduced by about 70 ECT in an attempt to reduce enrichment tube powers.

Three enriched uranium slug ruptures occurred during the month, bringing the total to 13 E and eight natural uranium ruptures for the year. A study has been made of ruptures occurring at H pile this year. Of the 19 ruptures studied, sixteen occurred after (or while) the metal was known to be exposed to a power of more than 60 kw/ft. Flux traverses and rod positions were studied to obtain a peaking factor for each rupture, and the history of each failure was traced from temperature maps. In an effort to lower rupture potential the following recommendations were given to and accepted by Operations:

- (1) The rod pattern controlling near-side enrichment flux peaking will be retained at the risk of lowering flattening efficiency.
- (2) Solid E metal columns will be limited to less than 60 kw/ft. specific power.
- (3) A new rod withdrawal chart for hot start-ups will be used. This chart will prohibit the complete withdrawal of selected rods. In essence, "all rods out" hot start-ups will be eliminated.
- (4) After each cold or secondary cold start-up the "cornpopper" pattern will be changed to one favorable for hot start-up monitoring.
- (5) E pieces being charged into known "trouble prone" areas will be numbered so that in case of a rupture the exact location of the ruptured slug may be determined.

DECLASSIFIED

DECLASSIFIEDH Pile (Continued)

Reactivity in control rods is at a low level so more dependence has been placed upon the PCCF for transient control. Shutdown maintenance has been necessary to overcome recent operational difficulties with the ball-valve system.

The Flexowriter has been out of service a significant amount of time. Non-equilibrium losses have been high, as Operations personnel depend strongly on this instrument and will not raise power when it is inoperable.

During the 8-12-58 outage it was observed that the PC was not performing properly. Instrument personnel checked the unit and found that both hot and cold counting tubes were burned out.

There are now about 65 I & E natural uranium columns in the pile. I & E material is available and will be charged in the normal enrichment ring; solid E metal will continue to be used in fringe poison compensation columns. Most of the reactivity loss caused by I & E charging will be compensated for by discharging permanent flattening columns and carrying less excess reactivity in control rods.

Results of flux traverses taken since the last near-side E column displacements show the front-to-rear flux distribution to be in good shape. Enrichment displacement plus the revised control rod configuration has reduced the near-side peaking from 35% to 7% above a normal cosine.

KE Pile (F. C. Franklin)

A reduction in power level was necessary on 7-27-58 due to a heat cycle. Control was regained by reducing the excess reactivity carried in the control rods from 275 to 250 ih.

A rapid temperature increase occurred in the top far corner of the pile during the start-up following the poison discharge outage on 8-8-58. Tube temperatures in that region increased about 30 to 40°C in a ten-minute interval and caused a temperature monitor scram.

A rupture occurred in a natural I & E slug in tube 4259 on 8-23-58. This is the first rupture to occur at KE pile since 5-20-58.

Flux traverses were taken on twelve I & E natural uranium charges by monitoring individual slugs as they were discharged. Readings were taken from the 20-foot rear face chamber and from two chambers installed through an access hole in the rear wall at the 38-foot level. The slugs were subsequently weaseled under water in the normal manner. A comparison of the normalized data shows the following: (1) the 20-foot chamber readings show flux peaks within $\pm 6\%$ of one of the chambers installed on the rear, and 3 to 10% below the other chamber; (2) the 20-foot chamber peak readings were 10 to 20% below the under water weasel readings; (3) the 20-foot chamber shows peak flux variations over the twelve tubes from -15 to +3% of a cosine peak, and the under water weasel readings show a variation from -2 to +24% of a cosine peak; (4) all readings

KE Pile (Continued)

taken during the metal discharge show (as anticipated) a flux distribution displaced downstream as compared to the under-water weasel readings.

KW Pile (G. R. Parkos and R. L. Ferguson)

Non-equilibrium operation persisted most of the month. Shutdowns on August 4 and 15 were due to natural I & E ruptures.

Forty inhours of enrichment were added within the flat zone on the near-side during the outage of 7-29. The added reactivity permitted returning to the I & E corrosion limit during the subsequent operating periods. The near-side reactivity problem was the result of several large discharges which were heavily biased toward the near-side. The operational difficulties associated with an unbalanced exposure distribution were discussed with Operations and Production Scheduling personnel, and a program was initiated to return to and maintain a balanced exposure distribution.

Increased in-pile reactivity due to recent enrichment additions has reduced start-up efficiency considerably. The efficiencies of the poison-free start-ups of 7-31, 8-5, and 8-9, were very low; after-the-fact estimates indicated that temporary poison start-ups would have reduced each start-up loss by more than 300 MWD. The estimates also indicated that minimum start-ups employing eight temporary poison columns (extending minimum time approximately three hours) would be more efficient than poison-free start-ups. This type of start-up was accomplished on 8-16-58 and was 450 MWD more efficient than the three previous poison-free start-ups. Rough estimates indicate that supplementary control would increase the start-up efficiency from minimum outages by about 1300 MWD.

The poison column displacement cylinder was used during a period of instability on 8-21-58. The cylinder was moved about 15 inches, and seemed to damp the front-to-rear graphite cycling in its vicinity.

No. 16 HCR was returned to service during the month. Nos. 13 and 17 HCR's stuck once during HCR scrams from high levels. However, the rods were freed and have operated satisfactorily.

The 650 machine graphite coefficient program was used to analyze old data obtained during the solid metal load. The results were essentially identical to those obtained by manual calculations. This run was for comparison and debugging purposes. I & E coefficient data will be run as soon as enough clean data are available.

PROCESS PHYSICS STUDIES

Safety Control

Considerable effort is under way to standardize and simplify application of safety control standards. These calculations are now being carried out by the individual pile physicists with some consultation and with the aid of published curves. Additional control capacity calculations have been programmed for the IBM-650 for C and H piles, DR pile, and for different enrichment locations at the K piles and at B, D, and F.

DECLASSIFIED

DECLASSIFIED

The effect on total control capacity of removing the three near-side ball hoppers from service, one considered expedient until the graphite separation problem is better defined, is calculated to require the reduction of 45 to 50 full length E columns from the near-side ring, corresponding to a reduction in flattening efficiency of 15 to 20%.

Equations have been formulated and trial problems have been submitted to the Data Processing Operation of a two dimensional variational method calculation for total control studies. It is hoped that application of this method may give some insight into the control effects of longitudinal flattening and enrichment.

PT-IP-188-C, authorizing tests of cold start-up procedures utilizing sub-critical monitoring at D pile, has been approved and is awaiting the return to service of the prototype fission counter system.

E Metal

Old-pile I & E E-Metal, designated O II E, has been canned and is available for charging at the D and H piles; 18 columns were charged at the D pile on August 23.

Pu-240 Program - PT-IP-132-C

Recently completed calculations on the heat generation rates and reactivity changes in .15% U-235 D metal are in good agreement with observations to date. W. E. Niemuth is re-calculating Pu-240 yield on the basis that moderator temperatures have not been raised as was anticipated at the time the original calculations were made; this effect is expected to increase the exposure requirement somewhat.

Three E-metal ruptures have been sustained in this loading to date. This number is not considered disproportionate since two ruptures have occurred during the same period in fringe enrichment columns which are roughly equivalent in total E inventory but whose slugs usually run at lower power.

Supplementary Control

It is anticipated that start-up testing will begin again at the D pile during September, utilizing the water eductor system for removal and disposal of the chopped splines. Further K pile testing is awaiting approval of a production test supplement now being circulated; this supplement provides for a guide collar to prevent uplift of the spline into the tubular central channel as occurred during the July 31 test at KW.

The Mechanical Development Operation is meanwhile considering stainless steel splines as a substitute for aluminum. Radioactivity observations indicate that the stainless steel splines may give smaller readings than aluminum splines during rapid discharge; however, in event of removal equipment breakdown, the aluminum splines have definite decay advantages.

The displacement cylinder installed in the KW pile is in service again and was used to advantage for front-to-rear control on August 21.

Reactor Fundamentals Classes

Replies to a questionnaire survey of Reactor Specialists compiled by Personnel Development were extremely favorable, particularly in regard to questions relating to the value of the course. Although a large percentage of the participating members were unable to attend the scheduled once per month session because of critical job responsibilities on meeting dates, the specialists stated a desire for more frequent classes, preferably on the job. Survey results were discussed at the Processing Managers' meeting on August 29; their subsequent recommendation to attain uniformity at the plants was that the course be offered downtown during off-shift hours on an accelerated schedule.

The Personnel Development specialist requested that instructors be made available again for the less detailed course given last spring to exempt personnel in servicing groups, as a backlog demand still exists for these courses.

Flux Traversing

A series of flux traverses were taken at the KE reactor using the rear face Beckman and two special chambers to monitor activity as the slugs dropped one-by-one from the tip-off. Although the rear face Beckman and one of the special chambers gave consistent agreement, the discharge flux traverses were 10 to 20% flatter than subsequent under-water weasel traverses on the same columns. These data indicate that special metal pick-up is required in order to obtain slug activity traverses of reasonable accuracy.

An Operational Physics representative is also working with Process and Reactor Development and Facilities Engineering personnel in the program for in-core flux monitoring techniques. Most promising for early use appears to be the wire traverse system used by Savannah River.

Potential Gains

Although the reactors were plagued with unscheduled outages during the month, no one reactor experienced exceptionally high efficiency losses during the month. The D pile happened to have near-perfect utilization of its splines and PCCF columns at the time of its equilibrium report map.

DECLASSIFIED

POTENTIAL GAINS - OPERATIONAL PHYSICS ASPECTS

DECLASSIFIED

JULY 16 THROUGH AUGUST 15, 1958

<u>Reactor</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	<u>Average</u>
Equilibrium Potential with existing limits	.9	4.0	0	.7	1.2	4.3	3.0	4.4	2.3
Non-Equilibrium Potential:									
Operating:	10.5**	8.7	7.5	4.6	3.5	5.0	6.8*	9.0	7.0
Temporary Poison Outage:	.2***	1.1	.6	0	0	0	1.1	0	.4
Total Non- Equilibrium:	10.7	9.8	8.1	4.6	3.5	5.0	7.9	9.0	7.4

* Includes one heat cycle.

** Includes seven scram recoveries.

*** "Quickie" type outage to discharge one poison column.

Documents Issued During the Month of Operational Physics Significance

- HW-58982 "Reactivity Balance and Associated Reactor Physics Data - July, 1958"
D. E. Goins, August 6, 1958.
- HW-55820 "A Comparison of Metal and Graphite Coefficients and Cold Clean
Reactivity of Solid and I & E Slug Loadings at C Reactor,"
D. I. Monnie, August 6, 1958. Sent to Files August 28, 1958.
- HW-57222 "Reactor Components Study" D. H. Curtis, G. C. Fullmer, W. D. Gilbert,
August 25, 1958.

**DECLASSIFIED
WITH DELETIONS**

HW-57278

DEL

IRRADIATION TESTING OPERATION

KAPL-120 LOOP

The empty in-pile tube was cooled with process water during the period.

An approval was received from the NRB on August 14, for a second decontamination of the out-of-pile portion of the Loop. This approval was based upon the use of the originally proposed 25 per cent nitric acid as the final cleaning solution. The decontamination was performed on August 14. The results were somewhat disappointing since the average decontamination factor was approximately 2.5. The two decontamination steps have, however, reduced the background activity in the equipment cubicle by a factor of approximately eight and the Loop modifications can be undertaken.

DR GAS LOOP

The construction activity on the DR Gas Loop continues on schedule. The procurement problems connected with auxiliary equipment for the gas compressors furnished by the General Engineering Laboratory have been resolved. The minor delays which have resulted will not affect the construction schedule. The completion date for the DR Gas Loop office has been rescheduled from August 18 to September 1, due to delays in the procurement of the prefabricated wall sections.

The installation of additional shielding on the X-1 level test holes has reduced exposure rates in the construction area (X-1 level) to acceptable levels.

INFINITE LINE SOURCE ACTIVITY CALCULATIONS

An IBM 650 computer program has been written to calculate radiation and shielding for an infinite line source. The program is similar in organization to the point source program discussed in the July Record Report. Nuclear data cards for 47 elements (required for either the Point Source or Infinite Line Source Programs) have been prepared.

HAPO FUEL ELEMENT IRRADIATIONS

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

**DECLASSIFIED
WITH DELETIONS**

	<u>This Month</u>	<u>Last Month</u>	<u>Reactor</u>
Number of tubes monitored	8	3	C
(I & E charged)	10	10	D
	6	4	KW
	8	7	KE
Number of tubes monitored	1	1	B
(Self-supporting solid charge)			

The irradiation of four enriched, 7-rod cluster fuel elements continues in test hole 3674 KE (HAPO-195). During the course of the irradiation, the uranium core temperatures of the two fuel elements with thermocouples gradually decreased from 488 C and 460 C on May 15 (eight days after start-up) to a temperature of 342 C and 306 C on July 31. The surrounding tube powers were the same for each measurement. The decrease in temperature is attributed to uranium swelling which improves the heat transfer bond between the uranium and the stainless steel can. As of August 17, the fuel elements had reached 64 per cent of goal exposure.

The irradiation of the three-foot long swaged UO₂ fuel element in test hole 3865 KE (HAPO-215) continued. As of August 17, the fuel element had reached 35 per cent of goal exposure.

Thirteen uranium specimens (one during this report period) have been irradiated in the Snout facility at KW reactor (HAPO-173). A total of 14 specimens are to be irradiated. This test, sponsored by HLO's Fuel Development Operation, is being performed to obtain information regarding the damage to the crystal structure and the changes in the tensile strength of uranium as a result of reactor radiations.

OTHER IRRADIATION TESTS AND SERVICES

1. A total of nine sets of activation analysis samples were irradiated in the Poison Column Control facilities in D and DR piles. These samples are identified as follows:
 - a. Five sets of HAPO-184 samples in support of a Washington Designated Program assigned to HLO.
 - b. Four sets of effluent water samples (HAPO-172) in support of an HLO study of the radioisotopes in effluent water.
2. A total of twenty-five samples were irradiated in the Quickie facility (E test hole) in F pile. These samples are identified as follows:
 - a. Seven samples of high purity magnesium and aluminum were irradiated. The radioactive decay of the samples was followed to determine the half life and energy level of impurities in the material. These tests are being made to establish the shielding requirements of a discharge cell proposed for use with the pneumatic facility at KE.
 - b. Two samples of UO₃ (HAPO-203) to provide a Np239 tracer in support of an HLO chemical separations study.

DECLASSIFIED

DECLASSIFIED EL

- c. One sample of strontium-84 (HAPO-219) to provide a strontium-85 gamma source in support of an HLO effort to develop a method for recovering strontium from fission product wastes.
 - d. One sample of Cerium Oxide and one sample of Ruthenium Oxide to provide HLO with high specific activity sources to determine counting correction factors.
 - e. Eleven sets of effluent water residue samples (HAPO-172) in support of an HLO study of the radioisotopes in effluent water.
 - f. Two samples of boron-steel spline material to determine the activity build up in this material. These data will provide a basis for the solution of the cask design and the removal procedure problems associated with the poison spline program.
3. One graphite boat was charged (HAPO-177) and one boat discharged from the Hot Graphite Facility (Y test hole) in C pile. These boats contain graphite samples for studies being made by the Non-Metallic Materials Development Operation, HLO, of irradiation damage to graphite.
 4. One set of thorium tensile specimens (HAPO-213) was charged in a fringe zone process tube in DR pile. These pieces are being irradiated in support of an HLO study of mechanical and physical properties of thorium. The data obtained from this test may provide a better understanding of radiation damage in uranium.
 5. One column of Cobalt-60 (ORNL-183) was shipped to Oak Ridge National Laboratory in support of the Radioisotopes Distribution Program. The calculated activity of this shipment is 10,000 curies.
 6. The irradiation of thermocouple leads insulated with quartz and asbestos continues in the 4B test hole in KW pile (HAPO-199).
 7. Thirty baskets began exposure and thirty baskets completed exposure in the Hanford (KE) gamma facilities. The majority of these irradiations are being sponsored by the Non-Metallic Materials Development Operation of HLO.
 8. The gamma irradiations for the Air Force under HIR-AF-100 have been completed. A document, "Final Report on Gamma Irradiations for the U.S. Air Force HIR-AF-100", HW-57001, has been issued.

BORESCOPING

At the request of the Rupture Removal Task Force, a design criteria for a bore-scope to support this activity was drafted and circulated for comment. A final draft of the criteria, incorporating the comments, is being prepared.

An inspection of process channel 0972F was terminated at 17-1/2 feet in from the front gunbarrel flange because the channel was completely blocked by broken graphite and dust. The same condition was found at 8 feet in from the rear gun barrel. A distorted section of split process tube was found in channel 1267F at a distance of 12 feet in from the rear. It was not possible to insert the

borescope beyond either of the obstructions. These inspections were attempted in support of the F Maintenance Operation's efforts to retube the channels.

Prior to the installation of Horizontal Control Rod #8, in C pile, the channel was inspected to a depth of 20 feet in from the skin and the following observations reported:

1. A piece of metal 1/2 inch thick and 10 inches long was found just beyond the end of the step plug. At this location it did not interfere with the rod.
2. The end of the rod track (graphite) was broken and slightly separated.
3. A 1-1/4 inch gap between the tube blocks forming the top of the channel was noted at 12 feet in.
4. The balance of the channel to a depth of 20 feet appeared clear and normal.

When the rod was installed, it failed by ten inches to completely enter the unit. Subsequent inspection revealed an obstruction one inch to one and one-half inches in diameter at a distance of 36 feet 10 inches in from the rod housing assembly. The obstruction had the appearance of aluminum which had been partially molten.

There was no observed evidence of "chattering" (in the area occupied by the upstream dummy charge) noted when process tube 0964D was inspected on August 23.

Inspection of the rod channels of interest at both K reactors continued. These inspections are in support of maintenance activities and to provide data for the evaluation of the apparent movement of the graphite. Detailed reports of these observations have been provided by letters to the Processing Operation Managers. Following is a brief summary of the activity during this report period:

1. Horizontal Control Rod Channel #16-KW
 - a. On July 30 assistance was provided in the removal of a piece of pipe from the channel. Gaps, 3/4 inch wide, were noted in the top of the channel at 40, 42 and 44 feet in.
 - b. Continuous support of the ball removal efforts was provided on August 4 and August 6.
 - c. Upon completion of the removal of the balls on August 8, the entire channel was inspected and found entirely clear of balls. In addition to the 3/4 inch gaps reported on July 30, a 2-1/2 inch gap on the right side and a 3 inch gap on the left side were noted at 41 feet in from the skin.
2. Vertical Safety Rod Channels-KW
 - a. Inspection of Channels #33 and 42 on August 4, revealed a condition similar to Channel #51. Displaced tube blocks form ledges in the channel upon which balls are retained. Gaps between tube blocks and tube layer filler blocks (in the corners of the channel) are large enough to pass balls.

DECLASSIFIED

b. Drop light inspection indicated that the block shifts in Channels #33, 42 and 51 are from far to near. The channel cross section (at the worst position) appears to be a rectangle whose long side is 3 compared to a short side of 1.

c. The distance from the top of the rod housing to the top of the graphite stack is 133-5/16 inches as determined in Channel #51 on August 15.

3. Vertical Safety Rod Channels # 33, 42 and 51-KE

The three channels were inspected on August 6. Their condition is similar, if not identical, to the same three channels at KW.

VERTICAL BOWING MEASUREMENTS

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

<u>Date</u>	<u>Area</u>	<u>Tube</u>	<u>Results</u>
8-13-58	100-H	4674-H Front	No change at 10' since 5-17-58
8-13-58	100-H	4674-H Front	Down .14" at 20' since 5-17-58
8-18-58	100-B	4574-B Front	Down .32" at 9' since 4-10-58
8-18-58	100-B	4574-B Front	Down .32" at 20' since 9-5-57
8-18-58	100-B	4391-B Front	Down .22" at 10' since 12-20-57
8-18-58	100-B	4391-B	Down .03" at 22' since 12-20-57

COOLANT TESTING OPERATION

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

1706-KE Single-Pass Tubes (PT-IP-197-A)

The six central zone single pass tubes were operated on process water until 8-25-58. On that date a test was initiated to determine corrosion rates for X-8001 and C-64 aluminum jackets on I & E slugs. Coolant Conditions for these tubes were as follows:

4355 KE	7.0 pH filtered water and 2ppm dichromate
4456 KE	7.0 pH filtered water and 1 ppm dichromate
4557	7.0 pH process water 1 ppm diatomaceous earth
4557	7.0 pH process water
4963 and 5063	6.5 pH process water

On 8-7-58, tube 2943 was charged with weighed, numbered dummies as specified by PT-IP-198-A. It was operated with preheated water at 90°C for corrosion tests on 1245 aluminum.

Three non-equilibrium KE reactor scrams resulted from the start-up of the new test on the 1706 tubes. Combined outage time lost from these scrams was 1.2 hours. Total outage time charged to the single pass tubes during the month was 2.2 hours.

MOCK-UP TUBES

Tests continued during the month to: (1) determine the resistance to corrosion, erosion and cavitation of aluminum alloys (A-1, A-2, C-1, and C-2) in a venturi type restriction; (2) test an M-257 process tube; (3) test K-Area resistance thermometers and adapters in 120° C & 140°C process water.

New tests initiated during the month were: (1) A test to determine the effects of metallic inclusions on overall and localized corrosion of aluminum. (2) A test to determine the corrosion effects of Turco 4306-B on X-8001 aluminum. (3) A test to compare the localized corrosion characteristics of X-8001 and 1245 aluminum in filtered water with 1 ppm diatomaceous earth added.

EIMO LOOPS

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

EIMO-2 - A test for evaluating a 50 ppm solution of sodium dichromate as a corrosion inhibitor was initiated on August 1. The loop was operated at pH 4.5 regulated by HNO₃ addition. Test samples were M-388 aluminum and 1051 carbon steel.

DECLASSIFIED

DECLASSIFIED

ELMO-5 - ELMO 5 continued to be operated at 290°C and a pH of 10.0, regulated by LiOH addition. The caustic embrittlement test continued under known stress conditions.

ELMO-6 - ELMO 6 continued to be operated at 300°C and pH 4.5 regulated by H₃PO₄ addition for corrosion testing of twelve different Alcoa alloys.

ELMO-7 - ELMO 7 was operated at 535°F and pH 4.5 for tests on (1) A thermocouple slug and connections; (2) C-812 aluminum corrosion samples; and (3) a number of PRTR and NPR connectors, seals and valves.

DOWTHERM UNIT - CARBON STEEL HEAT EXCHANGER

The Dowtherm loop continued to be operated at 700°F and 140 psi, with a raw water heat exchanger outlet temperature of 212°F. The overall heat transfer coefficient decreased by approximately 5% after four weeks of operation at bulk Dowtherm temperature of 700°F.

ORGANIC COOLANT PROGRAM

ORA-1 - The loop continued to be operated with MIPB at a temperature of 700°F for corrosion studies on M-388 clad AlSi bonded fuel elements, nickel bonded aluminum jacketed I & E elements and an aluminum jacketed element with a graphite diffusion barrier.

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

KER FACILITY

There were no unscheduled KER reactor outages charged to the KER loops during the month. 9.4 hours of outage time were charged for KER work.

Loop 1 - The dump valve on loop 1 was repaired on 8-5-58 and the in-pile section was charged under PT-IP-146-A. The charge consisted of six stainless steel jacketed UO₂ 4-rod cluster elements and two coextruded zircalloy jacketed natural uranium 7-rod cluster elements. Operation of the loop at 270°C and a pH of 10.0 with LiOH addition continued through month end.

