DECLASSIFIED

HW--68343

DE93 003528

IRRADIATION PROCESSING DEPARTMENT

MONTHLY REPORT

JANUARY 1961

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.

HANFORD ATOMIC PRODUCTS OPERATION

GENERAL ELECTRIC

RICHLAND, WASHINGTON

MASTER

DECLASSIFIED

DISTRIBUTION RESTRICTED TO U.S. ONLY

ARC-GE RICHLAND, WASH.

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

HAN-77857

HW-68343

DECLASSIFIED

This document consists of
59 pages. Copy No. 5
of 20 copies. Series A.

DECLASSIFIED

IRRADIATION PROCESSING DEPARTMENT
MONTHLY REPORT
JANUARY, 1961

77857

by Authority of OK PR-2
Robert H. Stueck 8/6/92
W. H. Stueck 8/21/92
PM 8/21/92

Compiled By
IPD Personnel

February 15, 1961

RICHLAND, WASHINGTON

Work performed under Contract No. AT (45-1)-1350 between the
Atomic Energy Commission and the General Electric Company.

[REDACTED]

Route To:	P.R. No.	Location	Files Route Date	Signature and Date

DECLASSIFIED

[REDACTED]

DECLASSIFICATION REVIEW
DECLASSIFICATION AUTHORITY
[Signature]
[Date]
[Initials]

DECLASSIFIED

HW-68343

DISTRIBUTION

Copy Number

1	W. E. Johnson
2	A. B. Greninger
3	H. M. Parker
4	APD, F. E. Crever
5-6-7-8	AEC-HOO, J. E. Travis
9-10	AEC Production Division, G. F. Quinn
11	AEC-SROO, R. C. Blair
12	R. L. Dickeman
13	O. H. Greager
14	R. T. Jessen
15	O. C. Schroeder
16	W. A. Shanks
17	J. S. McMahon
18	S. H. Small
19	300 Area File
20	Records Center

TABLE OF CONTENTS

<u>SUMMARY</u>	A-1
<u>GENERAL</u>	A-4
<u>RESEARCH & ENGINEERING</u>	
Process and Reactor Development Operation	B-1
Process Technology Operation	B-9
Operational Physics Operation	B-16
Testing Operation	B-21
<u>MANUFACTURING</u>	
Production Operation	C-1
Reactor Operation Statistics	C-2
Applied Reactor Engineering Operation	C-7
B-C Reactor Operation	C-13
D-DR Reactor Operation	C-15
F Reactor Operation	C-16
H Reactor Operation	C-18
KE-KW Reactor Operation	C-20
<u>FACILITIES ENGINEERING</u>	
Reactor Modification Design Operation	D-1
Equipment Development Operation	D-4
Plant Engineering Operation	D-6
Project Engineering Operation	D-8
<u>NPR PROJECT</u>	
Process Design	E-1
Field and Operations Engineering	E-4
Program Evaluation	E-11
<u>FINANCIAL</u>	F-1
<u>RELATIONS PRACTICES</u>	G-1
<u>SIGNIFICANT REPORTS ISSUED</u>	H-1
<u>TRIPS</u>	H-3
<u>VISITORS</u>	H-7

DECLASSIFIED

DECLASSIFIED

HW-68343

SUMMARY

RESEARCH & ENGINEERING

Three C Reactor channels were retubed with oversized Zirconium tubes and charged with self-supported overbore size fuel. Coolant flows and temperature variation around the coolant annulus are in very close agreement with those predicted from laboratory data.

The first projection fuel element failure occurred at D Reactor on January 21, 1961. The element was a normal uranium 3-rail solid bumper model at an exposure of 957 MWD/T and, based on initial visual examination, was classified as a side-other failure.

Four NPR inner fuel tubes were charged into KER-4 loop on January 14, 1961 and represent the first irradiation of an actual NPR fuel element.

Final results have been reported from the test use of a high aluminum sulfate feed rate at B Reactor. Reductions in the concentration of six important isotopes ranging from 25 percent to 75 percent can be achieved.

Power levels were limited by rupture control considerations at B, C, DR, F and KE Reactors; bulk outlet temperatures at D and H Reactors; and the AEC administrative limit at KW Reactor. C and H Reactors were also limited by the AEC administrative limit for a portion of the month until a relaxation was received.

MANUFACTURING

Production

Reactor input production was 6.6 percent above forecast; 0.1 percent above at the six old reactors and 15.7 percent above at the K's. Forecast was exceeded at the K's due to high time operated efficiency and improved operating levels.