Loop 2 - In-pile recirculation of loop 2 at a pH of 4.5 continued during the month. Reductions from the 195°C operating temperature were necessary several times during the month because of a severe leak and a failure of the rupture monitor equipment. The charge consisted of 14 M-388 aluminum jacketed doe slugs, eight M-388 jacketed mint slugs, four zircalloy jacketed enriched uranium cluster elements and one thermocouple slug.

Loop 3 - The in-pile section of the loop was charged on August 5 under PT-186-A. The charge consisted of two zircalloy jacketed, natural uranium three rod cluster elements (one 2' long and one 3' long), one zircalloy jacketed four rod Al-Pu cluster element, and four zircalloy jacketed UO₂ four rod cluster elements. Operation at 185°C with high purity water continued until month end.

Loop--4 - The loop was charged on 8-5-58 with 15 M-388 clad doe slugs under PT-IP-190-A. A slug with thermocouples embedded in the jacket was also charged. The loop was operated at 205°C and a pH of 4.5 until the latter part of August. The #1 pump on loop 4 failed on 8-28-58 and the loop was operated at reduced temperature from that date to month end.

DECLASSIFIED

COMPONENT TESTING OPERATION**DECLASSIFIED**Irradiated Material Examination

Detailed examination of the following 39 tubes of irradiated fuel elements was completed during the month.

<u>Pt. No.</u>	<u>Tube No.</u>	<u>Pt. No.</u>	<u>Tube No.</u>	<u>Pt. No.</u>	<u>Tube No.</u>	<u>Pt. No.</u>	<u>Tube No.</u>
60A	2684-H	60A	2665-H	112A	3162-H	120A	1980-DR
	2683-H		2663-H		3165-H		2075-DR
	2677-H	70A	3153-KE		3164-H		2076-DR
	2660-H		1654-KE		3163-H	550	4963-KE
	2581-H		1456-KE	120A	2181-DR		4556-KE
	2578-H		1387-KE		2281-DR		5063-KE
	2565-H		3450-KE		2875-DR		4557-KE
	2563-H	39A	5379-KE		1977-DR		2944-KE
	2674-H	84A	1880-B		1978-DR	I&E Reg.	1677-D
						Metal	
	2671-H	134A	4268-KE		1979-DR		

Rupture tube 2582-C was discharged August 9, 1958. Visual examination revealed that one of the I&E enriched slugs had ruptured inside the hole of the piece. To confirm the rupture, water previously boiled around the slug was sent to Analytical Laboratories Operation, HLO, and subjected to gamma spectrometer analysis. The following isotopes and energies were observed:

<u>Isotope</u>	<u>Gamma Energy</u>
Cs-137	0.66 Mev.
Zr-95	0.75 Mev.
Ru-103	0.50 Mev.
I-131	0.38 Mev.

The slugs from rupture tube 4985-KW were visually examined and measured for warp. The bore of slug No. 18, counting from the rear of the charge, was found to be blocked and evidently was the rupture piece. A light film pattern was observed on the outside of this piece and the measured warp was 51 mils; however, the outward appearance was very good. The maximum warp found on other pieces from this tube was 75 mils, and the average warp on all pieces was 24 mils (tube average warp usually runs 5 to 10 mils). Eleven hot spots and 12 film patterns were observed on the pieces from this charge, all on slugs between position 5 and 33. There was no apparent correlation between hot spots and warp, nor was the plane of the warp constant with respect to the position of the hot spots. Evidence of a severe corrosion attack was found at some of these hot spots.

Process Tube Corrosion Monitoring Program

In-pile measurements of 49 process tubes were made this month using the Probolog. Listed below are the number of tubes measured per reactor and the report document numbers:

DEL

HW-57278

<u>Reactor</u>	<u>Tubes Probed</u>	<u>Report No.</u>
D	10	40, HW-57204
B	33	41, HW-57235

Four tubes from 105-C and two tubes from 105-KE will be reported later.

Four tubes removed from reactors were examined in basin facilities and sampled for measurement in the 189-D Metallurgical Laboratory. The exact damage caused by the rupture or mixer slug in tube 3681-C could not be determined due to the severe gouging of the tube by the splitter used at the time of its removal from the reactor. Corrosion product had built up to such an extent on tube 0480-D that a depression resulted which was rubbed by the metal during discharge. Three holes, $7\frac{1}{2}$ to $8\frac{1}{2}$ feet from the rear Van Stone flange were found in leaker tube 0562-D. These holes were caused by external corrosion.

Five leaking inlet pigtail connectors, 0987-H, 1791-H, 2689-H, 1577-F, and 1384-DR, were examined. A single flaw was found in each connector. Detailed examination revealed no other flaws.

Panellit Programs

Process inspection of 628 Panellit gauges was performed and 10% were found which failed to meet standard specifications. These gauges were processed by individual area instrument shops and the rejection rate compares favorably with that experienced by the Central Panellit Shop when it was in operation.

In-board examination of 5971 Bourdon tubes was made with a leak percentage of 0.29.

Due to the concentrated effort on Bourdon tube examinations, only 115 Panellit gauges were subjected to the in-board reliability examination.

Twenty-nine gauges were given failure analysis examination with an increased incidence of switch failures noted. Analysis of failures during the months of June and July was reported in document HW-56380.

One thousand of the new Bourdon tubes have been received. Fifty are now in service with 200 more ready for installation.

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

Inventor (s)

None

Inventor

DECLASSIFIED

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

HW-57278
DECLASSIFIED

PRODUCTION AND REACTOR OPERATIONS SUMMARY

AUGUST, 1958

Reactor input production for August was 2.1 per cent below forecast and output production was 3.4 per cent above forecast.

There were no increases in the maximum established power levels during August.

The overall time operated efficiency was 80.2 per cent (81.0 per cent forecast) with 79.1 per cent at the six old reactors and 83.6 per cent at the K's. Fifty-three reactor outages of which 27 were scrams occurred during August.

Twenty-two ruptures were removed from the reactors during August. Nineteen of these ruptures were at the six old reactors: 12 were regular metal, 10 solid and two I & E, and seven were E-Metal, three solid and four I & E. The three K Reactor ruptures were regular metal I & E. Nine of the 22 ruptures removed during August were stuck.

Significant items of equipment experience were:

1. One hundred six process tubes were installed.
2. Seven water leaks, six tube and one Van Stone, were corrected.
3. Further borescopic examination of the VSR and HCR channels in KE and KW Reactors has confirmed the graphite shifting previously reported and has shown it to be occurring on the far side as well as the near side.
4. The first rupture of a fuel element in a tube containing a poison spline occurred at D Reactor. Removal was accomplished without incident, using a maximum force of 7000 lbs.
5. Inspection of the far DR downcomer revealed considerable damage to welds, vent pipes and walls.

No disabling injuries, security violations or radiation overexposures were incurred.

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

B-C REACTOR OPERATION
AUGUST, 1958

- I. ORGANIZATION AND FUNCTIONS - Effective August 25, A. R. Maguire was appointed by the Department General Manager to represent the Reactor Operations as a member of the newly established Expansion Design Council for NPR.

Effective August 1, the responsibility for coordinating inter- and intra-departmental movement of IPD Power Operations personnel (bargaining unit) was transferred from B-C General, B-C Reactor Operation to the Personnel Development and Placement Operation, Employee Relations Operation.

II. PERSONNEL

A. Force Summary

	July 31			August 31			Net Change
	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>Of Total</u>
General	3	3	6	3	3	6	0
B Processing Operation	16	39	55	16	39	55	0
C Processing Operation	16	33	49	16	34	50	+1
Power Operation	14	97	111	14	97	111	0
Maintenance Operation	<u>24</u>	<u>101</u>	<u>125</u>	<u>22</u>	<u>103</u>	<u>125</u>	0
Total	73	273	346	71	276	347	+1

- B. Movement of People - Exempt movement consisted of one temporary promotion from the nonexempt roll (L.V. Kinnie, Supervisor-Shift Maintenance) and three reclassifications to the nonexempt roll upon completion of temporary exempt assignments (D.L. Helgerson, H.W. Heavner, and L.V. Kinnie). Nonexempt movement consisted of four transfers in, three reclassifications from the exempt roll, one transfer out, one resignation, one termination for lack of work (ROF originated in CPD and R&U), and one promotion (temporary) to the exempt roll.

Effective August 1, titles of maintenance supervisory positions were changed to eliminate the titles, Supervisor, Maintenance I and Supervisor, Maintenance II and to provide the following titles more descriptive of the incumbent's function:

Supervisor, Mechanical Maintenance

G. N. Culverhouse
C.G. Phillips
E. P. Skow

Supervisor, Electrical Maintenance

O. A. Clarke
W. I. Tatro

Supervisor, Maintenance

A. J. McKinnon

Supervisor, Shift Maintenance

L. F. Carpenter
J. V. Clatworthy
A. J. Dupuis
C. G. Mumford

Supervisor, Instrument Maint.

F. D. Jones
L. E. Ziege

DECLASSIFIED

DECLASSIFIED

- III. PERSONNEL ACTIVITIES - First place winner in the Washington State Safety Slogan Contest for June was R.D. Sansom of B Processing Operation.
- IV. SAFETY AND SECURITY - Eighteen medical treatment injuries were reported during August. No disabling injuries, serious accidents, or security violations were reported during the month.
- V. NON-ROUTINE REPORTS - None were issued.
- VI. INVENTIONS AND DISCOVERIES - All persons engaged in work that might reasonably be expected to result in inventions and discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period therein covered by this report; notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

VII. COMPONENT ACTIVITIES

GENERAL

- A. Administrative Activities - In a special meeting August 27, managerial personnel were briefed on the new Savings and Security Program which is scheduled to go into effect January 1, 1959.
- B. Personnel Development - Six employees attended four classes in the IPD Employee Training Program during August; four exempt employees attended two Communications Course classes during August; eight information meetings moderated by exempt employees of B-C Reactor Operation were attended by 54 nonexempt and 14 exempt employees; seven employees were enrolled in the PBM-I course with classes scheduled to start in September; one Technical Graduate continued a rotational training assignment with B-C Maintenance Engineering Operation.
- C. Cost Control Activities - Customer codes were re-established for isolating loaned labor costs incurred for the radiation monitoring functions of each Processing Operation. The FY 1958 target budget for operating expenses of level 4 components was compiled and distributed to managerial personnel of the Operation.
- D. Landlord Activities - Replacement of inoperable wooden doors with metal doors was completed at Building 115-B; a schedule for necessary interior and exterior painting of B-C Area buildings during FY 1958 was established and preliminary work orders issued to the Central Maintenance Operation; roof repairs and weed spraying were continued during the month.
- E. Suggestions - Under study at the start of the month, 38; received for evaluation during the month 27; evaluations completed during the month, 31; under study at the end of the month, 34.

B PROCESSING OPERATION

- A. Production - Input production (Pu) was 105 percent of forecast, and was limited by bulk outlet temperature and tube power limits. The TOE for the month was 79.4 percent.

B. Operating Experience - There were six unscheduled outages during the month.

<u>Day</u>	<u>Hours</u>	<u>Reason</u>
8	31.1	Panellit scram due to rupture 3579. Discharged with charge machine.
12	0.4	Panellit scram. Leaking Bourdon tube, gage 3193.
13	0.3	Panellit scram. Leaking Bourdon tube gage 3787.
16	0.3	Panellit scram. Row 10 - Cause undetermined.
17	72.1	Manual scram. Rupture 2162, stuck. Discharged with 5200 pound force.
28	48.9	Rupture tube 3463; stuck. Discharged with 3000 pound force.
	153.1	Total Hours

During the month, leaks necessitated the removal of the tube and the blanking-off of channel 2276 on August 17 and the channels 3463, 0482, and 0576 on August 28.

C. Equipment Experience - The unit was leak tested twice using the helium leak detector and once by pressurizing headers. One hundred and ninety-two tubes were stinger leak tested. Vertical traverses were run on tubes 4391 and 4579. The Foxboro outlet temperature thermohm, which had failed, was replaced and returned to service. A total of 358 tubes were processed, including 70 I and E charges. A new PCCF charge machine was placed in service in order to perform necessary productive maintenance on the old machine. The 105 air compressor required the installation of a new cooling jacket, as a leak in the old jacket was allowing water to enter the air receiver and system. The flexowriter required extensive repairs, for replacement of a ram shaft, bearings, and slide wire. Twenty-seven suspected leaking and three mechanically defective Panellit gages were replaced. Seventeen loop header flow meters were overhauled. Six tubes were successfully probed. Twenty-three Panellit gages with 10-90 trips were installed for test purposes.

D. Improvement Experience - PT-IP-84A, "Evaluation of Slugs Having Projections for Use in Ribless Tubes" was active, and three tubes were discharged. PT-IP-189, "Pilot Loading of I and E Fuel Elements at B, D, DR, F, and H Reactors" was initiated and 20 tubes of I and E material were charged. A new wash pad acid decontamination tank hood was installed for more effective removal of fumes.

E. Radiation Monitoring Experience

1. Radiation Occurrences - nothing to report.

2. External Exposure Experience - Observing VSR withdrawal following scrams occasioned dose rates to personnel of 150 mr/hr. Work involving draining inlet lines and clean up in the dryer cells of the 115 building caused dose rates to personnel to 1 r/hr. Personnel dose rates for discharge area work were as follows: Set up "quickie" equipment - 2 r/hr; Tube splitter removal - 1 r/hr; Gunbarrel removal - 500 mr/hr; Discharge operations and other work - 200 mr/hr.

DECLASSIFIED

W-57278

DEL

3. Contamination Control - Fifty-eight air samples were taken, none of which indicated an activity density greater than the permissible limit for the respiratory protection worn; eighty-nine vehicles were surveyed, none were found contaminated.
- F. Events Influencing Cost - Twenty-four exempt and 96 nonexempt overtime man-hours were required, plus 116 nonexempt radiation monitoring man-hours. No helium startups were made. Total helium used was 250,910 cubic feet, as compared to 198,740 cubic feet in July. Total gas usage was 904,910 cubic feet, as compared to 729,540 cubic feet in July. Approximately 6000 dummies were shipped via special well car to the 200 areas for decontamination. When returned the average exposure level was approximately ten times that normally acceptable for charging. Re-decontamination by the 200 areas reduced this level to twice that normally acceptable for direct handling during charging. The dummies were again decontaminated to acceptable limits, using the wash pad decontamination facility.

C PROCESSING OPERATION

- A. Production - Input production (Pu) was 81.0 percent of forecast. Power level was limited by slug corrosion limits.
- B. Operating Experience - The following 11 (unscheduled) outages were experienced:

<u>Day</u>	<u>Hours</u>	<u>Reason</u>
5	61.4	Rupture - Tube 0981
7	0.5	Scram - Panellit gage 4071 oscillating
7	0.3	Scram - Panellit row 17 (cause undetermined)
9	0.8	Rupture - Tube 2582
14	0.3	Scram - Panellit row 13 (cause undetermined)
15	61.2	Rupture - Tube 2775
17	1.2	Scram - Panellit row 13 (cause undetermined)
17	2.5	Scram - Faulty controller at 190-C
19	33.0	Rupture - 2176
26	34.1	Rupture - 1676
31	20.0	Rupture - 2480
	215.3	Total Hours

Of the six ruptures experienced during the month, four were enriched I & E slugs and two were I & E natural uranium slugs. The four enriched I & E ruptures were discharged with the charging machines; the two natural uranium I & E ruptures (0981, 2775) required removal of the process tube. Channel 0981 was blanked-off and left as an air channel; a zircaloy tube was installed in channel 2775 later in the month.

C. Equipment Experience - A piece of aluminum was removed from the front of the HCR 8 channel. Another foreign object about 3/4" x 2" in cross-section was observed at the far end of the channel, limiting rod travel to within 10 inches of full-in. The "in" limit switch was adjusted to stop the rod at 20 inches from full-in and the rod returned to service. During the August 5 outage, HCR 14 was visually inspected by the C Reactor Engineer. On July 28, the coupling on the inlet cooling water hose to the rod had failed, resulting in loss of water to the rod. No damage was apparent. Ninety-four silicone O-rings were installed on rear pigtail elbows during the month for a total, to date, of 221.

D. Improvement Experience

PT-IP-132-AC - Production of High Pu-240 Plutonium at C Reactor - Enriched metal ruptures were experienced in Tubes 1676, 2176, 2480, and 2582.

PT-IP-143-A - Evaluation of In-Reactor Performance of Zircaloy Process Tubes - Zircaloy tubes were installed in channel 3681 and ball valve channel 2775 on August 20. Each was charged with 26 weighted and measured regular uranium I & E slugs. Three zircaloy tubes have been installed to date.

PT-IP-56-A-86-MT - Evaluation of Low Hydrogen Dingo Uranium Fuel Elements - Nine tubes were charged with weighted and measured slugs to initiate this production test.

Significant Changes in Production Test Tubes:

	No. Tubes 7-31-58	No. Tubes 8-31-58	Change
*PT-IP-148-AC	306	0	-306
PT-IP-132-AC (D metal)	84	84	0
(E metal)	277	239	- 38
PT-IP-168-A	4	9	+ 5
PT-IP-143-A	1	3	+ 2
PT-IP-56-A-86-MT	0	9	+ 9
*PT-IP-19-A	1	0	- 1
*PT-IP-141-A	849	0	-849
**PT-IP-142-AC	2	0	- 2
	<u>1524</u>	<u>344</u>	

*Terminated as production test - transferred to regular production status.

**Transferred to PT-IP-168-A.

DT-IP-135-E - Studies of Process Water Pressure Fluctuations - Capillary suppressors were installed in 10 panellit gage lines for a total of 12 installed to date. The suppressors are designed to dampen gage oscillation and eliminate the necessity for throttling the gage line. The purpose of this development test is to evaluate the oscillation control effect under operating conditions.

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

Project CG-651 - 111 Tube Operational Charge-Discharge Facility - During the outage of August 5, the pressurized magazine charging machine was connected to Tube 1469 five times and the front ball valve opened and closed to test the reliability of the charge machine actuator. Earlier in the month, the actuator had failed during a charge-discharge operation of solid aluminum dummy columns, resulting in incomplete closure of the front ball valve and inability to depressurize the charge head. On August 20, the charge machine was coupled to each front ball valve on rows 14 through 19 and Tubes 2072 through 2075. All alignments and couplings of the machine were remotely controlled from the operational charge-discharge console in the control room. The closed circuit television system was used for fine alignment.

E. Radiation Monitoring Experience

1. Radiation Occurrences - An employee performing work at the viewing pit received shoe contamination up to 40,000 c/m. There was one case of hand contamination to 28 mrad/hr. Tools were stored in the decontamination room such that the dose rate was 200 mrad/hr at the radiation zone boundary. A backflow of water occurred when the OCD pressurized charging machine was uncoupled from a ball valve. There was no overexposure of personnel on the elevator. An employee received shoe contamination in the Metal Examination Facility to 32 mrad/hr.

2. External Exposure Experience

Location	Type of Work	Personnel Dose Rates mrem/hr	
		Max.	Avg.
Ball 3X Tunnel	Installation of Back Draft		
	Dampers	2,000	350
Discharge Area	Gunbarrel removal	2,900	150
Inner Rod Room	Borescope Channel 8 and		
	inspect rods	2,500	25
Exhaust Air Tunnel	Remove debris from exhaust		
	vent grills	2,000	750
Charge Face	Remove Tube Splitter	2,500	10
X-2 Level	Discharge samples	600	50

3. Contamination Experience - Twenty-two vehicles were surveyed and none were found contaminated. There were five cases of skin contamination, none constituted an over-exposure, and all were readily decontaminated. There were three instances of personal clothing contamination; all items were decontaminated with the exception of one pair of shoes. A total of 95 air samples were taken; none indicated activity densities greater than the permissible limits for respiratory protection worn.

- F. Events Influencing Cost - Six hundred and sixty-two man-hours nonexempt and 46 man-hours exempt overtime were required during the month. Eleven unscheduled outages totalling 215.3 hours were incurred.

POWER OPERATION

- A. Operating Experience - The Export Load was supplied by B Area during the month. The north 183-B cone valve linkage failed on August 9th causing the valve to close; flow was maintained through the south cone valve and north bypass valve; the faulty valve was repaired on the same date. 105-C was scrambled on August 18th due to malfunction of the 190-C master controller which resulted in a 30-pound drop in riser pressure. A power surge was experienced on August 26th due to lightning on the Montana Power Company system affecting frequency of the B.P.A. system. This resulted in a 10-pound variation in process water pressure. No production time was lost as no equipment was effected.
- B. Equipment Experience - At 183-B Building, No. 5 backwash valve was replaced on August 8th. The south flow controller was Class A inspected. Pea gravel was added to the weak spots in No. 5 filter. At 190-C Building, vibration checks were completed on No. 11 turbine, and the Travelers Insurance Company Inspector completed the Third Party Inspection of No. 2 boiler at 183-B Building.
- C. Improvement Experience
1. CG-558 - A modified and repaired impeller was installed in No. 3 pump in 190-B Annex.
 2. CG-600 - Pump repairs have been discontinued until new impellers are on hand.
 3. Other - Phase III of Project CG-751 (Steam Pole Replacement) is complete except for repairing steam leaks on trap lines. Exploratory digging has been done and detailed check prints have been completed on Project A-89053 (Process Water Cross Tie). No further activity on the Prototype Bauxite Feeder Installation at 183-B. Additional funds are being sought to install a graded acid export line from 183-C to 183-B to supply extra acid needed for the Bauxite installation. A flow test from 181-B to 183-B was conducted in connection with R-34105 (Existing Reactor Water Plant Study) being made by the Reactor Modification Design Operation of Facilities Engineering Operation.
- D. Events Influencing Cost - Maintenance costs remained high due to replacement of No. 5 back wash valve and Class A inspection of No. 2 boiler. Water treatment costs were above normal because of excessive feeds required to control film in B Reactor.

MAINTENANCE OPERATIONA. Equipment Experience1. Instruments

105-B Moisture Monitor - Extensive maintenance was performed on the dew cell system during the month. The refrigeration system required a complete overhaul and a new compressor unit was installed. Dew cells were inspected and 21 of 92 cells are inoperative because of failure in windings.

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

107-B Beckmans - The north exit chamber required rebuilding. The inlet chamber thimble broke loose from its mountings on August 21st. Extensive repair will be necessary to reactivate the chamber.

105-C Graphite Thermocouple Stringer - The fabrication of the graphite thermocouple stringer for channel 2267C is eighty percent complete at month end.

105-C Temperature Monitor - A total of 34 exit water thermocouples were repaired during the month. Thirty-four spares were used to make the repairs, leaving a total of 134 spares available for use. The failure rate of exit water thermocouples is currently averaging one per day.

105-C Thermocouple Stringers - One exit water I & E thermocouple stringer was installed and one was inspected during the month.

105-C Flux Monitors - The five Model V amplifiers for flux monitor use have been on test throughout the month and are now ready for installation.

105-C Pressure Monitor - A response check and base range check was made on rows one through seventeen with no failures detected. High-low trip checks were completed. The inboard inspection of 109 gauges revealed 58 failures as follows:

Leaking bourdon tube	2 gauges
Missing washer	1 gauge
Excessive dial play	2 gauges
Sticking dial play	3 gauges
High resistance switch	1 gauge
Close magnet	1 gauge
Corrosion on terminals	16 gauges
Faulty drive slot	30 gauges
Incorrect trip span	2 gauges

105-C Dewcell Moisture Monitor - The dewcell equipment was returned to service with exception of the recorders. During the month, fifteen elements failed as a result of moisture or specks of dirt. Five of the elements were rewound, and the remaining elements were returned to service after cleaning and drying. A test connector was installed on August 8th to allow replacement of elements without having to pull out the entire lead wire and has presented no problems to date.

105-C Gamma Monitor - Four condenser failures were experienced as a result of excessive heat in the far side gamma monitor room.

2. Electrical

The fire and sanitary pump motor bearing has failed a second time in six months. The motor frame is cast integral with the pump mounting casting. The frame is no longer manufactured and is obsolete. Replacement with a modern unit is recommended.

105-B Building - Electrical forces in connection with mechanical have continued alterations to the continuous hydraulic ram, work area crane index, and overhead charging machine.

105-C Building - Extensive checks were made throughout the month on the vertical safety rod electrical circuits to determine any possible cause for failure of a rod to function as designed; no confirmed trouble was located.

D Elevator - All limit switches were repaired and the communications system completely reworked; elevator operation switches were overhauled.

Horizontal Control Rods - A new limit switch (full in) was installed on No. 8 HCR.

Television - A new closed circuit cable was installed on the operational charge-discharge charging machine television camera.

3. Mechanical

105-B Building - The overhead charging machines are ready for installation on the reactor. Outages and manpower shortages caused by vacations have prevented installation on the target date. Positioning lights on the work area crane have been installed on the work area wall to readily position the cranes. Modifications are nearly complete to facilitate use of the continuous hydraulic machine (Red Ram). Speed has been increased, the ram made more adaptable to varying conditions, and controls have been simplified.

105-C Building - An air conditioning unit was installed in the far side gamma monitor room. The No. 8 horizontal control rod was returned to service during the month. The complete winch unit was removed from No. 22 vertical safety rod to allow a controlled dismantling in an attempt to determine the cause of rod failure in the past. This work is in progress at month end. Prior to removal of the winch, the drive motor and brake had been thoroughly checked. The installation of a rear face catwalk to facilitate thermocouple replacement was started and carried to ninety percent completion during the month.

B. Maintenance Engineering

1. Instrument Engineering

Effluent Water Thermocouple Replacement - C Reactor - The thermocouple terminal boards have been received and the thermocouple terminal cabinets are expected on plant by September 10th. The specifications for the off-plant fabrication of the thermocouple harness assemblies have been completed preparatory to submission for Bids.

DECLASSIFIED

DECLASSIFIED

HW-51218

DEL

Rear Face Thermocouple Inspection - B Reactor - An inspection of ten suspect rear face thermocouples at B Reactor on August 8th indicated that seven of the thermocouples were not bottomed in the well. Flow vibrations probably caused the caps to vibrate loose resulting in the thermocouple wire backing out of the well. Future plans are to select, from a temperature traverse, the apparent low temperature indicating thermocouples and, during the following shutdown, check the thermocouple for "bottoming" in the well.

2. Mechanical Engineering

Gamma Monitor System - B Reactor - A study has been completed and a report is being prepared recommending the installation of new sample lines, heat exchangers, and flow control devices for the B Reactor Gamma Monitoring System. The present system has failed to give satisfactory service since "Trip-After Instability" limits have been used allowing higher reactor effluent temperatures.

Concrete Floor Conditions - 105-B Building - Ninety yards of clay were pumped, by mud jack, under the floors of the fan room and work area of the 105-B Building to fill voids and strengthen the floors.

C. Planning and Scheduling

Productive Maintenance - During August, 2,541 man-hours of work were scheduled. This included 1,958 man-hours scheduled for August, and 583 man-hours carried over from previous months. The total included 93 Class A overhauls, 223 Class B overhauls, 48 Class C overhauls, and 5 lubrications. Of this total, 1,853 man-hours, or 73 percent were completed.

<u>Reason</u>	<u>Percentage</u>
Jobs in progress	5
Waiting for parts	5
Shutdown items	7
Equipment not available	2
Insufficient manpower	8
TOTAL	27%

During this period, equipment condition dictated changing 12 Class A overhauls to Class B, and 4 Class B to Class A; also, one lubrication to Class B.

A. R. Maguire

Manager
B-C REACTOR OPERATION

AR Maguire:PGM:mus

D-DR REACTOR OPERATION
AUGUST, 1958

I. ORGANIZATION AND FUNCTIONS

There were no changes in the assigned responsibilities during August.

II. PERSONNEL

A. <u>Force Summary</u>	July 31, 1958			August 31, 1958			Net Change
	NE	E	Total	NE	E	Total	
General	3	4	7	2	4	6	-1
D Processing	41	16	57	40	16	56	-1
NR Processing	35	16	51	35	16	51	0
D-DR Power	102	14	116	102	14	116	0
D-DR Maintenance	<u>130</u>	<u>22</u>	<u>152</u>	<u>125</u>	<u>22</u>	<u>147</u>	<u>-5</u>
Total	311	72	383	304	72	376	-7

B. Movement of People

Effective August 1, the titles of the below listed Supervisors, Maintenance I were changed to the titles indicated. This change was made to better describe the functions of the individuals.

H. M. Armstrong	Supervisor, Mechanical Maintenance
R. M. Buslach	Supervisor, Mechanical Maintenance
John Fatur	Supervisor, Mechanical Maintenance
F. D. Lloyd	Supervisor, Instrument Maintenance
D. L. Weaver	Supervisor, Instrument Maintenance
A. O. McDaniel	Supervisor, Electrical Maintenance
D. W. Sorrels	Supervisor, Electrical Maintenance
Cal Dupree	Supervisor, Shift Maintenance
R. E. Franks	Supervisor, Shift Maintenance
H. A. Konkle	Supervisor, Shift Maintenance
E. T. Palmer	Supervisor, Shift Maintenance
F. W. Haggard	Supervisor, Development Laboratory Maintenance

There were no changes in exempt personnel assignments during August.

Nonexempt personnel movement during August included 6 transfers in, 11 transfers out, two terminations, one deactivation and one reactivation. One deactivated employee retired.

Within the Administrative Group, R. E. Regimbal, Steno-Typist, was transferred to the IPD Financial Operation, effective August 18, 1958.

III. PERSONNEL ACTIVITIES

J. E. Kaveckis discussed reactor control instrumentation at a meeting of D-DR Reactor Operation exempt personnel on August 20.

G. W. Reinmuth is attending the IPD Communication Training Course which has been planned to coincide with the A Shift schedule.

DECLASSIFIED

HW-57278

DEL

IV. SAFETY AND SECURITY

There were 15 medical treatment injuries reported during August. No security violations were incurred.

V. NON-ROUTINE REPORTS

None were issued.

VI. INVENTIONS AND DISCOVERIES

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

VII. COMPONENT ACTIVITIES

GENERAL

A. Administration Activities

Coordination of the D-DR Operation Upturn Program continued during August. Items of significance were: issuing to all exempt employees information to aid supervisors in planning and conducting August activities, and plans for use of the 100-D Area safety marquee to publicize our past accomplishments of an improvement nature.

A D-DR Reactor Operation personnel summary and forecast for the period September 1, 1956 to December 31, 1959, inclusive, was submitted to the Employee Relations Operation during the month.

Two news items concerning recent Engineering Developments made by D-DR Reactor Operation people were prepared and submitted to the IPD Communications Specialist for possible inclusion in a future issue of the "G. E. REVIEW".

Suggestion Statistics for the month of August were:

Unanswered at Beginning of Month	44
Received for Evaluation	22
Suggestion Replies	30
Unanswered at Month End	36

B. Personnel Development

Two rotational pool technical graduates and one summer junior continued D-DR Reactor Operation assignments throughout the month.

C. Cost Control Activities

In cooperation with the D-DR Reactor Operation Financial Representative a study was initiated during the month to determine possible improvements that can be made in methods of reporting cost information to the Operation.

An analysis was made, during August, of the monthly product cost data for the D and DR Reactors for the past five years. This was done to indicate any seasonal changes that may take place in product costs.

The status of Equipment Projects affecting the D-DR Reactor Operation and to be funded from the FY-1959 Budget was studied and discussed as appropriate during the month.

D. Landlord Activities

A scope report for relocation of a dormitory from 1100 Area to 100-D Area was reviewed and comments submitted to the IPD Project Engineering Operation.

Work on Maintenance Job Authorization No. 11, Graveled Surface Roof Repairs, 100-B, C, D, DR, F and H, and on Project CA-735, Lunch and Locker Room Improvements, 100-B, D and F Areas continued in 100-D Area during the month.

D PROCESSING OPERATION

A. Production

Input production was 107.3 per cent of forecast. Maximum operating levels were limited by tube power limits and bulk outlet water temperature limits. Time operated efficiency was 87.0 per cent which was 105.7 per cent of forecast.

B. Operating Experience

1. Operating Continuity

There were seven outages during the month as a result of a water leak, a rupture and five scrams.

<u>Date</u>	<u>Hours</u>	<u>Reason</u>
8-3-58	0.3	Scram - Error in removing Panellit jumper.
8-5-58	0.1	Scram - Unexplained, suspect Panellit gauge on row 2.
8-14-58	60.8	Rupture 2680-D. Tube contained a poison spline.
8-16-58	1.2	Scram - Rear cap became loose.
8-17-58	0.2	Scram - Error in removing Panellit jumper.
8-22-58	33.7	Water leak in tube 4075-D.
8-30-58	0.2	Scram - Unexplained, suspect VSR clutches or difficulty in safety circuit relays.

DECLASSIFIED

2. Equipment Experience

a. Vertical Safety Rods

Difficulty was encountered in removing VSR No. 13 from the reactor during the month. Therefore, the rod is tied out of service awaiting repairs.

b. Ruptured Fuel Element

One rupture occurred during the month in tube 2680-D, lot KA-103-C, concentration 440. This tube contained a spline inserted 28 feet from the front of the nozzle. The spline was found to be stuck under the metal and as a result could not be removed in the normal manner. The charge and spline were discharged into the basin using forces up to 7,000 pounds. The tube was split and removed.

c. Reactor Operation

Prior to the August 13 outage, (caused by rupture 2680-D), an unusual heat shift had caused a concentration of high power tubes in the immediate vicinity of tube 2680-D. Therefore, twenty-one tubes of metal in this location were considered to be rupture-prone and were discharged below goal concentration.

d. Cooling Water Flow - Reactor Down

During the August 14 outage, adequate cooling water was not maintained on headers 8, 9, 11, 12, 13, 14 and 15 to prevent the temperature from exceeding the 35° C outlet water limit that has been arbitrarily set as the control point. The maximum temperature recorded was 113° C on header 9. A temperature on header 11 reached 102° C. Temperatures on other headers involved reached a maximum of 70° C. As a result of these incidents, 25 tubes on headers 9 and 11 were considered rupture-prone and discharge below goal concentration.

e. Probologging

All tubes on row 6 and below that were discharged during the month were probologged. Of the 20 tubes probologged, three tubes had severe external corrosion, three tubes had medium external corrosion, and the remaining 14 showed no evidence of corrosion. The tubes with severe corrosion have been charged with dummy material awaiting replacement.

C. Improvement Experience

1. Production and Process Tests

a. PITA-IP-1-I - "I & E Loading"

A total of 438 tubes of I & E material was charged during August to bring the total tubes now charged to 822. Enlarged venturies were installed on 62 tubes. (All tubes charged "E" and I & E enriched are being equipped with enlarged venturies.) Enlarged venturies on I & E regular were installed as time allowed during the outage of August 22.

b. PT-196-I - "Investigation into the Causes of Hot Spots"

Blunt-nose tru-line metal from eight tubes scheduled for discharge were recovered and flagged for inspection as requested in the production test.

c. PT-IP-63-K - "Test of Upstream Dummy Charges for Tubes Equipped with Spline Caps"

One tube, equipped with a spline cap and charged with upstream dummies, was borescoped. No evidence was found to indicate that the presence of the upstream dummies was causing tube damage. This supports information obtained during June from another similarly equipped tube.

D. Radiation Monitoring Experience

1. Radiation Occurrences

One lapse of radiation control occurred involving contamination spread from a 1608-D pump repair job.

2. External Exposure Control

Five Radiation Monitors have received exposure at a rate greater than 3 R/year during the first 32 weeks of 1958. The average accumulated exposure per Monitor for the first 32 weeks of 1958 was 1829 mr; the maximum was 2188 mr.

Surveys made on the basket level during reactor operation revealed relatively low radiation levels. The maximum dose rate was 12 mrems/hr including 5 mr/hr. Therefore, if necessary, entry may be made to this location during operation.

3. Contamination Experience

A tube splitter used to split tube 2680-D, which had contained a ruptured slug, gave a dose rate of 50 rads/hr at one inch.

DECLASSIFIED

HW-57278
DECLASSIFIED

3. Contamination Experience (Continued)

Radioactive gnats were found inside hoods of Patrol cars and in the 1701-D Badge House display cabinets. On an accumulation of 3 or 4 cc's of these gnats, a reading of 2,000 c/m was found. A spectrometer analysis revealed the main isotopes in the bodies of the insects were Zn⁶⁵ and Cr⁵¹. The 107 retention basins and the river bank are the probably source of this radioactivity.

E. Events Influencing Costs

A force reduction of one person was accomplished. This is expected to offset, in part, pending wage increases.

DR PROCESSING OPERATION

A. Production

Production was 87.7 per cent of forecast. Time operating efficiency was 67.2 per cent, which was 85.4 per cent of forecast. Failure to meet forecasts was caused by ruptured slugs.

B. Operating Experience

1. Operating Continuity

Operation was interrupted by four unscheduled outages during August.

<u>Date</u>	<u>Hours</u>	<u>Reason</u>
8-1-58	153.1	Continuation of July 31 outage for rupture 2563-DR. Replaced 77 tubes.
8-11-58	43.6	Rupture 2366-DR.
8-16-58	28.4	Rupture 1465-DR.
8-18-58	19.3	Rupture 3566-DR.

2. Equipment Experience

a. Ruptured Fuel Elements

- 2366 - Hot spot variety, charged June 12, 1958, lot KA-121-A, concentration 284, stuck, removed with 11,000 pounds force.
- 1465 - Unclassified type, charged June 12, 1958, lot KA-121-A, concentration 298, stuck and removed using 1500 lbs. force.
- 3566 - Hot spot type, charged May 24, 1958, lot CA-849-A, concentration 421, stuck and removed using 4500 lbs. force.

b. Tube Replacement

Seventy-nine tubes were replaced. Two of this number had been damaged by ruptured slugs; the rest had residual wall thicknesses of 28 mils or less.

c. Building Sewers

A drain line fitting east of the fan room was found with a five-foot hole which had been covered with a piece of sheet metal. The fitting was replaced. Leakage from the No. 3 storage basin drain box was corrected. A void under the railroad track outside the transfer area was filled in.

d. Downcomers

An inspection of the far downcomer was made by Facilities Engineering Operation. Three vent pipes were found loose between the second and fourth baffles and a hole has been worn into the liner. Cracks were found in the welds supporting baffles 1, 7 and 8 (counting from top). Preparations are being made for decontamination and repair of this equipment.

e. Vertical Safety Rod No. 12

This rod was replaced with the new heat-resistant type.

f. Metal Lot KA-121-A

Eighty-two tubes of this lot were discharged below goal following incidents of two slug ruptures in this material at low concentration.

C. Improvement Experience

1. Projects

a. AEC-600 - Army Gas Loop

Construction of this facility was continued during the month.

2. Other

a. Oxygen Analyzer

New lines without couplings were run to reduce leakage of oxygen into the system. The equipment was returned to service.

b. Crossheader Pressure Differential Monitor

Installation of sensing lines between front and rear cross-headers was continued. Fabrication of the annunciator boards was completed and installation was begun.

DECLASSIFIED

DECLASSIFIED

D. Radiation Monitoring Experience

1. Radiation Occurrences

Six lapses of radiation control were charged to the DR Processing Operation during the month. Two of these lapses involved Supplemental Crews responsibility. One additional lapse occurred at the reactor involving an H Reactor Maintenance employee's failure to wear badge and pencils and was charged to the H Reactor Operation.

Two lapses resulted from discharge area activities. A Processing employee received shoe contamination of 35,000 c/m in one and a Supplemental Crews Operator became contaminated to 50,000 c/m on the hand in the other.

Two lapses resulted during transportation of contaminated equipment from one zone to another. In one, a Maintenance man received contamination of 20,000 c/m on the face while moving broaches from rear to front. In the other, the wrist of a Supplemental Crews Operator became contaminated to 300 mrads/hr while he was moving rear face nozzles to the wash pad.

The remaining two lapses originated in the storage area and resulted from improper storage of contaminated equipment. Both instances involved tongs contaminated to 80 mrads/hr and floor areas smearable to 1500 c/m.

2. External Exposure Control

Whole body dose rates in excess of 3 r/hr were received on two occasions; three men were exposed to a maximum rate of 5 r/hr during removal of the "X" hole shielding plug on X-2 level and an additional three men were exposed to rates up to 4 r/hr while disposing of VSR tips.

Dose rates averaged 250 mr/hr for extensive decontamination work on the discharge area rear wall following the spread of rupture debris late last month from tube 2563-DR. Dose rates for decontamination of the charge elevator and pit ranged from 500 mr/hr to 5000 mrads/hr following rupture removal work during this month.

Inspection and decontamination work preliminary to the scheduled repair in the far downcomer was accomplished at a maximum dose rate of 1500 mr/hr and various averages from 100 mr/hr to 800 mrads/hr in the different bays.

E. Events Influencing Costs

Costs are expected to remain high for August because of the large amount of outage time experienced. Some results of this were:

1. Consumption of new dummies and lead-cadmium poison was heavy because there was not sufficient time between outages to decontaminate the required quantities of used material.

[REDACTED]

Events Influencing Costs (Continued)

2. Overtime usage rate was 3.9 per cent.
3. Maintenance charges will be high because of the large amount of maintenance work accomplished.

D-DR POWER OPERATION

A. Operating Experience

The August steam generating load was 66,000 pounds per hour average and 87,000 pounds per hour maximum. The average evaporation rate for the month was 7.0 pounds of steam per pound of coal.

Radiographic tests of the 105-D high tank effluent and influent lines were completed on August 1.

Power surges were noted on August 7, 25 and 26. A slight increase in water pressure was noted on August 25 surge at the 190-D and 190-DR control boards.

B. Equipment Experience

183-D Building

The new acid injection feed system was completed and placed in service on the south side of the Building on August 26.

190-D Building

No. 2 process pump unit was removed from service on August 7 to replace the primary impeller and wear rings.

No. 4 process pump unit removed from service on August 27 to replace the brushes on the exciter and motor field collector rings and to clean and reset the oil relief valves.

190-DR Building

No. 5 and No. 3 process pump units were removed from service on August 7 and 20 to replace the primary impeller and wear rings.

C. Status of Approved Projects

Project CG-782 - 181-D Building

Installation of the noise abatement material is 75 per cent complete.

Project CG-751 - 100-D Area Replacement of Steam Line Poles

Replacement of poles was started on August 18. Project 40 per cent complete.

D. Events Influencing Costs

No unusual variations in cost are anticipated for August.

[REDACTED]

DECLASSIFIED

D-DR MAINTENANCE OPERATION**DECLASSIFIED**A. Equipment Experience1. Instrumentsa. Temperature Monitor System

105-D Building - Additional modification of the system was made by removing the KRF relay which permitted selection of a traverse from Row 1 through Row 46. This relay was considered excess as the same results could be obtained by means of the relay providing a Row 46 through Row 1 traverse on the High Speed Digital Temperature Logger. The removal of the KRF relay made the entire system "scramble proof". ("Scrambling" consisted of getting several of the selector switches in various erroneous positions at one time.)

b. Pile Control Instrumentation

105-D Building - The Sub-Critical Monitor assembly was removed and it was found that the positioning jack-screw was jammed. An improved positioning mechanism is being developed by the Instrument Development Group.

105-DR Building - Three PC chamber failures have been experienced in the E test hole, sub-critical neutron monitor in the past three months. This thimble has therefore been modified and pressurized with Helium to reduce condensate. More time will be required for evaluation; however, good results have been obtained in the past on similar installations.

2. Mechanical

105-D Building - Ninety pounds of steam has been made available at the wash pad and the rear near side 30 foot level landing. The steam is transported through 350 feet of 1-1/2 inch welded steam line from the work area corridor 225 pound steam supply line.

105-DR Building - During the July 30 outage 75 tubes were removed and replaced at a rate of 1.35 hours per tube. Considerable difficulty was experienced with the channel broaching. Twenty-two hours were spent removing a stuck broach from channel 2668, and six hours were spent removing a stuck splitter from channel 2164. Due to poor broach performance, eight new tubes were stuck in the unit and had to be removed from the front. This removal operation consumed ten hours of outage time. It is expected that more durable and efficient broaches will be available for use in the next tube replacement outage.

B. Maintenance Shift Activities

The Maintenance shift crews spent 99 per cent of their time in 100-D Area during August.

C. Maintenance Engineering and Planning and Scheduling

1. Instrument Engineering

DR Thermocouple Replacement

All materials have arrived. Cabinets and wire have been prepared for installation but no opportunity to install the equipment on the rear face has occurred. Bids were out on 50,000 feet of improved thermocouple wire. Although the job was started with excess wire available, the intention is to complete the job with the recently proved wire upon its receipt.

DR Crossheader Pressure Differential Gauges

All materials have arrived. The Barton gauges have been inspected and calibrated and are ready for installation. Trail cables are installed and the tubing work is 80 per cent complete. The annunciator panel fabrication is also complete.

2. Electrical Engineering

D Elevator Test and Control Panel 105-D and DR

Since this type of panel has proven so useful on the C Elevators, we are expediting the design of similar panels for the D Elevators. This will minimize D Elevator outage time and allow virtually all trouble-shooting to be performed in the electrical equipment room.

All circuitry to accomplish this work has been determined and preliminary sketches for the test board have been prepared.

Design Change to Provide Dual Flux Monitor Trip System

Preparation of Design Change 207 is complete. However, because of the unexpectedly early starting date for Project CG-786 work, it has been decided not to install this change. The procedures and drawings prepared for the Design Change will be used in project work accomplishment.

3. Mechanical Engineering

Tugger Cable Inserter

The design of an air operated cable inserter to be mounted on the tugger is complete. Drawings are in the check-print stage. This small device will preclude manual insertion of the cable and thus minimize the mechanic's exposure to a major source of radiation during tube replacement.

DECLASSIFIED

DECLASSIFIEDMetal Handling Conveyor

The design for the mountings of the metal conveyor on the C Elevator is complete. This design will be tried at D Reactor to demonstrate its feasibility. The conveyor will mount against the unit side handrail and can be readily removed or reinstalled as conditions warrant in a matter of minutes.

4. Planning and Scheduling

A schedule of equipment inspection and lubrication in 105-D, 105-DR, 115, and 1700 Buildings has been set up and a man assigned to routinely do this work. These inspections will be tabulated and reported as class C inspections.

A training school for Janitors has been set up and scheduled for September.

D. Events Influencing Costs

A net force reduction of five people was realized during August. This will offset, in part, wage increases effected during the year.

Manager,
D & DR Reactor Operation

JH Brown:WLS:af

F REACTOR OPERATION
AUGUST - 1958

I. ORGANIZATION AND FUNCTIONS

There were no changes in assigned responsibilities.

II. PERSONNEL

A. Force Report

	<u>July 31</u>			<u>August 31</u>			<u>Net Change of Total</u>
	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>E</u>	<u>NE</u>	<u>Total</u>	
General	3	2	5	3	2	5	0
Processing	15	39	54	15	38	53	-1
Power	8	55	63	8	55	63	0
Maintenance	<u>14</u>	<u>73</u>	<u>87</u>	<u>14</u>	<u>72</u>	<u>86</u>	<u>-1</u>
Total	40	169	209	40	167	207	-2

B. Movement of People

J. D. Floyd, Specialist - Reactor Operations, was reclassified to Supervisor - 100 Operations, effective August 1.

D. R. Rokkan, Engineer II, was transferred from Research and Engineering to F Processing Operation as Specialist - Reactor Operations, effective August 1.