Over-all time operated efficiency was 79.5 percent (80.1 forecast); 76.7 percent at the six old reactors and 87.7 at the K's. Efficiency was below forecast at the old reactors due largely to the discharge of irradiated metal pieces onto the rear elevator at H Reactor.

The combined reactor instantaneous power level was increased 165 megawatts (18785 to 18950). The individual reactor record power levels were increased 175 megawatts at KE (3855 to 4030), 45 at C (2090 to 2135), 30 at D (1810 to 1840), 15 at B (1845 to 1860), 15 at DR (1835 to 1850) and 10 at F (1835 to 1845). Input production records were achieved at C and KW.

Eleven ruptures, nine I&E regular metal and two I&E enriched, were removed from the reactors. Three of the I&E regular ruptures were at D, three at H and one each at F, KE and KW. The two I&E enriched ruptures were at DR and KW.

Engineering

Resident Industrial Engineering services are being performed now at B, C, F, H and N Reactor Operations.

Plans are being made to attach copper wires to process tube flanges when nozzles are replaced for the bumper fuel element program. Use of these lead wires will permit measuring the electrical potential which exists between process tube flange and ground. Data obtained will be used to determine if this potential may be used to indicate need for tube replacement.

Operation planning work is in progress. This system is being used to simulate an improved activity in the 105-C Metal Examination Facility.

During the month spare parts inventory increased \$111.00. Work priorities were established on process elevator modifications for conformance to Code and Safety requirements. Firm vendor delivery dates have been established for initial delivery of rear face pigtailed for the older reactors. Craft training has been initiated for 12 additional instrument trainees; 24 are presently in training. Training on engineered method of tube replacement has been conducted for 133 personnel.

A test was completed on an inlet nozzle attempting to duplicate the nozzle failure at B Reactor. Analysis of data is in progress. Recommendations and a supporting document assessing the integrity of nozzles modified for bumper fuel elements were issued. Assistance was provided to D-DR and H Maintenance Engineering to resolve minor problems related to nozzle modification.

Appropriation Requests were approved for readout instrumentation for Geminol graphite thermocouples and for helium leak detectors. Planned work continued in support of project engineering managed action on crossunder lines, poison spline coils, gamma monitor system improvements, Beckman-Panellit interlocks, analog-to-digital converters, and pressure monitor system improvements.

FACILITIES ENGINEERING

Distortion in the graphite stack at C Reactor has rendered two vertical safety rods inoperable and has caused binding in five additional rods. Drawings of a C rod assembly modified for flexible operation have been transmitted for comment.

DECLASSIFIED

An analysis of the maximum safe overbore for C Reactor confirms the previously estimated value of approximately 600 mils.

Study drawings of the inlet and outlet process tube assemblies for use at C Reactor with self-supported fuel element have been approved for prototype procurement. Purchase specifications have been completed for purchase of 10 inlet and outlet assemblies for existing tube sizes.

Banks of high efficiency filters have been installed in all filter buildings in the reactor areas. Leaks found on approximately three percent of the originally installed filters have been corrected. An inspection of the filters installed at H Reactor revealed them to be in good shape although very wet due to the high humidity of the exhaust air from the reactor building.

Drawings of the cell piping and process tube nozzle assembly for KER loops No. 3 and No. 4 have been transmitted for approval. The high temperature and pressure strain gauge tests on the KER nozzles have been completed. Discussions concerning the KER loop pumps have been held with the vendor.

Project CGI-884 is estimated at 63 percent complete based on the revised design progress schedule which has been transmitted to the AEC for approval. This revised schedule includes C Reactor in the project scope and replaces electric motor valve operators with air motors.

Three C Reactor fringe tubes were overbored 550 mils, fitted with oversize zirconium tubes, new prototype hardware, and charged with oversize fuel elements. Laboratory tests have indicated the technical feasibility of operational charging with a hand operated hydraulic machine. The high speed scanner has been put in operation and is being adjusted prior to an acceptance test run. A remote manipulator was used to assist efforts to remove fuel elements from a rear elevator.

In NPR work a packing material has been found which, on the basis of short-term tests, appears to be serviceable as a dynamic front face gas seal.

The program to improve crossheader service conditions by installation of expansion joints and guides is progressing to the point of actual reactor installation.

Good progress was made in preliminary engineering for the experimental water treatment facilities at 1706-KE.