W. G. Howell, Specialist - Reactor Operations, resigned effective August 15.

Nonexempt changes during the month included: three transfers in, three transfers out, one leave of absence and one retirement.

III. PERSONNEL ACTIVITIES

M. C. Caton completed the training course on Secretarial Proficiency.

M. W. Dickerson, J. K. Grady and H. N. Litchford were enrolled in the Communications Course for First Line Supervisors.

C. N. Gross, Manager - F Reactor Operation, held two Conference Table Meetings with 14 exempt employees attending. He also served as I.P.D. representative on the Negotiation Committee.

S. L. Nelson, J. A. Webster and M. T. Lewis attended a training class on Labor-Management Relations.

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

IV. SAFETY AND SECURITY

There were 13 medical treatment injuries reported. There were no disabling injuries and no security violations reported.

V. NONROUTINE REPORTS ISSUED

None.

VI. INVENTIONS AND DISCOVERIES

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

VII. COMPONENT ACTIVITIES

GENERAL

A. Administrative Activities

Position Guide for Manager - Power Operations (F and H) was revised and circulated for comments.

A meeting to discuss methods of electrical cost distribution was conducted on August 13. Nine F Reactor Operation personnel attended.

Personnel History and Forecast for F Reactor Operation was submitted on schedule.

B. Landlord Activities

Scoping and project proposal for the relocation of the main badge house and the area perimeter fence to exclude H.L.O. facilities was requested by F Reactor Operation as a result of H.L.O. and A.E.C. considerations.

A survey of building roofs was completed and information regarding Phase II roof repairs was supplied to Project Engineering.

Removal of excess equipment in 185-F Building was completed with minor exceptions.

Requests for site approval of new Biology facilities for H.L.O. were reviewed and detail information regarding utilities and services was supplied.

C. Suggestion Plan Activities

To be evaluated - start of month	9
Received for evaluation	37
Evaluated and returned	22
Unanswered - end of month	24

F PROCESSING OPERATIONA. Production

F Reactor production was 113.0 percent of forecast during August. Time operated efficiency was 82.1 percent. Tube operating limits were reduced approximately 25 kw to maintain 110 C outlet temperatures based on rupture considerations.

B. Operating Experience1. Operating Continuity

<u>Outage Date</u>	<u>Outage Hours</u>	<u>Reason</u>
8/8/58	31.2	Rupture - 1275-F.
8/10/58	2.0	Panellit scram - cause unknown.
8/10/58	10.6	Rupture - 3776-F.
8/25/58	0.2	Panellit scram - PCCF valving error.
8/28/58	<u>89.2</u> 133.2	Rupture - 3672-F. Also charge-discharge, tube replacement, and maintenance.

2. Equipment Experience

Ruptures - Three regular metal ruptures were sustained during the month. All were removed with the charging machine after seating to 4500 pounds. Two of the ruptures were from Lot KA-126-A. Approximately 85 high-factor tubes from this lot were subsequently discharged short of goal as rupture prone.

Tube Replacement - A total of 26 tubes were replaced during the month at the rate of 0.76 hours per tube, including 25 of 71 probologged for external corrosion.

Downcomer Inspection - An inspection of the interior of the 105-F downcomer was completed during the outage of August 28, 1958 after approximately one month of operation with reactor flow in excess of 75,000 gpm. Representatives of Reactor Plant Engineering, Processing and Maintenance made the inspection. The downcomer appeared to be in good condition. No damaged welds or cracks in the liner were visible.

C. Improvement Experience1. Projects

Project CG-666 - "Zone Temperature Monitoring" - The monitor panel was turned over to Processing for beneficial use during the month with a total of 147 RTD's in service.

DECLASSIFIED

HW-57278

DEL

2. Other Improvements

New Rear Pigtales - Twenty-four new type rear pigtales of a sliding seal design were installed on a test basis. The new design reduced installation time by 45 percent during the initial use.

D. Radiation Monitoring Activities

1. Radiation Occurrences

No radiation incidents and two lapses of control were incurred by F Reactor Operation personnel this month. The first involved the failure of a Maintenance employee to wear prescribed personnel meters in a radiation zone. The second case was incurred by an F Maintenance employee while working in 105-C Area and involved hand contamination attributed to lack of care during removal of protective clothing.

2. External Exposure Control

The maximum exposure rate of personnel was 3 r/hour, which was incurred on two occasions. The first involved removal of a piece of stuck process tubing during routine tube removal operations. The second occurred during set-up for "Quickie" discharge of a rupture from process tube 3672. Efforts to discharge by "Quickie" methods were unsuccessful and the rupture was removed later in the outage with a maximum personnel exposure rate of 400 mr/hour. The initial reading of 300 rads/hour on the pigtail had fallen to 600 mrad/hour at this time.

Dose rates to personnel up to 1500 mr/hour were encountered while attempting to clean problem tube channel 1267 approximately three hours following shutdown. Personnel exposure was held minimal by precautions to shield expected sources and to expedite removal of the vacuum filter by mounting it in a burial cart. A ten-fold reduction was noted in the dose rate from the filter box two days following the operation.

3. Contamination Experience

Four cases of personnel contamination were encountered and were successfully reduced. The maximum level encountered was 50 rads/hour over approximately a three-inch long spot on the wrist of a Maintenance foreman. Duration of exposure was estimated at less than 15 minutes. The remaining three cases involved less than 4000 c/m contamination in localized spots.

F POWER OPERATION

A. Operating Activities

1. BPA Power Disturbances

At 2:58 p.m. on August 5, frequency dropped to 59.53 cycles resulting from loss of generation at Chief Joseph Dam. Process water pressure

to the reactor dropped 8 psi momentarily, returning to within two pounds of normal until 3:01 p.m. at which time the frequency was restored to 59.8 cycles and normal process water pressure was restored.

Two power surges occurred at 4:13 and 5:10 p.m. on August 25 as a result of lightning. The 190 emergency turbine pumps accelerated at the 4:13 p.m. surge. No other equipment was effected.

At 12:10 a.m. on August 26, frequency variation resulting from Montana Power removing load reached a high of 60.5 cycles. Process water pressure to the reactor increased 8 psi above normal and then dropped to five psi below normal momentarily. No other equipment was effected.

2. 190 Emergency Turbine Pump Flow Test

Seven emergency steam turbine pump flow test with turbines operating at full governor speed was conducted on August 31. Details are covered under separate report.

B. Equipment Experience

1. 181 Raw Water Pump Impeller Adjustments

Impeller clearance for all of the motor-driven raw water pumps was checked and adjusted to a 1/16-inch clearance by August 5. Adjusting impeller clearance to minimum was required to maintain maximum pumping capacity, thus minimizing eight-pump operation.

2. Filter Backwash Valve

The east side backwash valve for No. 10 filter was replaced with a rebuilt valve on August 29.

3. Terry Turbine Driven Generator

See item listed under Maintenance, Mechanical - 184-F.

4. 4500 HP Motor Slip Ring and Exciter Brush Inspections

Completed inspections to slip ring assembly and exciters for all of the 4500 hp motors on August 29. No brush replacements were necessary.

5. Process Header Strainer Cleaning and Inspection

The twelve 12-inch and two 18-inch header strainers were cleaned and inspected by August 30. Very little foreign material was found. The frequency of cleaning and inspecting strainers will be decreased from six months to twelve months as a result of findings.

DECLASSIFIED

C. Improvement Experience

1. Requests for Special Information and Services by HOO-AEC

W. L. Howell, AEC Field Engineer, accompanied W. P. Nicklason, Project Engineer, to 100-F on August 26 and contacted H. G. Harder and R. McDonald as to the feasibility of relocating steam lines supplying 1717-F and 1707-F Buildings under Project CA-762, "Steam Pole Replacements".

2. Project CG-558 Completion

The rotating assembly for No. 5 Annex pump was removed from casing and sent to White Bluffs Machine Shop on August 29 for modification work.

3. Project MJA-11 - Graveled Surface Roof Repairs

Work was started on August 19 and is approximately 40 percent completed.

D. Events Influencing Costs

Class "A" overhaul to No. 2 boiler will increase Maintenance costs.

Steam consumption is higher than normal for this period because of increased demand to 190 Building to operate emergency steam-driven pumps during reactor outage on August 28 and 29, at which time the 184 emergency generator was not available.

F MAINTENANCE OPERATION

A. Equipment Experience

1. Instrument - 105-F

During the month, a total of 104 additional 10-90 Panellit gages, all with new Bourdons, were installed in the Pressure Monitor System. A total of 972 Panellit gages with the 10-90 trip settings have been installed to date. Ten Panellit gage surge suppressors, provided by Reactor Plant Engineering, were installed during the outage of August 28, 1958.

The oxygen analyzer was put into service during this period. It is operating with consistent results but has a tendency to drift.

Although the cold P.C. chamber was recently replaced, difficulty was again encountered during a cold start-up of the reactor. Engineering efforts are being devoted to this problem.

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

2. Electrical

The instantaneous overload protection circuitry for the 184-F capstan car puller was installed and tested. This installation was made to prevent overload and subsequent breakage of the mechanical gearing. The equipment was used successfully in car moving operations.

3. Mechanical

105-F Building

The installation of slug pans on the near and far rear elevator pad was completed. Remote controls for dumping the pans have been provided in the "D" elevator machinery room.

184-F Building

A class "A" inspection was completed on the Terry turbine of the 750 kw emergency turbo-generator unit, except for oil pump. C. F. Quackenbush, Principal Mechanical Engineer, and E. W. Baker, Standards Engineering Operation, assisted in the inspection of the governor assembly and mechanical parts during the dismantlement. The top casing was also removed, and the two row action wheel was checked for condition, alignment and looseness of the shaft. All mechanical parts appeared to be in good mechanical condition.

After reassembly of the turbine and during the checking of the overspeed trip, the emergency tappet spring on the overspeed trip broke. It was replaced with a new spring. The breakage of this spring is not considered critical as far as turbine protection from overspeeding is concerned.

A load test was applied to the generator in 50 kw increments until 750 kw were applied. Governor action was observed after each load application and performance was satisfactory. Emergency governor trip occurred at 3950 rpm.

The valve body extension on the no oil trip valve, held in place by set screws, showed considerable damage from the set screws. It was reinstalled but will be replaced with a new part which is being expedited.

A Class "A" overhaul on the generator unit was completed during December 1957.

C. Maintenance Engineering

Temperature Monitoring Equipment

"As Built" information was provided for the digital temperature logger

incorporating all existing changes to date. Drafting Operation is providing "As built" prints.

The "null balance" portion of the temperature recording equipment was redesigned and rebuilt. A spare unit was also constructed.

MANAGER
F REACTOR OPERATION

CN Gross:EWW:det

DECLASSIFIED

H REACTOR OPERATIONAUGUST, 1958**DECLASSIFIED**I. ORGANIZATION AND FUNCTION

Effective August 1, the responsibility for coordinating all movements of Irradiation Processing Department radiation monitors and maintenance craftsmen was reassigned from H Reactor Operation to Employee Relations Operation.

II. PERSONNELA. Force Summary

	<u>July 31</u>			<u>August 31</u>			<u>Net Change</u>
	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>of Total</u>
General	4	3	7	4	3	7	0
Processing Oper.	16	38	54	16	38	54	0
Power Oper.	9	57	66	9	57	66	0
Maint. Oper.	16	67	83	15	65	80	-3
Cent. Maint. Oper.	19	100	119	18	100	118	-1
Total	64	265	329	62	263	325	-4

B. Movement of People

G. F. Freed, formerly Supervisor, Metal Fabrication Shop, in the Central Maintenance Operation, was reassigned as Supervisor, Mechanical Maintenance, Maintenance Operation effective August 1.

C. E. Phillips and H. W. Murray, formerly Supervisors Maintenance I, were reassigned as millwright journeymen effective August 1, in accordance with exempt manpower readjustments.

The following nonexempt employees were temporarily promoted as relief supervisors to the positions and for the periods indicated. To facilitate salary payment, these individuals remained on the weekly payroll.

M. S. May, Supervisor, Tool Crew	- 8/18/58 - 8/24/58
A. C. Rediske, Supervisor, Special Maintenance	- 8/18/58 - 8/31/58
D. V. Seslar, Supervisor, Electrical Maintenance	- 8/18/58 - 9/14/58

Nonexempt personnel movement in August included four transfers in, five transfers out, three reductions in force, two additions from the exempt roll, one retirement and one reactivation.

III. PERSONNEL ACTIVITIES

All exempt employees of the Operation received preliminary orientation on the new Company Savings and Security Program.

IV. SAFETY AND SECURITY

There were no disabling injuries, radiation incidents or security violations during the report period. One near-serious incident occurred on August 6, when a Maintenance Operation tractor and flat-bed trailer, lightly loaded, jackknifed. Rope stored on the tractor became entangled in the drive shaft causing the rear tractor wheels to lock. This incident was investigated and a report issued.

Seventeen medical treatment injuries were reported.

V. NONROUTINE REPORTS

A brochure was prepared and distributed to IPD Management by the Central Maintenance Operation. The publication summarized the services which this Operation was prepared to provide on a centralized IPD basis.

Thirteen supplemental pages for the Reactor Tool Manual were issued by the Central Maintenance Operation.

VI. INVENTIONS AND DISCOVERIES

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

VII. COMPONENT ACTIVITIES

General

A. Administrative Activities

Forms and instruction booklets relative to the Engineering Personnel Register were distributed to all qualified personnel within the Operation.

Arrangements were made to hold an information meeting for all Operation exempt people on the evening of September 24, to review progress for 1958.

Candidates were nominated for the fourth presentation of Professional Business Management I.

Papers were processed to change Maintenance Operation first-line Supervisor titles from Supervisor, Maintenance I to appropriate functional title Supervisor, Electrical, Mechanical or Shift Maintenance effective August 1.

A two-month program for three Commonwealth Edison maintenance supervisors was drawn up.

DECLASSIFIED

A productivity index for H Reactor Operation was issued. The index based on the ratio of output to input, shows an increase in productivity during first quarter CY 1958 and a decrease during the second quarter. The decrease was caused by a seventeen day ruptured slug outage.

B. Landlord Activities

Work on Phase II - Project CA-762 "Graveled Surface Roof Repairs" was begun during the month.

Assistance was given, Plant and Industrial Engineering Operation on scope preparation for rewiring Buildings 1760-H and 1761-H.

C. Suggestions

Start of month	38
Received for evaluation	20
Evaluated and returned	28
End of month	30

H Processing Operation

A. Production

Input production exceeded the forecast by 5.6 per cent.

Equilibrium power levels were governed by the bulk outlet water temperature limit.

B. Operating Experience

1. Operating Continuity

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

<u>Day</u>	<u>Hour</u>	<u>Reason</u>
4	0.6	Scrammed by a leaking Panellit gauge.
4	30.7	Shut down for a solid E rupture in tube 1554-H. Discharged metal and located a leak in ball valve tube 1582-H.
7	28.8	Shut down for a solid E rupture in tube 1454-H. Discharged metal and performed miscellaneous maintenance.
12	0.4	Scrammed by ruptured rear pigtail 2978-H.
12	26.5	Scrammed by another low Panellit trip on tube 2978-H. Replaced worn pigtails with new ones.
13	1.6	Shut down for a solid E rupture in tube 0569-H.

<u>Day</u>	<u>Hours</u>	<u>Reason</u>
19	0.4	Scrammed by an oscillating Panellit gauge.
30	0.4	Scrammed by leaking rear pigtail 0376-H.

2. Equipment Experience

Rear pigtails - Leaking rear pigtails became a major problem during the month. One cause of these failures is the rubbing together of poorly formed pigtails installed during tube replacement. Rubbing pigtails are being replaced at every opportunity.

C. Improvement Experience

Improvements were many this month, but none were carried to completion. Items which are essentially complete include: (1) final design for C Elevator modifications, (2) installation of exhaust vents in the downcomer rooms, (3) further testing of droop snoots and flags, and (4) installation of the VSR monorail system.

D. Radiation Control

1. External Exposure

- No dose rates greater than 1 rad/hr were set for personnel.
- One radiation occurrence resulted in two lapse of control.
- The average exposure to IPD radiation monitoring personnel is 1880 mr for 33-week period. This projected for the year is over 2900 mr average for the monitors. The exposure accumulation rate for the past two months indicates that about ten per cent of the monitoring force will exceed 3 r for the year.

2. Contamination Control

- One case of skin contamination occurred during August.
- No contamination was found on unregulated vehicles.
- There were no reported contamination spreads outside of radiation zones.

E. Events Influencing Costs

Unscheduled outages required the use of 119.2 hours of operator overtime and 68.5 hours of monitor overtime.

H Power Operation

A. Operating Experience

Process water pressure was reduced four times during the month.

DECLASSIFIED

DECLASSIFIED

HW-57278

System flow tests of the raw water system between Buildings 181-H and 183-H were conducted on August 26.

On August 7, 19, and 26, voltage and/or frequency variances were experienced from the BPA power source. Pressure changes on the process water system were not sufficient to create operating difficulties. Equipment at other area facilities was not affected.

Standard quality water was produced throughout the month at an average alum feed of 5.6 ppm. Raw water turbidity averaged 3 ppm.

Soundings were made of the river pump station forebay on August 19. The sand deposit has become larger during the past year. However, adequate channel depth is still available on both sides of the bar.

The normal steam generating rate was 29,700 lbs/hr with an average of 30,600 lbs/hr. An evaporation rate of 7.25 pounds of steam per pound of coal was attained.

Analytical Laboratories performed routine control services and special analyses on 183 essential material samples, 56 water samples, 61 process control samples and one special sample.

B. Equipment Experience

General - Governor and overspeed mechanisms for all turbine drives were inspected and reset during August. A new tile field was completed for the septic tank servicing Buildings 105-H and 151-H.

Building 182-H - No. 4 condenser water pump was removed from service on August 3 due to a broken pump shaft. Repairs were completed and the unit was returned to service on August 11.

Building 183-H - A rebuilt tilting disc check valve was installed at No. 3 filtered water pump on August 14. The swinging disc type valve, installed under Project CG-558, was vibrating excessively with resultant high wear. The inboard motor bearing of the high tank pump unit failed on August 9. Since considerable difficulty has been experienced with this motor drive, a replacement unit was installed.

Building 184-H - The pump shaft of No. 1 boiler feed pump was remetalized and the unit was returned to service on August 25.

Building 190-H - The installation of facilities for pumping liquid sodium dichromate was essentially complete at month end. Repairs were completed to the rotating assembly of No. 6 annex pump unit. No. 7 unit was disassembled for similar repairs, but difficulties with the inboard mechanical seal on No. 8 unit necessitated reassembly as a standby unit. No. 7 rotating assembly will be scheduled during September. Repairs and recalibration were completed to the No. 27 undervoltage bus relays. The faulty relay serving the front south 13.8 KV bus had previously caused difficulties in starting annex pump motors.

D. Events Influencing Costs

Items adversely affecting costs included: Inspection of No. 8 annex pump motor, reassembly of No. 7 annex pump prior to repairs by Minor Construction, and the installation of a new septic tank tile field.

H Maintenance Operation

A. Instrument Maintenance

1. Pressure Monitor - Three faulty Panellit gages were detected and replaced. Each was potential cause for an outage.
2. Temperature Monitor - Excessive service for Flexowriter tuning channels appears to have been corrected by installation of standoff sockets for amplifier tubes. Since installation on July 30, no adjustments have been needed.
3. Dewcel - This equipment is now in service, but can be read on the gas wing indicator only, since control room segmental recorders have not been rebuilt.
4. Oxygen Analyzer - This equipment is now in service. Considerable maintenance has been required because the instrument has failed to standardize properly.

B. Electrical Maintenance

1. Building 190-H Power-loss panel - Tests were made to determine the cause of turbine starts during startup of the 4500 hp motors. One undervoltage relay was replaced. It was found that the power-sensing relays acted to open the turbine control relay intermittently. The problem is being studied further.
2. H Reactor Communications - Due to a pigtail leak on the rear face, the C-D elevator communication system was out of service for eight hours. Temporary repairs were made by replacing one speaker, rerouting traveler wires, and replacing a microphone. Several ideas for improving the system on the D elevator have resulted and will be studied further.

C. Mechanical Maintenance

1. Building 190-H Mechanical Shop - All pipe racks and shop supplies for area maintenance were moved from Building 1717-H to Building 190-H preparatory to installation in the new shop enclosure.
2. Helium Tank Car Valves - The manifold valve on a tank car could not be opened by forces applied with a 24-inch Stilson wrench. Further attempts were stopped until the work hazard was evaluated, including inspection by AEC safety representatives. The valve was finally opened by remote manipulation.

D. Engineering Activities

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

1. Manual Writing Activities - During August training data was prepared for the electrician training manual on the subjects of communications, Ball 3X indicating lights, and testing protective relaying. In addition, two training classes were held, and assistance was provided the electricians with a number of problems.
2. Overhead-supported Charging Machine - Preparation of cost estimates and review of purchase requisitions was continued on the overhead charging machines. Details of the C elevator revisions are complete, and drafting is 90 per cent complete. A prototype metal-handling T-cart is being fabricated for trial use.
3. Casualty Tube Auxiliary Vacuum System - The design of an auxiliary tube vacuum system with shielded, disposable filters was completed. Fabrication and installation cost estimates are being prepared.
4. Spare Parts Program - Work continued during August on preparation of the Kardex records for the Spare Parts Program.

Central Maintenance Operation

A. Engineering

1. The tube pulling mandrel has been redesigned, as a result of recent difficulties with the combination broach-mandrel.
2. The gunbarrel cutter which worked successfully on repeated shop tests failed on the first test on the unit. The irradiated metal and tool are being analyzed for clues as to why the tool failed.
3. The twin cask design and modifications were completed.
4. The equipping of the rupture tool van is continuing and is scheduled to be completed by October 1, 1958.

B. Hot Shop

1. Completed reworking the following: 125 splitters; 38 broaches; die checked 180 splitter blades and 25 package broaches.
2. Completed three VSR's for H and one for DR Reactors.
3. Completed impeller work for Building 1706-KE.
4. Supplied tools for an 80 tube outage at DR Reactor and a 40 tube outage at F Reactor.

C. Instrument-Electric Shop

1. Work was somewhat curtailed by movement of the shop from 100-F Area to Building 1717-H.
2. Devices for recording river temperatures were completed.

3. Controllers for B, C, and D Reactors are ready for installation during outages.

D. Machins Shop

1. Completed air powered crimper for 100-K Area.
2. Metalized pump sleeves for 100-K Area, and a feed pump and condenser pump shaft to 100-H Area.
3. Completed two new charging heads for B Reactor.
4. Reconditioned one 20 inch valve for 100-F Area.
5. Completed 30 new type pigtail adapters.
6. Fabricated for tube program; 50 channel broach bullet noses, three gun-barrel pulling mandrels, twelve tube splitter blades; seven rib reamer assemblies, two slug grapplers; eight core drill tube drills.
7. Fabricated flocculator shaft for 100-B Area.

E. Fabrication Shop

1. Fabricated and installed shields in F Reactor pickup chutes.
2. Completed air duct installation Building 146-F.
3. Completed poison spline catcher for KW Reactor.
4. Fabricated special discharge tray for KE Reactor.
5. Fabricated droop snoots for H and B Reactors.

F. Paint Shop

1. Main activities centered in 100-K Area.
2. Started moving into 100-B Area.
3. Seal was applied to far side F Reactor.
4. Five condensate pots were amercoated in 100-D Area.

G. Planning and Scheduling

1. Special re-emphasis was placed on scrutinizing every work order and work request for compliance with the latest Advice.
2. Established system of maintaining shop records on preventative maintenance of all shop equipment.

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

H. Special Maintenance

1. Exploration of thimbles in test holes in several areas were continued on Project CG-707. The conditions found will result in more work to accomplish the required installations than originally anticipated.
2. Work on Project CG-708 has been temporarily curtailed until conditions in several rod channels can be evaluated.
3. The last panels for Project CG-666 were set up in C and H Reactors and were energized for their 30 day trial run.

I. EVENTS INFLUENCING COSTS

1. A meeting of all Maintenance Managers and their specialists on tube removal was conducted to acquaint them with the latest problems, tools and equipment.
2. The practice of sand blasting exterior concrete walls before painting has been started to improve quality and durability.

Manager
H Reactor Operation

RT Jessen:HCS:met

KE-KW REACTOR OPERATION
AUGUST, 1958

DEL

I. ORGANIZATION AND FUNCTIONS

There were no changes of assigned responsibilities during the month.

II. PERSONNELA. Force Summary

	<u>July 31</u>			<u>August 31</u>			<u>Net Change</u>
	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>E</u>	<u>NE</u>	<u>Total</u>	<u>Of Total</u>
General	4	2	6	4	2	6	0
KE Processing Oper.	16	40	56	16	40	56	0
KW Processing Oper.	16	41	57	15	41	56	-1
Power Operation	13	72	85	13	72	85	0
Maintenance Oper.	26	123	149	26	119	145	-4
Supp. Crews Oper.	10	57	67	10	57	67	0
	<u>85</u>	<u>335</u>	<u>420</u>	<u>84</u>	<u>331</u>	<u>415</u>	<u>-5</u>

B. Movement of People

M. E. Tappan, Supervisor, Shift Maintenance, terminated effective August 1, 1958.

R. M. Nelson, Radiation Monitoring Analyst, KW Processing Operation, terminated to accept employment with the AEC in Albuquerque, New Mexico, effective August 20, 1958.

Changes during the month included 1 transfer in, 1 reactivation, 4 transfers out, and 3 terminations.

III. PERSONNEL ACTIVITIES

W. R. Moon attended the American Institute of Electrical Engineers Pacific General Meeting in Sacramento, California and presented a paper entitled, "Performance Testing of Emergency Power Supplies for a Nuclear Reactor".

A display of General Electric Products used in the operation was set up at the main badge house as part of "Operation Upturn". The display was prepared by personnel of the Maintenance Planning and Scheduling, Maintenance Engineering and Plant Administration. R. C. Theil was chairman of the display project.

The Military Liaison Committee and Staff visited K Plant on August 4. The Plant Manager and KW Processing Manager were hosts for the tour.

W. A. Elliot of Traveler's Insurance Company made a third party inspection of the Number 1 boiler in 165-KW.

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

IV. SAFETY AND SECURITY

No disabling injuries were experienced during the month. Twenty medical treatment injuries were incurred for a frequency rate of 3.05.

No security violations were incurred.

V. NON-ROUTINE REPORTS

None.

VI. INVENTIONS AND DISCOVERIES

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

VII. GENERAL ACTIVITIES

A. Administrative Activities

Internal arrangements were made for selection and briefing of escorts for the area inspection by Level 3 Managers in connection with the Monthly IPD Safety and Security Meeting.

A KE-KW Reactor Operation personnel summary and forecast for the period 9-1-56 to 12-31-59, inclusive, was submitted to the Employee Relations Operation.

Suggestion Plan statistics for the month were as follows:

Suggestions at start of month --	62
Received for evaluation -----	19
Replies submitted -----	13
On hand at end of month -----	68

Work was initiated on a Plant Attitude Survey for all assigned personnel to be conducted as a follow-up on the 1957 opinion poll.

In connection with "Operation Upturn", assistance was given to the GE News for arrangements for photographs to illustrate the "Who Is My Customer?" feature.

Internal arrangements were made for three tours of K Plant facilities, which accommodated 12 persons.

B. Personnel Development

Twenty-six K Plant exempt personnel attended an information meeting on August 13. The guest speaker, S. S. Jones of the Reactor Engineering Operation,

DEL

reviewed the bulk outlet limiting factors with emphasis on K Reactor application.

Attendance to IPD Training Courses was as follows:

Radiation Protection:	C. E. Nelson
Communication Training:	A. F. LaMonte
Techniques of Interviewing:	J. W. Baker, R. J. Bursey
Secretarial Proficiency:	Betty L. Nelson

One Technical Graduate and one Summer Placement were assigned at month end.

C. Cost Control Activities

Information was supplied to Project Engineering of FEO on KE-KW Reactor Operation requirements of the following budgets:

- (a) General Plant Projects of the Plant Acquisition and Construction budget.
- (b) "Equipment Not Included In Construction Projects" of the IPD Equipment Projects

With assistance of the IPD Financial Operation, a data sheet showing comparison between FY-1958 budget, actual expenditures and FY-1959 target budget was made on all principal cost categories.

D. Landlord Activities

Arrangements were made to treat selected ground areas with CMU sterilization solution to prevent weed growth.

Arrangements were made for the installation of a General Electric Monogram sign on the marquee bulletin board.

The wire cables on the area flag poles were replaced with rope to eliminate high maintenance costs of cables and winches.

Arrangements were made with Road Maintenance Operation to repaint approximately 300 feet of striped safety walkways.

Three excavation and core drilling permits were issued.

KE PROCESSING OPERATION

A. Production

Input production was 96.0 per cent of the forecast. Power level was limited by top-of-annulus corrosion limits of I & E charges.

B. Operating Experience

1. Operating Continuity

DECLASSIFIED

DECLASSIFIED 57278

DEL

Reactor outages totaled 147.8 hours for the month. Operating continuity was affected by the following events:

<u>Day</u>	<u>Hours</u>	<u>Remarks</u>
4	78.7	Scheduled outage for metal processing.
8	1.2	Temperature Monitor trip after reactor start-up.
23	66.6	Rupture in tube 4259. Following removal, outage time was utilized for metal processing.
26	0.4	Panellit trip associated with a 1706-KE tube.
27	0.9	Two Panellit trips associated with 1706-KE tubes.

2. Equipment Experience

- a. Instruments and Circuitry - A temperature monitor scram due to high temperature on tube 4985 occurred shortly after the August 8 start-up. On August 25, there were 1458 thermobulbs out of service due to wet thermobulb leads. The required number were returned to service before start-up to make the 12 point tube temperature deviation recorder usable in compliance with Process Change Authorization Number 8-81. At month end there were 62 thermobulbs out of service.
- b. Ruptured Slugs - An I & E slug failed in tube 4259 on August 22. The slug failure was a inside-other. The charge had attained an exposure of 729 MWD's.

C. Improvement Experience

1. Production and Process Tests

- a. PT-IP-70-A-MT - Irradiation of Lead Dip Canned I & E Slugs in K Reactor - Three tubes of this PT material were discharged during the month.
- b. PT-IP-39-A - Measurement of Slug Corrosion Rates - One tube was discharged for examination.
- c. PT-IP-178-A - I & E Fuel Element Development and Corrosion Monitoring, KE and KW Reactors - Two charges were added to this PT on August 5.

2. Projects

- a. CG-705 - Rod Coolant Instrumentation Modification - The project was completed, acceptance tests approved and the equipment placed in service during the August 5 outage.
- b. CG-708 - Installation of Additional VSR's KE-KW - Installation work has been discontinued pending the findings of the K Reactor graphite stack damage survey.

DEL

D. Radiation Monitoring Experience1. Radiation Occurrences

Nine Radiation Occurrence reports were processed during the month. Two of these were classified as Lapses of Radiation Control. Two of the Lapses involved radiation work without monitoring or timekeeping assistance. The third was a case of contamination spread during graphite stringer removal.

2. External Exposure Control

Removal of the rupture from tube 4259 was accomplished at a maximum dose rate to personnel of 1 r/hr. Dose rates up to 500 mrad/hr were measured in the discharge area due to irradiated reactor gas during the poison outage. The highest gamma dose rate for discharge area work during the month was 180 mr/hr.

During graphite thermocouple stringer removal, pieces of irradiated thermocouple wire were placed in casks at maximum personnel dose rates of 4.2 r/hr.

Dose rates up to 300 mr/hr were measured from samples brought in and stored in the HLO laboratory of the 183 KE building. Appropriate action was taken and HLO management was requested to review control procedures.

3. Contamination Control

Breaking of the graphite thermocouple stringer during removal together with failure of the closure equipment on the removal container resulted in contamination to the 105-KE experimental levels and on the ground between the building to the burial ground. The affected areas were decontaminated and returned to normal status.

KW PROCESSING OPERATIONA. Production

Input production was 96.5 per cent of forecast. Power level was limited by top-of-annulus corrosion limits for I & E enrichment loadings.

B. Operating Experience1. Operating Continuity

Reactor outages totaled 96.7 hours. Operating continuity was affected by the following events:

<u>Day</u>	<u>Hours</u>	<u>Remarks</u>
4	30.3	Reactor shut down to remove rupture in tube 4077.
8	29.8	Reactor scrambled by spurious Panellit trip. Recovery attempt failed.
9	0.5	Reactor scrambled by Panellit trip following start-up, as a result of distorted heat flux.

DECLASSIFIED

DECLASSIFIED

HW-57278 DEL

cont.

<u>Day</u>	<u>Hours</u>	<u>Remarks</u>
11	0.3	Reactor scrambled by Panellit trip due to oscillating gage 0153.
15	32.7	Reactor scrambled by Panellit trip caused by a rupture in tube 4985.
16	3.1	Poison push outage. A planned poison start-up and discharge was made to improve reactor start-up and increase non-equilibrium production.

2. Equipment Experience

a. Ruptures - Two ruptures were experienced. Both ruptures were "C" size I & E natural pieces and were the first ones experienced at KW Reactor. The rupture which occurred on August 4 was stuck and both tube and metal were removed. The rupture which occurred August 15 was pushed with normal charging machine pressures using "Quickie" discharge equipment.

b. Instruments and Circuitry - Four Panellit trips were experienced, one of which was spurious. A differentiator system was installed to record and identify which of the four Panellit boards shows the initial trip indication.

The number of inoperative thermobulb circuits experienced during the three minimum outages varied from 123 to 330. No outage time to repair inoperable thermobulbs was required.

The gamma monitor system accurately detected the slug rupture in tube 4077 on August 4. However, it failed to give a significant indication prior to the Panellit trip from the rupture in tube 4985 on August 15.

c. Horizontal Control Rods - Borescope examinations of HCR channel Number 16 revealed two and one-half to three inch cracks in the graphite surrounding the channel at a distance 41 feet from the near side. The rod was returned to service during the August 8 outage. A detailed program of graphite damage examination was prepared by Research and Engineering Operation and will be undertaken during the next outage.

d. Vertical Safety Rods - Channels Number 33 and 42 were borescoped during the August 4 outage and their condition was found to be similar to that previously noted in VSR 51 channel. The channels were normal down to 30½ feet from the top of the bumper block. At 31 feet gaps between the tube blocks and filler blocks were wide enough to allow 3X balls to enter them. From 36 feet down twenty rows, a shift of blocks into the VSR channels from one-half to three-quarters inches caused ledges on which 3X balls could lodge. All three channels were cleared of loose 3X balls that were laying on the graphite ledges.

e. Bottom Thermal Shield - Orifices were removed from the upstream and downstream ends of the check valve in the service water supply to

the bottom thermal shield. As a result the shield outlet water temperature dropped significantly during the succeeding operating period.

C. Improvement Experience

1. Production and Process Tests

- a. PT-IP-64-CE, "Supplement B, Slug Column Displacement During Reactor Operation" - The displacement equipment installed on tube 3851 on July 5, was utilized during the month. The equipment functioned as designed and helped maintain proper heat control.
- b. PT-IP-128-CE, Supplement A, "Poison Spline Flexible Control System Tests at 105-K" - Revisions to the poison spline cap were made to prevent spline binding. Supplement test approvals are being obtained.

2. Projects

- a. CG-708 - Installation of Additional Vertical Safety Rods - Installation of the near side accelerated VSR's was halted until the extent of VSR channel damage can be determined.

3. Other

- a. Improved Start-up Production - Based on recommendations of the KW Reactor Physicist, G. R. Parkos, a poison start-up instead of a normal start-up was used following the August 11 outage. Use of poison resulted in improved reactor control, increased production (435 MWD's above the average of the three previous start-ups), and reduced start-up gas usage.

D. Radiation Experience

1. Radiation Occurrences

Six radiation occurrence reports were processed, four of which were classified as Lapses of Radiation Control. Three of these involved skin contamination and the other concerned radioactive reactor gas exposure.

2. External Exposure Control

Metal processing operations were completed at dose rates of 25 to 100 mr/hr. Rupture removal was accomplished at a maximum personnel dose rate of 1.5 r/hr. The maximum dose rate measured on the pigtail of a rupture suspect tube was 150 rads/hr.

Irradiated 3X balls were removed from horizontal rod channel Number 16 at personnel dose rates of 50 to 300 mr/hr. Borescoping of the channel was accomplished at dose rates of 100 to 1,000 mr/hr. The maximum personnel dose rate for reinstalling the rod was 500 mr/hr.

DECLASSIFIED

DECLASSIFIED

KE-KW POWER OPERATIONA. Operating Experience1. Electrical Peak Control Efforts

Generation for peak control was required for 84 hours during periods of peak operation to limit the Bonneville Power Authority interruptible demand at approximately 23.5 megawatts. The required control efforts reached a maximum of 6.0 megawatts on August 21.

2. Number 4 High Lift Electrolyte Cooling Interruption - 190-KE

An interruption of electrolyte cooling occurred on the Number 4 high lift rheostat on August 29, when the circulating pump stopped due to failure of the motor holding coil. As a temporary expedient, the coil was blocked closed to permit re-starting the motor. The faulty holding coil was replaced on August 30.

B. Equipment Experience1. Number 2 Service Water Pump - 190-KE

The Number 2 service water pump unit was satisfactorily tested and made available for service on August 13 following motor failure in July that necessitated shipment of the motor to a Portland service shop for re-winding.

2. Third Party Inspection - Number 1 Boiler

A third party inspection of the Number 1 boiler in 165-KW was conducted by a representative of the Traveler's Insurance Company on August 21.

C. Improvement Experience1. Projects

- a. CG-715 - Automatic Synchronizers - Performance testing of the synchronizing equipment was completed at 165-KW on August 4. The installation of similar equipment at 165-KE was also completed, and 80 per cent of the acceptance test run by month-end. Test results to date indicate minor modifications will be necessary prior to actual usage of this equipment for routine operations.
- b. CG-743 - Ventilation Improvements - The correction of the power house stack drainage problem and repainting of the stacks was completed. The reversing switches on the ceiling exhaust ventilators to permit their usage as supply units during winter operation were installed.

KE-KW MAINTENANCE OPERATIONA. Equipment Experience1. Instruments

- a. Panellits - Twenty new gages were installed in 105-KW. Range

changes and checks were made to 4668 gages, 72 per cent of these being completed during outages.

- b. Temperature Monitor System - Twenty-six temperature resistance elements were replaced in 105-KE and two in 105-KW. Six new connectors were installed in 105-KE and four were repaired. Twenty-two connectors were repaired in 105-KW. Four new leads were pulled down in 105-KE.
- c. Graphite Stringers - Stringers Number 3 and 8 were removed and replaced in 105-KE. The stringer installed in Number 8 channel was fabricated with dual couples in five of the thirteen positions. All thirteen positions have iron constantan primary couples. The secondary couples in the five positions were of geminol material installed for test purposes.

3. Electrical

- a. Service Water Pump - 190-KE - The motor of Number 2 pump was re-installed after its return from off-site for stator rewinding.
- b. Safety Circuit - A Brush event recorder was installed in the 105-KW Control room to determine whether the panellit system or the Number 1 safety circuit trips first in case of a scram.

4. Mechanical

- a. Cross-tie Valve Control Air Receivers - 105-KE-KW - New code receivers were installed in the tunnels in accordance with Standards Engineering Operation recommendations.
- b. Viewing Pit - 105-KW - An underwater tube cutter was fabricated and installed.
- c. Fuel Oil Unloading Stations - 166-KE-KW - Modifications to the piping and hoses have been completed to allow more efficient hook-up to the cars. A reduction of draining time from an average of eight hours per car to an average of two hours resulted.

B. Engineering and Planning and Scheduling

1. Instrument Engineering

- a. Temperature Monitor System - An additional 17,000 feet of lead wire was received by the Lewis Engineering Company from Rockbestos Products Corporation for harness assembly fabrication. The lead wire vendor was unable to make a production forecast.

Wire samples fabricated from Dow Corning "Silastic" 916 by the Electric Autolite Company met qualification tests at HAPO. The Company was authorized to proceed with production on their estimate to complete 50,000 feet of lead wire by September 19 and 50,000 each week thereafter. Twenty-six harnesses assemblies have been

DECLASSIFIED

DECLASSIFIED 278 DEL

completed and seventeen additional harnesses were in the process of assembly at month end. The vendor supplying gas seals was granted a \$0.45 unit price increase. Production on the second half of the order was begun.

2. Electrical Engineering

- a. High Lift Pump Liquid Rheostat Cells - Examination of the 13 cells returned to the vendor for weld improvement has prompted a request for return of the remainder of the cells for repair. A DC over-potential test was proposed for the cells already in service.

3. Mechanical Engineering

- a. Graphite Stringers - 105-KE-KW - A cup-type broach was designed for clearing the channels by cutting on the upper part of the channel only.
- b. Retention Basins - 105-KW - Recommendations were made that the 107 Basins not be flushed during the extended outages, since no significant reduction of corrosion would result.

4. Planning and Scheduling

Class "A" overhauls were completed on 84 items of equipment and class "B" overhauls on 95 items.

C. Events Influencing Costs

1. Overtime Usage

Hours worked in KE-KW Reactor Operation by K Plant personnel	634
Hours worked in KE-KW Reactor Operation by other personnel	42
KE-KW Reactor Operation Maintenance requirements	<u>676</u>
Hours worked in 1706 Buildings by K Personnel	79

SUPPLEMENTAL CREWS OPERATION

A. Events Influencing Costs

1. Supplemental Crews' Time Distribution

The non-exempt time distribution was as follows:

<u>Area</u>	<u>Percent</u>	<u>Area</u>	<u>Percent</u>
100-B	15	100-F	11
100-C	13	100-H	3
100-D	10	100-KE	15
100-DR	28	100-KW	5

DEL

2. Overtime Usage

Non-exempt overtime worked by Supplemental Crews personnel totaled 374 hours. All overtime was chargeable to the particular area involved.

R. S. Bell
Manager
KE-KW Reactor Operation

RS Bell:GEG:ljg

DECLASSIFIED

PRODUCTION OPERATIONAUGUST, 1958**DECLASSIFIED**I. ORGANIZATION AND FUNCTIONS

No change.

II. PERSONNELA. Force Report

	As of 7/31			As of 8/31			Net
	Ex.	N.E.	Total	Ex.	N.E.	Total	Change
General	2	1	3	2	0	2	-1
Prod'n Reports & Statistics	1	2	3	1	2	3	0
Prod'n Forecast'g & Sched'g	5	3	8	5	3	8	0
Prod'n Computing	3	3	6	3	3	6	0
Essential Materials	1	1	2	1	1	2	0
	<u>12</u>	<u>10</u>	<u>22</u>	<u>12</u>	<u>9</u>	<u>21</u>	<u>-1</u>

Frances R. Sargent, Secretary to the Manager - Production, retired on August 29. Arrangements were made for her replacement in September.

III. PERSONNEL ACTIVITIES

E. Bailey visited the Columbus, Montana plant of Mouat Industries August 30.

Group tours by Production Computing Operation were made of the KER facilities and the Animal Farm.

IV. SAFETY AND SECURITY

All personnel except one attended safety and security meetings on schedule. There were no injuries or security violations reported.

V. NON-ROUTINE REPORTS

None issued.

VI. INVENTIONS AND DISCOVERIES

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

VII. FUNCTIONAL ACTIVITIESA. Production Forecasting, Scheduling and Analysis1. Production Forecasting

Work continued on a document covering the methods used in forecasting and scheduling reactor production.

Enriched metal requirements were reviewed to determine quantities and types of slugs needed for the presently conceived programs.

Work began on collecting information for assumptions to be used in the next eighteen-month forecast.

2. Production Scheduling

a. Discharge Concentrations

Discharge concentrations for regular uranium were not changed during August except for a temporary arbitrary reduction for I and E slugs at KW Reactor. In this case a cut to 650 MWD/ton was initiated following two ruptures which occurred essentially at goal exposure.

The continued high rupture incidence in solid E slugs at H Reactor prompted a general tightening of the goal exposure plan for this material. Certain near side tubes were put on a goal 40 percent below normal based on recent rupture experience. While these goal changes were initiated at mid-month, they were not effected until after month-end because the reactor was able to continue operating during this period. Similar tightening of discharge concentrations for solid enriched material within the framework of the present goal plan is anticipated in September for the other old type reactors. This is possible because production of the "O" size I and E enriched slug has eliminated all shortages of the solid E slug.

With the exceptions noted below, essentially all material discharged was at established goals:

<u>Reactor</u>	<u>Regular or Enriched</u>	<u>Tons Discharged</u>	<u>Tons Excess Usage</u>	<u>Reason</u>
C	E	4.2	3.1	Rupture-prone lot KE 118E
D	R	2.0	0.3	Apparent over-powering of tubes in a small section of the reactor
DR	R	7.9	2.7	Process tube replacement
DR	R	11.5	3.8	Rupture-prone lot KA 121A
H	E	0.5	0.3	Rupture-prone lot KE 043A
KW	R	32.4	4.1	Temporary goal reduction to control ruptures slugs.
Total regular U		53.8	10.9	
Total enriched U		4.7	3.4	

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

DECLASSIFIED

DECLASSIFIED

<u>Month</u>	<u>Regular U</u>		<u>Enriched U</u>	
	<u>Solid</u>	<u>I & E</u>	<u>Solid</u>	<u>I & E</u>
June	509	744	718	633 (less than 1 ton)
July	543	749	655	872
August	517	807	704	812

b. I and E Slugs

Conversion of old type reactors to the use of I and E slugs is proceeding ahead of schedule. D Reactor is nearly converted and both B and H Reactors have started full scale charging. In addition, monitor charges have been placed in DR and F Reactors where the start of full scale charging is planned for September. Charging of enriched I and E slugs was started at D Reactor. This material is available in sufficient quantities for use at all old type reactors during September.

c. Process Tube Replacement

Process tube replacements during August were:

DR Reactor	79
F	26
KW	<u>1</u>
Total	106

d. Off-Plant Shipments

Ten casks of irradiated bismuth were shipped to Mound Laboratory; one cask of irradiated cobalt was shipped to ORNL.

3. Operations Analysis

Work continued on the study and review of general overall production items such as:

- (1) Helium gas consumption and availability with particular emphasis on possible production effects should the gas be in short supply as presently indicated,
- (2) Review of NPR designs with comments being forwarded to the H Reactor Processing Manager,
- (3) Review of probolog data on reactor process tubes to locate and determine areas of external corrosion,
- (4) Continued preparation of detailed calculation methods used in arriving at production test losses due to special irradiations.

B. Production Computing

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

Individual tube source data were supplied to the SS Accountability Operation for calculating weights of SS materials in discharges and month's end in-reactor inventories.

The Operational Physics Operation was provided with relative tube power factors and production data for use in estimating the cost of the Pu-240 program at C Reactor.

C. Production Reports & Statistics

1. Daily Reporting

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

2. Monthly Reporting

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

The July Production Summary was prepared for management.

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

3. Other Activities

Significant time was spent preparing the quarterly report on Production losses due to special irradiations for the AEC-HOO. This report covers the second quarter of CY 1958.