Extensive liaison efforts were required as a result of Priest Rapids incidents involving temporary flow stoppage of the Columbia River.

Class A stator was returned from the Seattle Service Shop January 11, and installed at 190-DR Building.

Since January 24, 1961, all 105 Building exhaust air is being routed through the particulate filters installed as part of Project CGI-791, Reactor Confinement.

DECLASSIFIED

NPR PROJECT

The graphite compression test, which provides basic design information for graphite machining, has been held up by the millwright work stoppage. Progress has been made during the month in resolution of the control concepts of the primary and secondary loops.

Construction at the N-site continued at a high rate, taking advantage of unseasonably favorable weather.

Production in the graphite shop was halted by a work stoppage of the millwrights on January 17, 1961, arising out of a jurisdictional dispute between them and the Technical Engineers regarding optical tooling and measurement.

Full load testing of the Tube Shop autoclaves has not yet been accomplished. Debugging of Tube Shop equipment continued.

A sufficient number of key processing and inspection procedures for the primary loop piping work were approved to permit manufacture and shop fabrication to start at lower tier contractors' plants.

Delivery of graphite and zirconium products continued to be satisfactory.

FINANCIAL

IPD's portion of the fully depreciated account, Plant and Equipment Not Used Nor Currently Useful, amounting to \$5,624,000, has been written off the books per direction of the Commission.

Preparation of FY 1963 and revision of FY 1962 budgets has been started. The personnel requirements budget was reviewed and submitted to Contract Accounting on schedule.

RELATIONS PRACTICES

Four technically trained candidates were interviewed during the month with one offer extended. One rejection was received leaving two offers open at month end. Six exempt employees transferred into the Department from other HAPO components; four transferred out of the Department; three resigned: two to accept employment with the Atomic Energy Commission and one for health reasons. One security violation was reported during January.

GENERAL

RESPONSIBILITY

There was no significant change in responsibility.

DECLASSIFIED

DECLASSIFIED

HW-68343

FORCE SUMMARY

	<u>Exempt</u>	<u>Non Exempt</u>	<u>Total</u>
General	7	2	9
Research & Engineering	106	61	167
Manufacturing	392	1364	1756
Facilities Engineering	123	45	168
NPR Project	89	29	118
Financial	17	14	31
Relations Practices	<u>6</u>	<u>19</u>	<u>25</u>
TOTAL	740	1534	2274

SAFETY, SECURITY AND RADIATION EXPERIENCE

There were 84 medical treatment injuries, no disabling injuries, one security violation and no radiation exposures exceeding operational control.

INVENTIONS

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

<u>Date</u>	<u>Name</u>	<u>Title</u>
11-27-60	R. Sherrard	Use of a Magnetic Amplifier and Saturable Reactor in a Trip Logic Circuit for Process Monitoring.

General Manager

AB Greninger:OCS:cs

RESEARCH AND ENGINEERINGPROCESS AND REACTOR DEVELOPMENT OPERATIONREACTOR FUELSPresent Reactor TechnologyProjection Fuel TestingSelf-Supported Fuel Development

Three columns of CVINS (overbore fuel) type fuel elements were charged into C Reactor during the 1-17-61 outage in 550-mil oversize zirconium smooth-bore process tubes. Each column was equipped with a downstream thermocouple probe for monitoring fuel design adequacy. The reactor started up 1-21-61 with the test material performing satisfactorily.

No unusual irradiation experience was noted from the eighty columns of self-supported fuel charged into B and C Reactors. Four columns of material were recharged during the report period.

Bumper Fuel Development

The first natural uranium bumpered fuel element failure occurred at D Reactor on 1-21-61 at an exposure of 957 MWD/T. The failure, OIINB, was a 3-rail solid bumper model and was classified as a side other failure based on visual examination in the D Reactor technical viewing facilities. Further examination to determine the role played by uniform corrosion is scheduled.

Three columns of solid-rail bumpered fuel were discharged during a 1-13-61 outage at D Reactor at an average exposure of about 810 MWD/T. Two columns were 3-bumpered and one was a 4-bumpered model. There were thirteen corrosion patterns observed.

All material to complete the one-hundred-tube bumper fuel demonstration loading at D Reactor has been charged. There are 95 columns of material (OIINB) under PT authorization and about 151 columns of material (OIIINB and OIIIEB) under PITA authorization in D Reactor.

Examination of the three high weight loss bumpered fuel elements sent to Radiometallurgy for residual can-wall determination has begun.