Attended two meetings held by W. F. Engesser, Plant and Industrial Engineering Operation, to discuss the use of charts in planning reactor outages and accounting for reactor outage time.

4. Production Statistics

Production statistics work performed during August included the following:

DECLASSIFIED

HW-57278

- (1) A chart book showing reactor outage time, ruptures and scrams was maintained for department management.
- (2) The Product Cost & Budgets Operation was furnished production data, operating efficiencies, outage hours and tube replacement information.
- (3) The Radiation Protection and Analytical Laboratories Operations, HLO, were given weekly reports showing process water flows and related reactor data.
- (4) The Plant & Industrial Engineering, Component testing and Supplemental Crews Operations were supplied information each morning showing which reactors were operating.
- (5) The Processing Engineering Operation, Fuels Preparation Department, was given power level, water flow and tube replacement data.
- (6) The number of Panellit trips, their cause and the resulting reactor outage hours during the last year was tabulated for the F Maintenance Operation.
- (7) The number of 3X system ball drops which have occurred to date and associated data were developed for the Process Technology Operation.
- (8) Certain operating data from start-up to-date were given to Process Design Operation for C, KE and KW Reactors.
- (9) Production data for each reactor were summarized by fiscal year for the last five years and given Process and Reactor Development Operation.
- (10) The number of I & E-E ruptures which have occurred to date at C, KE and KW Reactors and the assigned outage hours were tabulated for C Processing Operations.
- (11) Rupture data by reactor for the last year were given to Project Engineering Operation.

D. Essential Materials

Rail and truck shipments received in August were as follows:

Carload shipments for IP Dept.	241
Carload shipments for other Depts.	87
Truck shipments for IP Dept.	<u>95</u>
Total shipments received	423

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

- (1) Bids on a proposed new contract for IPD's requirements of liquid carbon dioxide were received and evaluated. A letter was prepared to R. R. Watts, Purchasing Agent, recommending the acceptance of alternate bid #2, quoting delivery by weighed tank truck from the seller's plant at Finley, Washington. This method of delivery, while somewhat higher in cost than rail tank cars, nevertheless was considered most suitable by all the reactor managers, particularly as all unloading at the several storage tanks would be accomplished by the seller.
- (2) At the request of Radiological Engineering and 100-F Power, arrangements were made to obtain sulphuric acid from a refinery source at Anacortes, Washington for use at the 100-F Area. This will allow the use of refinery acid for several months at 100-F as a comparison with the smelter acid being used at the other locations.
- (3) Continued to investigate the expansion and startup activities of a new sodium dichromate plant in Columbus, Montana.

E. Miscellaneous Activities

A number of security classification matters were handled for the department. Actions and questions of the AEC's Division of Classification regarding NPR-related topics in the proposed Hanford Classification Guide (HW-55000) were referred to the Facilities Engineering Operation. Classification problems introduced by recent AEC security code discontinuances were discussed with the Technical Information Operation of HLO, with agreement on the need for certain replacement codes.

Special attention was given to the development of formal job knowledge tests for inclusion in the procedure for selecting Utility Operators to be upgraded to the Pile Operator classification.

Action was taken to implement the policy decision that emergency Power Operation crews will not be requested to remain in the 184 Bldgs. (steam plants) in the event of a plant evacuation. These steam generation facilities will be left on automatic control, just as has been the procedure for 165 Bldgs. at K Plant.

Training procedures employed in IPD for reactor processing, maintenance, and radiation monitoring personnel were reviewed in preparation for discussions with Stanford Research Institute people who had been expected to visit Hanford in late August.

Production Operation participation in the "Operation Upturn" program continued, with emphasis on technical competence and its importance to effective job performance.

C. A. Priode
Manager
PRODUCTION OPERATION

REACTOR OPERATIONS - STATISTICS - PROCESSING

August 19 58

HW-57278

DEL

DECLASSIFIED

	B	C	D	ER	F	H	KE	KW	TOTAL
Input Prod. - Pu (\$ of Forecast)	105.0	81.0	107.3	87.7	113.0	105.6	96.0	96.5	97.9
Time Oper. Eff. (% Overall)	79.4	71.1	87.0	67.2	82.1	88.0	80.1	87.0	80.2
No. of Reactor Outages & Hrs.	No.	Hrs.	No.	Hrs.	No.	Hrs.	No.	Hrs.	No.
Scheduled	0	132.7	0	52.5	0	82.6	1	115.0	1
Unscheduled - Scrams	3	1.0	5	4.8	2	2.2	4	2.5	3
Other	3	81.6	6	77.8	3	48.4	1	30.3	3
TOTAL	6	153.1	11	215.3	5	133.2	6	147.8	53
Break'd'n of Reactor Otge Hrs.	No.	Hrs.	No.	Hrs.	No.	Hrs.	No.	Hrs.	No.
Planned									
Charge-Discharge	39.1	31.9	31.6	41.0	26.8	20.6	96.3	38.1	325.4
Tube Replacement	3.5	0	1.8	119.0	37.4	0	0	0	161.7
Project Work	0	0	0	0	3.0	0	0	0	3.0
Production Test	2.0	37.6	5.0	0	0	0	14.3	0	58.9
Maintenance	25.9	56.3	14.1	0	11.5	23.2	4.4	32.9	168.3
Miscellaneous	0	(2) 6.9	0	0	3.9	0	0	0	10.8
Sub-Total	70.5	132.7	52.5	160.0	82.6	43.8	115.0	71.0	728.1
Unplanned									
Charge-Discharge	0	0	(3) 3.4	(3) 8.2	(3) 3.3	0	0	0	14.9
Production Test	0	(1) 20.5	0.8	0	0	0	1.3	0	22.6
Rupture Removal	29.2	52.0	29.8	(4) 1.4	(5) 39.2	29.0	6.8	18.4	275.8
Water Leak	49.9	0	8.0	0	3.0	3.5	0	0	64.4
Maintenance	2.5	5.3	1.2	4.8	2.3	(6) 12.1	72.5	0	50.7
Instrumentation	0	0	0.2	0	0.6	0	1.2	0	2.0
Panel lit	1.0	4.8	0.6	0	2.2	1.0	0	7.3	16.9
Miscellaneous	0	0	0	0	0	0	1.0	0	1.0
Sub-Total	82.6	82.6	44.0	84.4	50.6	45.6	32.8	25.7	448.3
TOTAL	153.1	215.3	96.5	244.4	133.2	89.4	147.8	96.7	1176.4
No. Slug Rupt. (all types)	3	6	1	3	3	3	1	2	22
No. New tubes installed	0	0	0	79	26	0	0	1	106
Type of Water Leak- Tube	3	0	1	1	0	1	0	0	6
Van Stone	1	0	0	0	0	0	0	0	1

Remarks:

- (1) Rupture removal (Production Test IP-132-AC)
- (2) Operational Charge - Discharge
- (3) Discharge of rupture prone material
- (4) Includes 5.8 hrs. charged to a July rupture.
- (5) Includes 7.5 charged to previous rupture.
- (6) Repair ruptured pigtail
- (7) Repair faulty thermobulbs

(Rev. 8-15-58)

[illegible]

DECLASSIFIED

DECLASSIFIED

HW-57278

Month	AUGUST 1958										REACTOR OPERATIONS, STATISTICS - POWER				Sheet 1	
WATER FLOW DATA																
RIVER WATER (181)																
To Reservoir (182)	GPM Avg.	14609														25361
To Filter Plant (183)	GPM Avg.	67200														605163
To Filter Plant (C&R)	GPM Avg.	81400														134167
To R. & E. (KER)	GPM Avg.															242
Total	GPM Avg.	153209														764933
Total	M Gal.	7285.6														34146.4
RESERVOIR WATER (182)																
To Power House (184)	GPM Avg.	32														185
To Cond. System (190)	GPM Avg.	3000														10699
To Cond. System (190) & 183	GPM Avg.															2900
To Export System	GPM Avg.	11577														11577
Total	M Gal.	652.1														1132.1
FILTER WATER (183)																
To Power House (184)	GPM Avg.	140														476
To Process (190)	GPM Avg.	64077														709890
To 105	GPM Avg.	1822														10688
To 105DR	GPM Avg.															2559
To Filter Plant (183)DR	GPM Avg.															5127
To F. & S. System	GPM Avg.	125														891
To R. & E. (KER)	GPM Avg.															0
Backwash	GPM Avg.	1936														14826
Total	M Gal.	2999.8														33003.5
PROCESS WATER (190)																
To Reactor	GPM Avg.	63677														702236
To Reactor	GPM Ner.	73300														811800
Power House (K Area)	GPM Avg.															53
105 (KE-KW)	GPM Avg.															4111
To R & E (KER)	GPM Avg.															190
Building Usage	GPM Avg.															3300
Total	M Gal.	2860.3														31689.5
RIVER DATA																
Elevation (MSL, FT.)	(Max)	392.1														386.4
	(Min)	389.1														382.8
	(Avg)	390.0														384.1
Temperature	Avg. °F	69.3														67.2

SHEET 2

REACTOR OPERATIONS STATISTICS - POWER

AUGUST 1958

WATER TREATMENT DATA		100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW	TOTAL
AT BLDG. 182 BLDG. 183	MM GALS	---		201.6		154.3	---			355.9
	MM GALS	2999.8	3633.6	3780.5	2355.5	3096.8	3187.3	6745.1	7204.9	33003.5
CHEMICAL CONSUMPTION										
CHLORINE (BLDG. 182) (BLDG. 183)	LBS					1750	---			1750
	LBS	25212	38131	37112	19820	27048	27435	65300	68300	308358
	AVG PPM	1.01	1.26	1.18	1.01	1.04	1.03	1.20	1.10	1.12
LIME	LBS									
	AVG PPM									
ALUM	LBS	152650	102451	198330	118420	159768	148120	274000	346300	1500039
	AVG PPM	6.1	3.4	6.3	6.0	6.2	5.6	4.9	5.8	5.5
SEPARAN	LBS	---	---	---	---	---	---	---	---	---
	AVG PPM									
SULPHURIC ACID (AS 100%)	LBS	158889	238332	270513	126315	248810	219518	516900	576200	2355477
	AVG PPM	6.4	7.9	8.6	6.4	9.6	8.3	9.2	9.6	8.6
BENZONITRATE	LBS	42230	49155	48800	38780	44340	43865	100780	105200	473150
BURGE MATERIAL CONSUMPTION										
COALS	LBS	---	500	---	---	---	50	---	---	550

DECLASSIFIED

REACTOR OPERATIONS STATISTICS - POWER

SHEET 3

AUGUST 1958

AUGUST 1958									
ANALYTICAL DATA									
RAW WATER									
PH	8.20	8.10	8.76	8.50	8.41	8.50	8.26	8.19	
TURBIDITY	4.0	5.0	2.0	2.0	4.7	3.0	4.0	4.0	
FINISHED WATER									
PH	7.10	7.10	7.07	7.06	7.00	7.05	7.03	7.03	
TURBIDITY	.008	.008	.003	.003	.006	.004	.007	.007	
Cl ₂ RESIDUAL	.05	.05	.16	.15	.05	.06	.07	.10	
DICHROMATE	1.78	1.76	1.80	1.80	1.79	1.80	1.80	1.80	
STEAM DATA									
GENERATED (MAX)	158000	87000	89000	50000	384000	76000	6200	138000	
(NOR)	69000	64000	35000	29710	197710				
(AVG)	72400	66034	32657	30653	201744	41699	33492	75161	
TOTAL	53906	49130	24297	22806	150139	31002	24918	55920	
TO PLANT	45712	41662	21381	19340	128095	27902	22426	50328	
COAL RECEIVED	2619	2939	916	518	6692				
CONSUMED	3286	3500	1617	1574	9277				
IN STORAGE	35925	45246	32173	30594	143938				
GEN. STEAM / LB. OF COAL	8.18	7.02	7.51	7.24	7.52				
OIL RECEIVED						516391	374826	891217	
CONSUMED						273379	231312	504691	
IN STORAGE						1046010	843948	1889958	
						113.4	107.7	110.9	

ELECTRICAL DATA

TOTAL GENERATED KW HRS.

1635200	1646400	3281600
---------	---------	---------

DECLASSIFIED

HW-57278

DEL

REACTOR OPERATIONS STATISTICS - RADIATION MONITORING

August 19 58

	B	C	D	DR	F	H	KE	KW	IPD Total
Special Work Permits Issued	54	48	12	19	28	12	13	9	195
Routine and Special Surveys	486	640	419	640	414	335	324	162	3420
Air Samples Taken	58	95	35	100	38	19	72	47	464
Hand Contamination Cases	0	2	1	2	1	1	1	0	8
Skin Contamination Cases	0	3	1	8	3	1	1	4	21
Contaminated Injuries	0	0	0	0	0	0	0	0	0
Vehicles Contaminated	0	0	2	0	1	1	0	0	4
No. of Cases of Personal Clothing Contamination	1	3	0	11	1	2	1	0	19
No. of Cases Contamination Spread Outside of Radiation Zones	3	6	4	8	1	0	1	1	24
No. of Employees for whom Dose Rates ≥ 6 Rads/hr. Were Established	0	2	0	2	2	0	2	0	8
Lapses of Control (Reactor Operation)	2	2	1	6	2	2	2	4	21
No. of Hours Training Others	4	11	3	10	0	0	0	0	28
Attendance at Mtgs for Training Others	13	29	30	40	0	0	0	0	112
REACTOR EFFLUENT DATA									
No. of Effluent Calculations	31	114	93	104	72	24	78	76	
Ave. Beta Dose Rate (mrads/hr.)	8.8	7.5	8.4	7.6	10.4	12.8	14.7	11.5	
Ave. Gamma Dose Rate (mrads/hr.)	15.0	13.3	15.6	16.9	23.3	26.2	27.3	24.9	
Ave. Total Dose Rate (mrads/hr.)	23.8	20.8	24.0	24.5	33.7	38.6	42.0	36.4	
Ave. Integrated Dose in 24 hrs.	593	499	576	588	808	927	1008	873	
Max. Integrated Dose in 24 Hrs in 1958	854	1930	1242	1394	2061	1237	1576	3305	

FACILITIES ENGINEERING OPERATION
MONTHLY RECORD REPORT

AUGUST, 1958

I. ORGANIZATION AND PERSONNEL

A. Responsibility

There were no changes of assigned responsibilities during the month.

B. Personnel Statistics

	<u>July 31,</u> <u>1958</u>	<u>August 31,</u> <u>1958</u>	<u>Net</u> <u>Change</u>
Employees on Permanent Payroll	193	193	0
Summer Professors	3	2	-1
Technical Graduates (Rotational)	10	11	+1
Technical Trainees	0	2	+2

	<u>FEO</u>	<u>Technical Graduates</u> <u>Rotational</u>
Transferred into Operation	2	1
Transferred out of Operation	1	0
Payroll Removals	1	0

C. Personnel Changes

E. F. Stell, Project Engineer, transferred to Chemical Processing Department on August 18, 1958.

C. A. Pursel, Senior Engineer, transferred from Atomic Power Equipment Department to Process Design Operation on August 1, 1958.

G. A. Daw, Secretary, was placed on the roll on August 11, 1958.

S. J. Dibbern, Secretary, terminated August 15, 1958.

L. M. Schmelzer, Secretary, on leave of absence, terminated by letter on August 23, 1958.

E. D. Ayres, Professor - Summer Program, terminated August 29, 1958.

D. Personnel Development

<u>Title of Course</u>	<u>Personnel Attending</u>
Suggestion Plan	1
Secretarial Proficiency	2
Understanding Human Behavior	1
Principles and Methods of Supervision	6

E. Safety and Security Experience

Six medical treatment injuries were reported.

One disabling injury occurred during the month and is described on Page 11.

No security violations were reported.

II. MONTHLY REPORT OF INVENTIONS OR DISCOVERIES

All persons in the Facilities Engineering Operation 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.

DECLASSIFIED

DECLASSIFIED 278

DEL

III. ACHIEVEMENT

A. Process Design

1. Research and Development

a. Category I - Existing Reactor Support

To assist R&EO in preparing the long term power level increase program for existing reactors, a brief study was made of project costs and time requirements for various proposed reactor and water plant modifications. Results are reported in HW-57091.

Analysis of rear face piping system stress conditions at higher reactor outlet temperatures indicates that over-stress may exist at the crossheader loop to riser joint for bulk outlet temperatures above 98 C. Estimates were made of the cost of corrective measures such as reinforcement of the existing components or replacement of the riser with a new design. Actual on-pile measurement of expansion movement and stresses must be made before firm recommendations can be derived.

Flow tests were performed during the month at B and H Areas to verify calculated system hydraulic characteristics for key portions of the reactor cooling systems.

Estimates were made of the cost and feasibility of a number of alternate methods of increasing water flow at F Area where available filter capacity is one of the more immediate flow rate limits.

Information was supplied in support of preliminary project proposal preparation for engineering and design work on containment provisions at existing reactor plants and for preliminary design and testing in support of increased process water flows.

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

Current analytical studies of NPR graphite temperature behavior have utilized the Electrical Analog Computer at 100-D. Some minor discrepancies in study results remain to be resolved before issue of a formal report.

In the program for determining venting requirements in event of a process tube rupture, procurement activity on items required for the planned process tube rupture test proceeded during the month. All mechanical design drawings with the exception of the test stack itself have been completed and initial work orders for equipment

fabrication issued. An outline of test bases and objectives is in preparation. Some rupture flow coefficient data have been obtained for a range of tube break characteristics and for alternate candidate fuel element geometries.

A report was completed summarizing recent studies of NPR primary loop transient behavior following a scram. Pressurizer and make-up water requirements were estimated for various methods of limiting the rate of heat loss in the main heat exchanger immediately after shutdown.

A meeting was held with the Architect-Engineer during the month to review recent work on evaluating the latitude in heat dissipation system design for incorporating built-in convertibility features within the prescribed initial capital cost limitation. Results appear encouraging in this regard. A program of additional study was agreed upon, mainly directed toward developing a better appreciation of the effect of initial design variables on plant residual value.

Data have been assembled on the cost and effectiveness of provisions for containing the products of various levels of energy release following a reactor incident.

Information was developed and a draft prepared of the NPR Preliminary Project Proposal.

2. Design Projects

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

Supplemental authorization for modification of the development test of alternate rod surface finishes was approved and issued during the month.

A final report has been issued by Equipment Development Operation on the study of safety circuit revisions recommended for incorporation in this project.

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

Design of components for the modification of existing pump sets is proceeding. Representative of the pump modification vendor visited Hanford during the month to review the present pump installation and to obtain data on dimensions of existing components.

Low lift pump motor rewinding bids were reviewed during the month. Prototype rewinding is planned for the KE outage in November if contractual arrangements are completed in time.

DECLASSIFIED

DECLASSIFIED

The proposal request for model testing of existing K high lift pump suction piping has been forwarded to the prospective bidder. Specifications have been prepared for model design and testing of the K primary pump intake wells.

c. CG-791 - Confinement of Radioactive Particulate Matter in 105 Building Exhaust Air

Request was received from the AEC that project action be undertaken on the engineering and design of containment provisions for existing reactors. A preliminary project proposal, CG-791, was prepared for submission to the AEC. It was approved and directive HW-469 was issued authorizing initiation of the proposed design work.

A preliminary discussion of the engineering program covered by the project, including a brief evaluation of fission product release characteristics for various reactor incidents, was prepared and transmitted to the AEC during the month.

3. Visitors

Mr. Carl Blom, Chief Engineer, and F. H. Trones, District Manager, Byron Jackson Pumps, Inc., Los Angeles, California, visited HAPO on July 30-31 to inspect 190-K, B, and DR process pump installations and to make measurements of the presently installed equipment components.

4. Trips

H. S. Davis attended the shielding symposium sponsored by the European Atomic Energy Society at Cambridge, England, on August 26 to 29. Mr. Davis was invited last May to present a paper and discuss some of the practical aspects of shield construction. He also presented a paper prepared by Fryar and Peterson (HLO) summarizing the attenuation properties of materials tested at HAPO, including four concretes.

J. R. Carrell, M. H. Russ, and G. L. Locke visited the Hempstead, New York office of Burns and Roe, Inc., on August 12-13. Mutual efforts related to the design and current studies for the NPR plant were discussed.

E. R. Astley attended a heat transfer seminar at the University of Minnesota - August 6-15.

E. R. Astley and H. R. Kosmata visited the General Nuclear Engineering Corporation at Dunedin, Florida, to discuss GNEC's evaluation of our NPR. This evaluation was to be included in their report for the Atomic Energy Commission.

H. R. Kosmata and D. L. Condotta visited Burns and Roe, Inc., New York City, New York, August 12-15, to discuss NPR system design, transient analysis and control.

M. H. Schack visited Washington State College, Pullman, Washington, on August 20 to review tests of the 105-F down-comer model.

N. F. Fifer visited Oregon State College, Corvallis, Oregon, August 25-29 to review tests of the CG-558 - 600 process pump suction piping models.

5. Significant Reports Issued

- HW-56168 A - "Supplement Authorization for Modification of Development Test IP-166-M", F. J. Kempf, August 28, 1958.
- HW-56488 - "Thermal Stress Analysis of Piping Systems - Using the IBM-650 Computer", N. E. Bennewitz, June 17, 1958.
- HW-56785 - "Design Criteria Preparation for NPR Reactor and Building", H. L. Pringle, August 8, 1958.
- HW-56713 - "CG-775 Project Representatives Meeting No. 2", H. W. Heacock, August 11, 1958.
- HW-56881 - "Status of the Waterwall Development Program with Model Study Results", W. J. Morris, August 1, 1958.
- HW-56940 - "Process Design Operation Monthly Design Test Status Report", W. J. Morris, August 31, 1958.
- HW-57091 - "Project Costs for Five-Year Existing Reactor Program", H. W. Heacock and A. B. Carson, August 12, 1958.
- HW-57106 - "Graphite-CO₂ Loop, Phase II Studies", G. E. Wade, August 8, 1958.
- HW-57115 - "Bottom Shield Temperatures for B, D, and F Reactors", D. E. Sebade, August 11, 1958.
- HW-57139 - "NPR Primary Loop Water Requirements During a Scram", L. N. Johanson, August 12, 1958.
- HW-57185 - "Existing Reactor Containment Program", G. J. Rogers and H. W. Heacock, August 15, 1958.
- HW-57200 - "Weighted Fuel and Moderator Temperatures", D. E. Sebade, August 18, 1958.

DECLASSIFIED

DECLASSIFIED

HW-57278

- HW-57209 RD - "Design Test No. ___, Determination of Boron Carbon Steel Properties", G. T. Haugland, August 8, 1958.
- HW-57211 RD - "Design Test No. ___, Cooling of Cast Iron Thermal Shields", G. T. Haugland, August 8, 1958.
- HW-57262 - "NPR Development and Testing Status Report", W. J. Morris, August 15, 1958.
- HW-57263 - "Design Test No. ___, In-Pile Testing of Borated Mortar Thermal Shield", G. T. Haugland, August 21, 1958.
- HW-57246 - "Make-Up Water Additions During Scram Conditions", L. N. Johanson, August 22, 1958.

Design Test Request No. ___, Thermal Shock Test of Kanthal-Super Electric Heaters", D. Marinos and G. H. Strong, August 14, 1958.

B. Equipment Development

Zircaloy tubes two and three were installed in Tubes 2775 and 3681 at C Reactor on August 20, 1958. On one tube, an improperly backed rear gunbarrel flange resulted in a cracked rear Van Stone flange which was cut off and re-Van Stoned. Other minor difficulties resulted in the Zircaloy tube installation consuming five hours of reactor outage time over and above that of a normal aluminum tube replacement. In the laboratory, Zircaloy tube splitting was accomplished with normal aluminum tube splitting equipment but rapid wear of the cutter wheels was noted; carbide cutting wheels have been ordered. Specifications and drawings have been prepared covering the requirements for portable rear-face Van Stone equipment for submittal to potential vendors. Test equipment has been assembled to evaluate fatigue effects on Van Stone flanges. Two protective coating materials were obtained for evaluation as potential alternates to the use of helium during high-temperature tube end annealing.

In the poison spline program, two attempts were made to insert a spline into a KW Reactor process tube shortly after startup on July 31, 1958. Laboratory tests after the failure showed that it was possible to have the spline pushed up by the inlet water jet into the center of the upstream perfs. This is evidently what happened at KW Reactor since, in both attempts, the splines stopped at about the location of the first slug. To eliminate the above problem, minor modifications have been made to the spline cap assembly consisting of a collar and spring to guide the spline under the perfs. Laboratory testing of the proposed change shows that the spline will always go under the perfs and that perf vibration is reduced. On August 14, 1958, a rupture was encountered in Tube 2680 at D Reactor in which a spline was located. Before insertion of the spline, the tube was running "hot" and contained normal uranium approaching goal exposure. Rupture, tube, and spline were removed using forces up to 4,000 pounds. Inspection of the spline showed no evidence of swelling. In the laboratory, boron-437 stainless steel, a potential solid spline material, was successfully cut with the standard spline chopper.

Development progress for the New Production Reactor includes:

1. Following several initial failures, Leonard Precision Products Company reported the successful 37° flaring of a New Production Reactor size moly-steel tube using a flaring machine developed specifically for on-pile use. Flaring tests for New Production Reactor size Zircaloy tubing have been scheduled. Such a flare has potential application at the joint between a Zircaloy process tube and a stainless-steel nozzle.
2. Negotiations were initiated with A. O. Smith Corporation toward a design, development, and research contract to explore the technique, equipment and procedures for flash and/or fusion welding of zirconium-to-zirconium as a connection method for New Production Reactor process tubing.

DECLASSIFIED

- CONFIDENTIAL
5776
DEL
3. A Marmon "Conoseal" closure test assembly failed twice under thermal test and a modified test component (end plug) was devised and ordered as a means of eliminating the presumed cause of failure.
 4. Testing of a bell-ring seal was completed through 2,000 cycles but the torque required to disassemble was found to be excessive, placing the test data in a questionable status. A rerun was started.
 5. A proposal was received from Manufacturing Services, Schenectady, to develop a manufacturing method for lowering the fabrication cost of bell-ring seals.
 6. Preliminary information was obtained from the design test deflecting New Production Reactor header-to-nozzle connectors, using stress coat at the bends of the piping to obtain stress crack patterns.
 7. Preliminary operations of the New Production Reactor charge-discharge test facility show flush discharges to be feasible.
 8. Instrument system studies were made on strap-on resistance temperature detectors; incorporation of "rate-of-change" in temperature monitoring; application of three concepts of "in-core" flux monitoring; use of differential current magnetic amplifiers in rupture monitoring and tri-axial cables in neutron monitoring; evaluation of a Texas Instrument Company DC transistorized amplifier for use in the high-level trip circuit of an octant monitor; and coupling of a Luther rotary differential transformer with the delta pressure transmitter of the Bristol Company to make a passive scanner type flow monitor.

At C Reactor, components of the prototype charging machine for use in charge-discharge-while-operating are being tested, calibrated, and adjusted with the charging machine connected to a tube containing a solid aluminum charge. On August 1, 1958, a process tube was discharged and recharged with solid aluminum dummy slugs to the point of closing the inlet ball valve. Here, equipment malfunctioning, since corrected, prevented closing the front ball valve and uncoupling, and required special actions to complete the cycle. Currently, minor modifications are being made to the auxiliary water flow control valve, the charging machine transmission, and the charging machine location limit switches before on-pile testing is resumed. Efficiently operating components include (a) the rear-face ball valves used in several operational discharges of fuel elements, (b) the vertical gamma monitor system to detect several ruptures, (c) the front-and-rear-face television systems to scan the reactor faces, and (d) television to align the charging machine with a front-face ball valve.

In the tube removal program, two prototypes of process tube insertors have been fabricated for early evaluation at B Reactor. Both massive prototypes will be suspended from the work area cranes; prototype one employs a hydraulically-powered free piston, and prototype two employs an air-powered winch. Use of both tube insertors is being held up.

temporarily until improved carboloy broaches, which will precede a process tube into a graphite channel, can be obtained. Side plate thrust bearings continue to give trouble on the rear-face process tube wrapper. Several alternates to the tube wrapper are being studied and mocked up including modification to an existing guillotine which would utilize the return stroke of the pneumatic piston to grip and pull a split process tube from the reactor. The 45-foot hydraulic piston, previously developed, has application in tube splitting, channel broaching, metal pushing and rupture discharging.

The hot-water recirculation loop has been operated around the clock for approximately three weeks in the 108-D Building to obtain information on rear-crossheader pressure drops, cavitation and vibration. Initial operation at 90° C, 8 psig, and 800 gpm gave inconclusive results on paint-coated specimens and showed no damage after one week's operation on polished aluminum specimens mounted in the crossheader opposite several pigtails. Operation continues at 100° C.

Three compact, portable, voice sending-and-receiving prototypes were received from the Army Signal Corps on August 15, 1958. These instruments were obtained to evaluate their use in SWP rear-face communications and in radiation instrument signal transmission. Preliminary tests show that the units have a range in open air of approximately 0.5 miles. Evaluation of the instruments is dependent on installation of relaying cable at DR Reactor in turn dependent on the availability of rear elevator time.

Drawings are being made of a process tube rib removing device for use in ruptured fuel element removal which employs a cutter powered by an air motor at the end of a flexible, 30-foot shaft. Feed rollers, fastened to a rear gunbarrel flange, bear on the flexible shaft housing and feed the cutter into the process tube. At completion of rib cutting, the flexible shaft and cutter will be disconnected from the air motor and dropped into the basin. Reduced radiation exposure and reduced contamination of manpower is the objective of this device.

A Production Test has been prepared and is routing for approval which will permit the evaluation of an automatic, static, interlock prototype receiving signals from the reactor Beckman and Panellit systems. This prototype will alarm or scram and is aimed at increasing reactor safety during the Beckman range-changing, Panellit-adjustment period of a startup.

Testing of 430 stainless-steel boron balls for potential use in the Ball 3X system of existing and future reactors has been completed and the balls are acceptable. Corrosion tests, temperature tests, drop tests, and hardness tests were performed and a number of balls were sectioned and photomicrographs made. Evaluation of the balls in ball handling equipment in 189-D Building and in service need to be done. One and one-half per cent boron-steel balls should be superior and less expensive than the current nickle-plated balls.

DECLASSIFIED

DECLASSIFIED

HW-57278

On 8-13-58, P. H. Ard, a rotational Technical Graduate working in Mechanical Development A Operation of Equipment Development, received a disabling injury consisting of electrical flash burns when an aluminum "process-tube" push-pole that he was carrying was pushed into a high-voltage (13,800 volt) power distribution line. Mr. Ard received first and second degree flash burns to both hands; left wrist; right torso; right outer thigh, knee, calf and ankle; and was hospitalized for treatment of the burns and for observation. Mr. Ard was assisting another engineer in the performance of a design test aimed at evaluating potential charging and discharging techniques and equipment for the New Production Reactor including discharging of fuel elements into a water basin. The test equipment is located on the roof of the 190-D Building.

An SS Material inventory discrepancy was noted on 8-29-58 in Mechanical Development B of Equipment Development when an I-and-E mixing slug, used in tests to determine crushing strengths, could not be located. Searching continues.

Visitors

J. K. Figenshaw, W. Hainer, and G. Rose of General Mills Company visited Mechanical Development A on August 14-15, 1958, to discuss the preliminary design for the under-elevator mounted manipulator.

R. H. Weigel of The Bellows Company, Seattle, Washington, visited Mechanical Development B on August 20, 1958, to consult on the Ball 3X mockup pneumatic equipment in 189-D Mechanical Development Laboratory.

T. D. Daniels of General Electric Silicone Products Department in Downey, California, visited Materials Development on August 12, 1958, to discuss problems associated with the use of silicone materials.

The following off-site personnel visited Instrument Development: Bruce Barling, Head of the Digital Computer Section of C. G. Electronics Corporation of Gulton Industries at Albuquerque, New Mexico, visited on August 6-7, 1958, to obtain a better concept of temperature and flux monitoring system needs.

C. H. Hoeyppner, Director of Research Radiation, Inc., on July 28, 1958, and H. Stovort and J. G. Neuland of Beckman System Division, on July 30, 1958, visited to consult on high-speed temperature scanning equipment with respect to Project CGI-802.

H. E. DeBolt, Manager, Nuclear Department, Fairchild Camera and Instrument Company, on July 25, 1958, visited to discuss the needs in reactor transistorized instruments in connection with Project CG-806.

Trips

C. W. Botsford visited Ederer Engineering Company and the Berger Engineering Company in Seattle, Washington, on July 29 and 30, 1958, and on August 11, 1958, to discuss a potential design contract for work area crane modifications.

R. K. Smith visited Crawford & Doherty Foundry in Portland, Oregon, on August 5-6, 1958, to observe the pouring of special castings.

Significant Reports Issued

- HW-54376-A - "Final Report - Design Test No. 1018," W. Dalos, August 8, 1958.
- HW-56001-B - "Interim Report No. 3 - Internal Chemical Decontamination with Turco 4306-B," T. D. Dow, July 31, 1958.
- HW-56001-C - "Interim Report No. 4 - Internal Chemical Decontamination, Rear Face Process Piping Only with Turco 4306-B," H. F. Jensen, July 31, 1958.
- HW-57090 - "Status Report - NPR Fitting Development Activity," J. H. Fastabend and J. R. Spink, August 7, 1958.

DECLASSIFIED

HW-57270

DEL

C. Plant and Industrial Engineering

1. Drafting Operation

Summary of Drafting Operation services provided is:

Revised or New Drawings, Graphs and As-Builts	161
Drawings and BPFs Added, Refiled or Retired	2026
Blueprint File Customers Serviced	232
Catalogs Added to File or Refiled	59
Catalog Customers Serviced	33

2. Industrial Engineering Operation

Rear Face Improvements, All 105 Areas, Material Handling

Filming of charge-discharge tests without using tip-offs was successfully completed at 100-KE. Film analysis of 100-DR set-up and button-up operations has been completed. A review meeting of the analysis was conducted for 100-D-DR Operations and Maintenance supervision August 25, 1958.

Radiation Dose Rate Study

The feasibility of decontaminating 100 Area "perfs" at the 200 Area has been demonstrated and reduced to practice in Processing. The liaison and Industrial Engineering assistance to the program has been completed and a letter to this effect was sent to all Processing Managers on August 20, 1958.

Planning and Measurement of Outage Work

The broad program of planning and measurement of outage work was explained to management of the 100-F Reactor Operation and agreement was attained that the system would be reduced to practice in 100-F Processing Operation as soon as possible.

The Scheduling Board was fabricated and specific tasks are being defined for use with the cooperation of 100-F Processing Operation personnel.

Portable Power Operator For Cross Header Valving

It was determined that use of a portable powered valve turning device on the 100-K Reactors front elevator is technically feasible. Time studies of the valving operation were conducted to determine the time savings which would result from use of such a powered valve operator. The savings potential per 100-K Reactor is calculated to be about 17 hours per year by comparison of the present valving methods with the proposed valving methods.

Lighting Study

The results of the lighting intensity survey in the work zones of 105-KW and the re-survey of the "C" elevator at 105-KE were compiled and distributed. Initial contacts on improving lighting intensity at 105-KE rear face were made. The changes made at 105-KE "C" elevator following the initial intensity survey were effective. The re-survey demonstrated the suitability of the new lighting arrangement.

3. Reactor, Plant Engineering Operation

E-Metal Handling

Design modifications have been determined and formal drawings are being prepared to obtain off-site vendor bids on a lot of 300 special handling buckets for E-metal.

Heat Treatment Facilities - 1717-H

Approval of Purchase Specification HWS-6416, for the heat treating equipment was obtained from Central Maintenance Operation and bid invitations were issued. Bids are due in 30 days which will be about September 10, 1958.

Panellit Photorecorder - 105-KW

Electrical design was completed on a system to photograph a miniature duplicate of the panellit trip indicating light system. The overall system, developed by Component Testing Operation, will photograph the indicating lights within one second after a panellit trip. Electrical prints H-1-24181, H-1-24182 and H-1-24183 have been approved and issued.

K-Area VSR Latching Solenoids

Electrical testing and studies have been conducted to determine if the holding force of these solenoids can be improved to insure that all VSR's will stay up during reactor operation. A desired minimum holding force of 100 pounds has been established for the present latching system. The minimum holding force of the tested solenoids have varied from 60 to 100 pounds. A simple modification to the solenoid plunger increased the holding force 25 percent. A complete new plunger has been designed and materials requisitioned for tests.

4. Water Plant and Utilities Engineering Operation

105-DR Downcomer

An inspection of the far downcomer on August 4, 1958 revealed that three breather pipes had broken loose and had worn a hole through the liner. Also, there were several badly cracked welds where the I-beams supporting the trays are welded to the side liners.

105-DR Downcomer (continued)

It was pointed out to D-DR operating management that even though these cracked welds exist, the trays do not appear to be in immediate danger of falling down since they are supported on three sides by an angle welded to the side liner. It was recommended that the far downcomer be repaired sufficiently so that it can be put back into service, and the vibration and pressure instruments be installed in the near downcomer as originally planned to obtain information for a firm recommendation on downcomer repairs and alterations.

Decreasing Average River Temperature

During the month a test was run in cooperation with officials of the Bureau of Reclamation for the purpose of determining if judicious release of cooler water from the depths of Lake Roosevelt could produce effective reduction of river temperatures at HAPCO. This test, which was completed August 4, 1958, showed that such control was technically feasible and effective temperature reductions of from 7/10 to 1-1/2 degrees noted at actual reactor inlets. As a result of the favorable test data, the Bureau of Reclamation has agreed to continue release of cool water on a scheduled basis as long as surplus water is available. Plans for a broader program next year are being formulated.

Engineering in Support of Power Forecasting

Estimates of peak demand were made for the month of September. Utility Operation, R&UO, was requested to arrange for 28 megawatts interruptible power beginning September 1. This represents an increase of three megawatts over last month, in addition to a scheduled increase of IPD firm power of six megawatts.

Individual area forecasts for the balance of FY-1959 have been received and are generally higher than originally planned for.

Study of equipment and installation cost of instantaneous demand recording systems was completed. A letter, giving pertinent details of the proposed system, was sent to 100-B, D, F and H Power Managers.

5. Standards Engineering Operation

Productive Maintenance

Upon request of FPD and CPD personnel, the various forms and instructions covering IPD Third Party Inspections were supplied to those departments. It is their intent to follow the methods established by SEO in this connection.

Engineering Standards

At the request of SEO, the Operations Research group conducted a study regarding the feasibility of calculating spare parts requirements on a mathematical basis. The subsequent report includes formulae, graphs and a description of the proposed method. This proposal is designed to assist rather than govern spare parts procurement.

Spare Parts

Stock Adjustment Requests processed		27
Maximum Authorized dollar value of new items added by SAR's	\$ 8,563	
Maximum Authorized dollar value of spare parts requested by letter to Project Engineering	0	
Maximum Authorized dollar value of spare parts requested for Projects by SAR's	6,719	
Number of Engineered spare parts items reviewed		46
Actual dollar value of items deleted from spare parts stock	36.50	
Maximum Authorized dollar value of items deleted from spare parts stock	4,073	

Process tube drawings were revised in order to permit the purchase of shorter lengths. This represents a saving since excess material from the longer tubes was previously cut off and discarded.

Craft Training

In order to assure IPD plants of Instrument Specialists of proven ability, craft selection tests were prepared. These consist of 154 questions on eight subjects. The testing program began late in August.

Craft training activities included the following:

- Zone Temperature Monitoring System - 70 Instrument personnel
- Moisture Monitoring System - 66 Instrument personnel
- Operation of Large Pipe Machine - 9 Pipefitters

6. Trips

W. W. Windsheimer and H. A. Kramer visited the Project Manager, Columbia Basin Project in Ephrata, Washington on July 30 and August 6, 1958, to discuss proposal and effect arrangement for using the colder water in Lake Roosevelt for cooling the Columbia River at HAPO.

J. C. Baudendistel travelled to Pullman, Washington on August 20, 1958, to observe preliminary operations of model downcomer tests at the Washington State Institute of Technology.

DECLASSIFIED

DECLASSIFIED**D. Project Engineering****1. Projects**

<u>Number of Jobs</u>	<u>Activity</u>	<u>Financial Responsibility</u>
9	Engineering Studies, Scoping, and Project Proposal Preparation	\$ 25,730
9	Projects in Design Phase	1,125,710
14	Projects in Construction Phase	3,812,450
6	Projects in Close-out Phase or Accrued Work on Closed Projects	40,124,011
4	Field Management of Non-project Work and MJA's	843,000
<u>42</u>		<u>\$45,930,901</u>

AEC-160 - Recirculating Gas Cooled Test Loop

The first sections of loop piping have been installed on the X-1 floor level at 105-DR.

The first compressor has been operated successfully at speeds up to 21,000 rpm at Schenectady.

CG-666 - Zone Temperature Monitoring, 105-B, C, D, DR, F, and H

Special Maintenance Operation has installed the controllers at 105-H, and the 30-day test of the zone temperature equipment started.

Equipment has now been installed in all areas except 105-C. Installation work started at 105-C during the week ending August 22.

CG-674 - Water Plant Component Test Loop - Building 1706-KE

All testing required of the loop assembly, in the vendor's plant, has been completed. The loop is being made ready for shipment.

CA-735 - Central Maintenance Lunch and Locker Facilities - B, D, and F

The lunch room facility in 1717-F was completed on July 28, and turned over to the F Area landlord. Lunch and locker room improvements at 1707-B and D are ahead of the contract completion schedule.

CG-741 - Renovation of Ball 3-X Handling Facilities - 105-C

The power connection for the backdraft damper was made during an outage

on August 15, 1958.

An access opening through the block wall to the Ball 3-X elevator room has been made. This completes the initial work preparatory to removing ball valves.

CA-751 - Steam Line Support Pole Replacements - Phase III

The principal work of replacing steam poles in 100-B Area is completed and the contractor's clean-up crew is in process. Work started at 100-D Area on August 18.

MJA-4 - 105-DR Sewer Testing and Repair

The section of sewer south of 105-DR was tested and accepted August 1, 1958.

MJA-11 - Graveled Surface Roof Repairs - 100-B, C, D, DR, F, and H Areas

The Phase I of roof replacement was completed by the Royal Company during August.

The Phase II roofing repair has been completed in 100-B and D Areas by the Vail Company, and work is continuing at 100-F and H Areas.

2. Project Proposals

Project Proposals Approved

CGI-791 Confinement of Radioactive Particulate Matter in 105 Building Exhaust Air

CGI-807 Modifications to 1713-D Building (Interim authorization of design - \$9,500)

Project Proposals Awaiting AEC Approval

CGI-802 Process Safety Monitoring System, High Speed Scanning Type for Temperature Monitoring

CGI-806 Nuclear Instrumentation for Reactor Safety and Control

Requests Received for Project Preparation, Revisions and Changes

CG-674, Revision 2 Water Plant Component Test Loop, 1706-KE

3. Visitors

Mr. James Clark and Mr. Edward J. Knight, Engineering Specialists for AiResearch Manufacturing Company, Phoenix, Arizona, and Mr. Allen Harris of their Seattle office visited the plant on August 11, 12, and 13, 1958, for the purpose of discussing cavitation measuring equipment with interested GE personnel.

DECLASSIFIED

DECLASSIFIED

4. Trips

During the period August 19 through August 28, 1958, Mr. H. H. Hubble visited:

1. Ingersoll-Rand Company, Phillipsburg, New Jersey, to discuss progress on their prototype pump for replacement of the DeLaval pumps installed by Project CG-558.
2. DeLaval Steam Turbine Company, Trenton, New Jersey, to inspect the castings for their replacement pump.
3. Philadelphia Navy Yard, Philadelphia, Pennsylvania, to inspect their pump test facilities.
4. Metallurgical Products Department, Detroit, Michigan, to discuss precision casting techniques for production of samples of contacted metal surfaces.
5. Bureau of Reclamation, Denver, Colorado, to discuss pump test facilities.

E. Expansion Operation

1. Activities

The proposed NPR document describing responsibilities and procedures was reviewed with supervision and management of the other operations involved and reconciliation of the various provisions was being prepared for an early reissue.

The first Expansion Design Council meeting was held. The project representatives for Research and Engineering were appointed and candidates for Operations' representatives were discussed with the Operations' Design Council member.

Discussions were held with Plant and Industrial Engineering regarding responsibility for spare parts under the NPR program. No definite agreement was reached on exact split of responsibilities, but Expansion Operation's recommendation that the primary spare parts responsibility be retained with this group until plant turnover was emphasized.

Plans were tentatively made for retaining responsibility for graphite and zirconium procurement within IPD, Expansion Operation and the general principle was discussed with CEO, Legal Counsel, Purchasing and Stores, and the Commission. A position guide for a Senior Contract Engineer to bear this responsibility was prepared and submitted for discussion of the selection of candidates.

A GE-AEC NPR information meeting was held to bring the Commission up to date on progress. General agreement was reached with the Commission on construction management which will be assigned either to an Architect-Engineer Agent-Constructor or a CPFF Contractor-Construction Manager.

Discussions were held with CEO regarding their efforts in technical direction of graphite machining and pile erection. CEO's recommendations regarding a detail definition of technical direction and recommended staffing for this function were received.

Expansion Operation contributed an expenditure pattern and obligation pattern, manpower forecast, and critical procurement schedule for inclusion in the NPR project proposal.

MANAGER
FACILITIES ENGINEERING

DECLASSIFIED

DECLASSIFIED

HW-57278 DEL

EMPLOYEE RELATIONS OPERATION
AUGUST 1958

PERSONNEL DEVELOPMENT & PLACEMENT OPERATION

Organization and Personnel

Though no change in the basic organization structure occurred, some modifications to assigned responsibilities of the Operation were made. Following transfer of the employment record function to Personnel Accounting, certain personnel administration functions formerly conducted by specialists in the 100 B-C and 100-H Reactor Operations were transferred to the Nonexempt Personnel Placement Office. This includes the responsibility for bargaining unit employee intra-department transfer requests (including shift change requests of pipe fitters, welders, millwrights, and radiation monitors), coordination of all department force adjustments and reductions of force, maintenance of Radiation Monitoring and Maintenance personnel rosters, and assistance in arranging inter-departmental personnel loans. Simultaneously, the Relations and Utilities' Personnel Practices Operation was requested to process all termination clearances and exit interviews of employees terminating from this department. Transfer of this activity, scheduled for September 1, will contribute to the more efficient conduct of the work and bring the work load in the Nonexempt Personnel Placement Office to a more reasonable level.

The number of people on roll at the beginning of the month and at month end was as follows:

	<u>Beginning of Month</u>	<u>End of Month</u>
Exempt	5	5
Nonexempt	15	15
Total	20	20

One medical treatment injury and no security violation occurred. Eight hours of overtime were worked. One information meeting was held with nonexempt people in the Operation. The Psychologist, Personnel Research and Development visited GE representatives in Cincinnati, New York City and Philadelphia to exchange information and discuss personnel development activities and attended the APA meeting in Washington, D. C.

Personnel Development

Pilot sessions of both the Techniques of Interviewing and Understanding Human Behavior courses were completed. Feedback from participants in both courses were favorable and they will be reoffered as time permits.