Examination of the fuel element which exhibited a post-irradiation ellipticity measurement of 69 mils has been initiated. Dimensional changes appear to be a result of both aluminum corrosion and uranium core growth.

Advanced Reactor TechnologyHigh Temperature Irradiations - KER Facility

KER-1: The 10 nominal NIN-1 elements charged in KER-1 on December 8, 1960,

DECLASSIFIED

DECLASSIFIED

HW-68343

STATUS REPORT OF PRODUCTION TESTS

<u>Test No.</u>	<u>Type Metal</u>	<u>Tubes</u>	<u>Reactor</u>	<u>Goal Exposure</u>	<u>Current Exposure</u>	<u>Remarks</u>
IP-84-A	Projection self-supported fuel in ribless aluminum tubes.					Preliminary evaluation of self-supported fuel elements. Routine charging to continue until tubes are replaced.
	a) supports at 1/7 position	6	B	1200 MMD/T	Varies with charge date	Ultrasonic & resistance welded supports currently being used. Goal exposure increased from 900 MMD/T to 1200 MMD/T.
	b) End Spider	5	B	1200 MMD/T		Initial charging of end-spider supports.
IP-171-A	I&E X-8001 OIIN	1	F	Variable	700 MMD/T	Provide for evaluation of alternate aluminum component vendors. Control columns are only ones carried special. Rest are lot charged. Cliff Manufacturing components are now under irradiation. Five monitor columns discharged.
IP-216-A	Normal Prod. Natural & Enriched fuel elements	81	All	Normal Variable Goal		Provides for monitoring the performance of a sample of all normal production material to assist in development of a Quality Index for production use. Test is continuous.
IP-255-A	Solid Black Mint	7	H	2 yrs.	15 Mos.	Provides for long term irradiation of solid black mint for conversion ratio, and fuel performance determination.
IP-262-A	Bumper-supported fuel in ribbed process tubes.	31 64	D	1200 MMD/T 900 MMD/T		Provides for testing of bumper-type fuel elements in ribbed process tubes to determine handling problems, associated with bumper fuel elements. First bumper fuel failure occurred on 1-21-61.

DECLASSIFIED

HW-68343

<u>Test No.</u>	<u>Type Metal</u>	<u>Tubes</u>	<u>Reactor</u>	<u>Goal Exposure</u>	<u>Current Exposure</u>	<u>Remarks</u>
IP-272-A	CIVN Geometry I&E self-supported fuel	69	C	Variable		Provides for testing of CIVN geometry fuel in C Reactor ribless Zirconium process tubes.
IP-363-A	Four 18-inch KSE-3 elements	2	KE	4000 MWD/T	KER-2, 1355 MWD/T KER-3, 775 MWD/T	KER-2 charged November 11, 1960. KER-3 charged Dec. 15, 1960. KER-4 was discharged Jan. 14, 1961, at an exposure of 1195 MWD/T to permit examination of the elements at low exposure.
IP-377-A	Four 24-inch NIN-1 elements	1	KE	3500 MWD/T	70 MWD/T	Charged Jan. 19, 1961, to evaluate N Reactor inner fuel tubes.
IP-378-A	Ten nominal 15-inch NIN-1 elements	1	KE	200 MWD/T	355 MWD/T	Charged Dec. 8, 1960, to evaluate different heat treatments.
IP-381-A	CVIN Geometry I&E self-supported overbore size fuel	3	C	Variable		Provide preliminary qualitative data regarding irradiation behavior of larger fuel element designs. Three columns of 32 pieces per charge were installed in C Reactor in ribless zirconium tubes on Jan. 17, 1961.

under PT-IP-378-A to evaluate different heat treatments reached an exposure of 355 MWD/T without incident.

KER-2: The 4 KSE-3 elements charged in KER-2 on November 11, 1960, under PT-IP-363-A to evaluate the behavior of elements simulating an NPR outer tube have reached an exposure of 1355 MWD/T.

KER-3: The 4 KSE-3 elements charged in KER-3 on December 15, 1960, under PT-IP-363-A to evaluate the behavior of elements simulating an NPR outer tube have reached an exposure of 775 MWD/T.

KER-4: The 4 KSE-3 elements charged in KER-4 on November 11, 1960 were discharged on January 14, 1961 at an exposure of 1190 MWD/T to obtain initial information about the behavior of the Be-Zr brazed closure. cursory examination in the 105-KE viewing basin disclosed no major abnormalities. The elements will be sent to the Radiometallurgical Laboratory for examination at the earliest opportunity. KER-4 was recharged with four 24" NIN1 elements on January 14, 1961 under PT-IP-377-A. These elements, which represent the first irradiation of an actual NPR inner fuel tube, have reached an exposure of 70 MWD/T as of January 23, 1961.