Three counseling contacts conducted during the month involved personal-type problems that were interfering with job performance. There were, additionally, three consulting contacts made and two potential group problem situations investigated.

The first presentation of the course "Secretarial Proficiency" was completed on August 21. Feedback comments received to date indicate that the class was well received. Some minor revisions to the course material are planned. These will be made before the class is presented again this fall.

A questionnaire was prepared and distributed to all Specialists, Reactor Operations, to determine their reaction to the recent "Reactor Processing Fundamentals - I" class in which they participated. It was also desirable to learn of their wishes regarding the scheduling of fall classes. Results of the survey were summarized and forwarded to Operational Physics Operation.

The following information reflects the attendance in the various training classes presented in the department during August:

	<u>This Month</u>	<u>Last Month</u>	<u>Year to Date</u>
A.E.C. Survey Information	0	0	20
Communication Training for First Line Supervisors	10	11	26
Data Processing	0	0	11
Drill Grinding	0	17	41
Effective Business Writing	0	0	14
Emergency Rescue Crew Training	0	5	5
Financial Operation Orientation	0	0	21
First Aid	0	0	13
G.E. Employee Benefit Plans	0	0	11
G.E. Salary Plan & Its Admin. in IPD	0	0	18
G.E. Wage Plan & Its Admin. in IPD	0	0	28
Interviewing Techniques	5	6	6
IPD Radiation Protection Program	19	6	68
Labor Management Relations	6	0	37
Maintenance of Overhead Charging Machines	0	0	36
Management Orientation	0	0	21
Moisture Monitoring Training	66	60	126
Operation of Large Pipe Machine	9	15	24
Principles of G.E.'s Financial Operation	0	0	7
PMS&L	10	10	20
Process Orientation	0	8	22

DECLASSIFIED

DEL

W-57278

	<u>This Month</u>	<u>Last Month</u>	<u>Year to Date</u>
Radiation Protection Training (IPD Processing Supervision Only)	0	0	22
Reactor Processing Fundamentals	0	0	159
Secretarial Proficiency	11	11	11
Suggestion Plan Philosophy & Investigation Procedure	9	0	36
Supervisor's Industrial Safety	0	0	7
Top Secret Workshop	0	0	156
Understanding Human Behavior	8	14	23
Zone Temp. & Moisture Monitoring	70	67	137

Distribution and returns of the Nonexempt Personnel Development forms:

	<u>This Month</u>	<u>Last Month</u>	<u>Year to Date</u>
Number of Forms Distributed	133	146	992
Number of Forms Returned	138	135	1021

Exempt Personnel Placement

Experienced BS/MS Recruitment

One experienced engineer transferred to Irradiation Processing Department from the Atomic Power Equipment Department, San Jose. Requests were made to both the General Electric Engineering Register and the Atomic Power Equipment Department for experienced instrument development engineer candidates to fill existing vacancies in the department.

PhD Recruitment

Three PhD candidates were interviewed by Irradiation Processing Department representatives with one employment offer made. Two employment offers were still outstanding at month end.

Transfers and Terminations

	<u>August</u>	<u>July</u>	<u>Year to Date</u>
Interviews for Transfer Purposes	16	17	158
Transfers - Other Departments to IPD	*1	1	16
Transfers - IPD to Other Departments	**3	4	19
Transfers within IPD	2	1	63
Other Removals	***5	3	23
New Hires	0	1	1

* From Atomic Power Equipment Department, San Jose.

** One employee transferred to Hanford Laboratories and one transferred to Chemical Processing Department. The other transfer was a service reactive transferring to Atomic Power Equipment Department.

*** Four employees resigned to accept other employment or to go into business for themselves. The other resigned to accept an offer from the Atomic Energy Commission at Albuquerque.

Employee Educational Loans

One additional employee Educational Loan was approved, bringing the total of such loans for the year to three. Another loan application was cancelled because of deadline expiration and the exhaustion of this year's allotted fund for this purpose at Hanford.

Technical Graduate Program

<u>Assignment</u>	<u>No. of Transfs.</u>		<u>No. Present at End of Mo.</u>	<u>No. Off-Program Assignments to IPD</u>	
	<u>Out</u>	<u>In</u>		<u>This Mo.</u>	<u>Since 1/1/58</u>
Research & Engrg.	0	2	11	0	8
Facilities Engrg.	1	1	10	0	3
B-C Reactor	0	0	1	0	0
D-DR Reactor	0	0	2	0	1
F Reactor	0	0	2	0	0
H Reactor	0	1	2	0	0
K Reactor	1	0	1	0	1
Employee Relations	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	2	4	29	0	13

Employment

Arrangements completed for the annual Quarter Century Luncheon included the mailing of invitations to all eligible employees, and preparation of a guest list which was forwarded to R & U Employee Relations.

No service pins were awarded and no employees received attendance recognition. As of August 29, 38 transfer requests were active (18 nonunit and 20 unit). Thirteen additions to payroll and 47 removals were made. No requisitions were on hold status at the end of the report period. Five contact notices, two warning notices, and no discharge notices were received.

DECLASSIFIED

DECLASSIFIED

DEL

Request for Transfer

	<u>Nonunit</u>	<u>Unit</u>	<u>Total</u>
On Hand 7-31-58	17	19	36
New Requests Received	1	3	4
Transfers Completed	0	2	2
Requests Cancelled	0	0	0
Interviews Conducted	0	0	0
Requests on Hand 8-29-58	18	20	38

Personnel Changes - 8-1-58 to 8-31-58

<u>Additions to Payroll</u>		<u>FY to Date</u>
New Hires	0	8
Re-Engaged	1	2
Reactivates	3	47
Transfers	9	169
Re-Hires	0	10
	13	236

<u>Removals from Payroll</u>		<u>FY to Date</u>
Deaths	0	9
Retirements	1	13
*Terminations	18	131
Deactivates	3	65
Transfers	19	166
Lack of Work	6	113
Discharged	0	3
	47	500

*Two formerly lack of work - resigned.

Requisitions

Number of Openings as of 7-31-58	4
Additional Openings 8-1-58 to 8-31-58	5
Openings Cancelled	1
*Number of Openings Filled	5
Number of Openings as of 8-31-58	3

*1 commitment.

Disciplinary Action

	<u>August</u>	<u>FY to Date</u>
Employee Contacts Received	5	60
Warning Notices Received	2	23
Discharge Notices Received	0	3
	7	86

Military Service

	<u>August</u>	<u>FY to Date</u>
No. of letters written to S.S. Boards requesting deferments or reclassifications.		
Deferment in S.S. Draft	2	37
Standby Reserves	0	2

Military Service - continued

	<u>August</u>	<u>FY to Date</u>
No. of interviews conducted for employees entering Military Service	0	0
No. of employees returned from M.S.	0	6
No. of deferments granted	5	37
No. of deferments denied	0	5
No. of deferments appealed to State Board	0	5

Office Service

Mail & Addressograph

MAIL STATISTICS

	<u>August</u>	<u>July</u>
Pieces of registered delivery mail	1,870	1,968
Pieces of postal mail	1,492	1,704
Pieces of regular mail	984,777	1,024,621
Number of addressograph orders handled	37	28
Number of addressograph impressions	13,621	12,904
Number of plates made	142	178

Duplicating

DUPLICATING STATISTICS

	<u>August</u>				<u>July</u>
<u>Off-Set</u>	<u>100-H</u>	<u>100-D</u>	<u>100-K</u>	<u>Total</u>	<u>Total</u>
Orders Received	656	212	311	1,179	1,117
Orders Completed	663	243	354	1,260	1,148
Orders on Hand	0	3	0	3	29
Xerox Masters Made	500	163	117	780	695
Total Masters Handled	2,621	791	1,307	4,719	6,784
No. Copies Duplicated	193,023	28,711	61,253	282,987	253,947

Verifax

Orders Received	39	49
Orders Completed	39	49
Orders on Hand	0	0
Total Masters Handled	380	289
No. Copies Duplicated	1,141	1,638

DECLASSIFIED

DECLASSIFIED

57278

DEL

COMMUNICATION

Mass communication activities for August included the publication of six Management NEWS Bulletins and two "Memos From the General Manager." The health bulletin was distributed to all employees and the Monogram to all exempt employees. In addition two priority messages were disseminated. The Round Table Guide was distributed to the approximately 225 supervisors and managers on the distribution list.

Two Management Information Meetings were held.

Four training meetings were held: two for each of the two Communication Training Courses for First-Line Supervisors now being presented.

Letter was prepared for the Acting General Manager's signature and sent to all exempt employees. It discussed promotion and transfer of exempt employees during the past six months.

Operation Upturn activities included the distribution of two posters, inclusion in the monthly Round Table Guide of supporting material, and distribution to all employees of "A Special Buyers Guide for GE Share Owners," which were obtained from the East at no cost. Also a full page GE NEWS feature discussed the "customer relations" aspect of Operation Upturn which was developed within IPD.

A proposed AEC Policy on publications was reviewed and comments submitted to HLO for the department.

Material from several operations was collected for the annual Research and Development progress edition of the GE Review.

Distribution lists one, two and four were reviewed and appropriate changes made to bring them up to date. In addition, the IPD distribution list of "Nuclear Science Abstracts" was reviewed.

The following articles were processed during the month:

"Production Reactor Operations at Hanford" for use in the Speaker's Bureau. - T. W. Hauff

"Radiation and Contamination Control at the Hanford Reactors" (Summary) for the 1959 Nuclear Congress. - S. L. Nelson

"Performance Testing of Emergency Power Supplies For a Nuclear Reactor" for AIEE Pacific General Meeting in Sacramento, California on August 19-22. - W. R. Moon

"Summary--Operational Problems of the Original Hanford Production Reactors" for the 1959 Nuclear Congress. - J. R. Young

The following OPGs and Advices were published during the month: OPG A 4, Financial Operation; and Advices 1.1.9, Technical Graduate Program; 1.2.18, Procedure for Making Personnel Changes Involving Utility and Pile Operators; 1.5.4, Procedure Covering Change of Payroll Status of Exempt Employees; 3.2.2, Monthly Record Report; 5.2.5, Records Management (new); 6.2.9, Control of Property of Others (new); and 8.1.1, Delegation of Routine Authorities--By Position.

UNION RELATIONS

August 18 Arbiter Sutermeister ruled for the Company when he decided that the discharge of an IPD Utility Operator last October for "bugging" his badge was for just cause.

The Bodmer arbitration case was settled on August 8 when the HAMTC accepted the Company's offer to grant Mr. Bodmer six hours pay for a mix-up involving a change of shift assignment.

The Operating Engineers' Chief Steward has indicated that they definitely do not plan to arbitrate a case which has been scheduled by the HAMTC regarding the "Warning Notice" given a Chief Power Operator for sleeping or "dozing" on the job. Apparently it was our Union Relations Information Bulletin which provided him with the complete information on the case which he had not had the benefit of prior to that time.

Fourteen of the nineteen grievances received this month were again on the subjects of jurisdiction and overtime distribution.

The HOO-AEC Labor Standards Board approved two jobs for assignment to plant maintenance forces which are estimated to cost \$6,890. Since the procedure for obtaining LSB approval was started in IPD, 93 jobs have been approved, representing an estimated total cost of \$3,045,579.

The following statistics summarize work review approvals during the month:

<u>Work Review No.</u>	<u>Estimated Cost</u>	<u>Description of Job</u>
IP-59-4	\$1760	Work Pad Acid Storage Tank, 105-DR
IP-59-5	\$5130	Facilities for Liquid Dichromate, 190-F

BARGAINING UNIT CHECK-OFF STATISTICS

	<u>Last Month</u>	<u>This Month</u>
Cancellations	10	9
Additions	7	2
Total Participating	954	947
Total in Unit	1333	1321
% Participating	71.6	71.7

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

IPD GRIEVANCE STATISTICS
7-17-58 through 8-18-58

A total of 19 grievances was received and four Step II grievance meetings were held. Following is a breakdown of the status of these grievances:

	<u>Unit</u>	<u>Non-Unit</u>
Received this Month	19	1
Received this Year	165	2
<u>Step I</u>		
Answer satisfactory	5	0
Answer unsatisfactory	14	1
Pending time limit	21	0
Settled this month	20	0
<u>Step II</u>		
Discussed this month	6	1
Pending time limit	2	0
Settled this month	8	1
<u>Arbitration Pending</u>	22	0
Active	3	0
*Inactive	19	0
<u>Arbitration Settled</u>	1	0
<u>Total Settled This Month</u>	29	1

*Inactive status means that there has been a lapse of three months without further action in the case.

Subject of August Grievances

<u>Unit</u>	<u>B-C</u>	<u>KE-KW</u>	<u>D-DR</u>	<u>H</u>	<u>F</u>	<u>Fin.</u>	<u>Emp. Rel.</u>	<u>Prod.</u>	<u>Fac. Eng.</u>	<u>Res.& Eng.</u>
Jurisdiction	1	2	2							
Overtime	1	6			2					
Work Force Size					1					
Work Contracted Outside	1									
Training Program		1	1							
Transfer				1						
<u>TOTAL</u>	<u>3</u>	<u>9</u>	<u>3</u>	<u>1</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Non-Unit</u>	0	0	0	1	0	0	0	0	0	0

EMPLOYEE COMPENSATION OPERATIONSalary Administration

Considerable attention has been directed to improving the exempt performance appraisal system. Work on this program has reached the point of a draft which was prepared by IPD and has received general basic agreement by Salary Administration representatives of other Departments.

Also developed were proposed plans for an individual type salary review for the department during CY-1959. We have built in several safeguard features to preclude overrun of contractual limitations, but of course actual implementation will be at the discretion of the acting general manager.

CHANGES OF STATUS OF PERSONNEL

Transfers into Dept.	<u>2</u>
Transfers Out	<u>4</u>
Location Changes	<u>0</u>
Suffix Changes	<u>2</u>
FISA Changes	<u>2</u>
Reassignments	<u>7</u>
Total	<u>17</u>

CHANGES IN SALARY OF PERSONNEL

Promotional Increases	<u>2</u>
Salary Review Increases	<u>50</u>
Interim Merit Increases	<u>1</u>
Salary Adjustments	<u>0</u>
Total	<u>53</u>

Wage Administration

The Specialist, Wage Administration has been placed on special assignment in connection with the salary study.

Information necessary for the Northwest Area Wage Survey was furnished to J. J. Tagen of Relations and Utilities Department to cover IPD wage relationships.

The cost-of-living increase of 0.59% effective July 28, bringing the override to 32.85% on the base rate, has been formalized by AEC authorization and by appropriate revision to wage and payroll records.

CHANGES OF STATUS OF PERSONNEL

Transfers between Depts.	<u>18</u>
Transfers within Dept.	<u>19</u>
Location Changes	<u>0</u>
Reclassifications	<u>4</u>
Total	<u>46</u>

CHANGES IN SALARY OF PERSONNEL

Automatic Increases	<u>21</u>
Reclassifications	<u>22</u>
Merit Increases	<u>0</u>
Total	<u>43</u>

Employee Benefits

A review of the percentage of participation in the Stock Bonus Plan indicates that the new participants enrolled during the campaign earlier this year are not cancelling their bond deductions.

DECLASSIFIED

DECLASSIFIED

57278

TEL

A comparative bar chart giving the status of the suggestion plan operation in IPD, other HAPO Departments, HAPO, APD, and the Company was sent with an analysis letter to all IPD level three managers and suggestion board members.

	<u>Current Month</u> <u>August</u>	<u>7/1/57</u> <u>To Date</u>
<u>Employee Purchases</u>		
Special purchases	1	25
Complaints by employees investigated and resolved	4	32
Letter written to obtain G. E. products	1	19
<u>Retirement Program</u>		
Retired	4	20
Pre-retirement Contacts	33	178
<u>Deceased Employees</u>	0	8
<u>Special Absence Allowances</u>	2	51

HEALTH & SAFETY

Personnel

Employees: Exempt - 3. Non-exempt - 1.

Accident Statistics

	<u>August</u>	<u>July</u>	<u>Year to Date</u>
Disabling Injuries	1	0	3
Frequency	2.81	0	0.99
Severity	50.53	0	14.50
Medical Treatment Injuries	93	86	739
Frequency	2.61	2.41	2.43
Serious Accidents	2	3	13

Accumulated Hours of exposure
since last Disabling Injury (8-13-58)

206,838

Fire Statistics

Fires	1	1	9
Loss	\$10.00	\$10.00	\$90.00

Security Violations

Research & Engineering	2	3	20
Facilities Engineering	0	0	1
Finance	0	0	1
H - Reactor	0	0	1
K - Reactor	0	0	1
	<u>2</u>	<u>3</u>	<u>24</u>

General

June Safety Slogan Awards from the Department of Labor & Industries were won by R. D. Sanson, 105-B. Processing, first prize, "Make sure safety is not neglected - Keep all workers well protected." Second prize slogan "Stop - Think - Are you a weak safety link" was won by H. J. Feters, F-Area.

E. W. Lamar, Field Entomologist, State Health Department, and F. J. McKinnon, inspected mosquito breeding areas. Pellets to destroy larvae were used in two such areas.

L. P. Forby and L. H. Rice, safety specialists, disposed of cylinder of Boron Trifluoride in D Area by removing it to remote part of area. It was necessary to open the safety disc because the valve was corroded shut.

DECLASSIFIED

DECLASSIFIED

HW-57278

DEL

HEALTH & SAFETY (Continued)

On August 6, 1958, an IPD employee operating a motor vehicle being used to transport a 300 HP motor became involved in an accident which resulted in a substantial property damage loss. No formal investigation was conducted; however, the incident was fully investigated. According to the operator, while driving at a reasonable rate of speed, the brakes suddenly locked causing the truck and trailer to jack-knife. Skid marks indicated that the vehicle travelled approximately 180' from the time the wheels locked until it came to rest.

On August 13, 1958, Philip A. Ard, a Technical Graduate assigned to FEO's Equipment Development Operation, was severely burned while working in 100-D. area when a metal pusher pole he was handling contacted a 13.8 KV line. This injury is IPD Disabling Injury No. 58-5. Latest reports are that Mr. Ard has been readmitted to Kadlec Methodist Hospital for possible skin graft.

Serious Accident No. 58-12. On August 15, 1958, K-area, R. C. Iverson, wearing protective clothing and gas mask, was attempting to examine rods visually. To do this better he leaned forward on a particular chain to peer out over and up; chain gave way and employee went to his knees thus saving himself from falling by grasping post on catwalk. He would have fallen about 21' to top of unit. No injuries were sustained.

Serious Accident No. 58-13. On August 27, 1958, D-area, a pipefitter journeyman while removing material from the 185-D. Building attempted to drive a two-ton forklift truck across the grating of a pipe trench in the 189-D. Building. When the rear wheels of the forklift reached the middle of the trench the grating started to buckle and the pipefitter jumped off the truck. The grating bent down about 18" at the center where existing pipes in the trench prevented the grating from falling. No injuries were sustained by the employee but there was damage to two sections of floor grating.

On August 22, 1958, D-area, a monitor was using fresh air supply which kinked. He became panicked and had to be rescued and boosted out of downcomer. A special investigation is being conducted by E. T. Hubbard and his report has not yet been received.

100-H. Reactor Processing received a helium tank car which had some defective valves. Valve trouble has been encountered various times before and creates a hazard to maintenance employees who are required to open the valves. Pictures were taken and an attempt will be made to get corrective action by the Bureau of Mines.

Procedures for handling tank car shipments of chlorine are being formulated.

Fire Protection

Organization and Personnel

		<u>Exempt</u>	<u>Non-Exempt</u>
Employees - Beginning of the month	-----	11	40
Employees - End of the month	-----	11	40

Fire Responses

Responded to two alarms during the month of August.

Description of Fires

August 12th - 4:40 P.M. - Outer Area - Vicinity of Priest Rapids - Smoke from rock crusher mistaken for fire.

August 31st - 11:37 A.M. - 1702-D Bldg. - Electric Motor from Air Conditioner overheated - No Fire.

August 23, 24 & 25, 1958 - Assisted The Army Fire Dept. on a large fire across the river in the Saddle Mountains for a total of 20 hours with one Tank Truck, Power Wagon and three men. Fire covered approximately 40,000 Acres.

Drills held during August

Outside drills	-----	42
Inside drills	-----	40
Feet of ladders used on drills	-----	491
Feet of Hose used on drills	-----	5,600

Meetings

<u>Type of Meeting</u>	<u>Number of Meetings</u>	<u>Number Attending</u>
Round Table	3	31
Information	5	49
Safety	4	39
Security	4	37

General

Acting Fire Chief attended Fire Prevention Meeting in Richland, conducted by the Chamber of Commerce.

Fire Protection conducted seven classes covering The Chemox Mask, The Scott Air Pack, Fire Fighting Equipment and procedures desired when responding to a fire, for 102 members of other operations in I.P.D.

Refresher courses for previously trained Rescue Crew Personnel has been completed. Training for new members will continue each Friday.

DECLASSIFIED

Serviceman's Activities

Fire Extinguishers: Inspected	-----	268	Gas Masks Inspected	-----	10
Installed	-----	3	Hand lines inspected	-----	16
Seals Broken	-----	18			
Serviced	-----	136			
Weighed	-----	85			

E. J. [Signature]

DECLASSIFIED

██████████

FINANCIAL OPERATION
MONTHLY RECORD REPORT
AUGUST, 1958

General Accounting

A new procedure for handling invoices against IPD contracts has been instituted. All invoices are routed from Accounts Payable (R & U) to IPD Financial for reimbursability review. IPD Financial also secures the administrator's approval of the invoices.

A summary of test loops was sent to Contract Accounting which contained the number of IPD in-pile and out-of-pile loops, cost, method of funding, location, date in service, and operational status of each loop.

Actual FEO costs by program are \$316,000 less than budgeted expenditures. The major underruns are Maritime Gas Loop \$100,000, CWIP (for lack of NPR authorization) \$114,000, and Research and Development - NPR \$69,000.

During August, 1958, one exempt employee and three nonexempt employees terminated. One nonexempt employee was received from D-DR Reactor Operation and two were received from Secretarial Compensation and Training (R & U).

Product Cost and Budgets

The FY 1958 Report of Representative Economy Measures was prepared and submitted for the Irradiation Processing Department. The measures included were most typical of the means taken to reduce existing cost levels.

A special meeting was conducted by H. R. Tolman in F Area on the distribution of interruptible electricity. Complaints had been made as to the distribution procedure originally established by Utilities Engineering, and the meeting was held to air various views and present a revised distribution which was mutually acceptable to all concerned.

Auditing

A report summarizing the action taken or to be taken to implement the recommendations of, and agreements made with the G. E. Traveling Auditors was prepared for the HAPO General Manager.

The findings of an audit of the 1958 fiscal year-end accruals, adjustments and statements were reported.

A secret, rough draft report on the audit of the Work In Process inventory was given limited distribution.

The Specialist - Auditing attended the Western Regional Conference of The Institute of Internal Auditors held during the month at San Diego, California.

Procedures

A study was concluded for Employee Compensation Operation of clerical procedures used in maintaining and issuing the department organizational directory. A revised system was recommended; implementation of the suggested changes has been made and the revised methods are installed and in use.

Contacts were made with representatives of the Friden Company to view a demonstration of their "Computyper." This machine combines the Friden calculator with a Flexowriter, or typewriter equipped with a paper-tape or edge-card punching device, and provides a basis for additional office automation.

In conjunction with procedures specialists from all other components and data processing representatives, a meeting was held with J. W. Pontius, Consultant - Electronic Data Processing, a one-day visitor at HAPO.

A revision was prepared of the department advice on the Monthly Record Report.

Manager-Finance
IRRADIATION PROCESSING DEPARTMENT

PD Lee:kd

DECLASSIFIED

END

DATE
FILMED

8 / 6 / 92