(Nomenclature: KSE-3 - KER-sized single-tube enriched pieces.)
(NIN-1 - NPR-sized inner tubes - natural uranium.)

REACTOR ENGINEERING

Present Reactor Technology

C Reactor Overbore

Three channels in C Reactor were retubed with oversized Zr tubes and charged with fuel elements on January 20. Operation since startup has been satisfactory. Tube flows obtained were in very close agreement with those predicted from laboratory data and were approximately three to four gallons per minute higher than predicted by design calculations. Data to date indicate that the temperature variation around the coolant annulus is modest, which again supports expectations and is a favorable result.

Progress in preparation of tubing to support additional overbored channels is proceeding satisfactorily.

Aluminum Nitrate Corrosion Effects

The use of aluminum nitrate coagulant in place of aluminum sulfate has been of interest from the standpoint of possible effects on film buildup and corrosion provided the same turbidity level is present in process water. Film buildup on fuel surfaces is the same with the two coagulates. Corrosion of process tubes cooled with water coagulated with both materials was monitored with the Probolog. No significant differences in wall thickness were found for either class of tubes.

Advanced Reactor Technology

Zirconium Tube Fabrication

Chase Brass and Copper Co. delivered 10 NPR tubes on January 20.

Harvey Aluminum Co. remains ahead of schedule in fabricating their production order.

Over 300 of the Zr tubes to be used in cross coolant channels in the NPR graphite have been delivered.

Technical Manual

Preparation of the Technical Manual for the NPR has proceeded, although some delays have been caused by higher priority work.

NPR Development Program

A summary status report of the NPR development effort is in preparation in response to a request from the AEC. Completion is targeted for February 1.

REACTOR PHYSICS

Present Reactor Technology

C Overbore

Power generation observed in the overbore channels in C Reactor compared well with the predicted values. Calculations for other locations and other fuel designs are in progress.

Critical Mass Review

Storage of unirradiated uranium slugs in clips at H Reactor was reviewed from a critical mass standpoint. Such storage was judged acceptable.

Neutron Life

Effective neutron lifetime in the reactor is a parameter of interest in the speed-of-control studies. Two approximations were used to compute this parameter. Though the results differ slightly, both lifetimes were longer than those used in previous speed-of-control studies. The speed-of-control curves thus are slightly conservative.

E-N Results

Results obtained from analysis of plutonium yield and burnout were reviewed. Results were reported in HW-66775 Supp. 3, "Semi-Final Report (Report No. 3) E-N Load Conversion Ratios", W. S. Nechodom.

DECLASSIFIED

HW-68343

Advanced Reactor Technology

NPR Fuel Purity

The effect of impurities, up to the maximum allowed in specification for the fuel, on the reactivity of the NPR lattice was calculated. A maximum reactivity effect of 1.4 mk was obtained.

NPR Fast Effect

A comparison was made between the wet NPR fast effect as computed from a Monte Carlo program and the presently used formula. The difference was insignificant, confirming the utility of the similar formulation.

Monte Carlo Slowing Down Program

The more accurate analysis is being tried to obtain the energy loss distribution of neutrons in the graphite of both NPR and old reactor lattices. The method involves coding actual energy losses instead of classifying losses in groups - a method which does not define the bulk energy loss as a function of incident energy accurately enough.

NPR Temperature Coefficients

Computations were made on the Idiot program for a wide spectrum of conditions to determine the temperature coefficients to be expected in the NPR. These results will be reported as part of a more general study of NPR reactivity investigations.

NPR Primary Loop Analog Model

Initial analog computations of the NPR primary loop characteristics have been completed. No new problems were discovered and confirmation of results from less complex models was obtained. These initial general runs will serve as a basis for extensive detailed investigations in the future.

RADIOLOGICAL ENGINEERING

Radiation Control Experience

<u>Classification</u>	<u>Total Dose</u>	<u>No. of Employees</u>	<u>Average Dose/Employee</u>	<u>Maximum Dose</u>
Radiation Monitors	228,820 mr	87	2630 mr	2963 mr
Processing Operators	590,940 mr	263	2247 mr	2977 mr
Pipefitters	178,243 mr	92	1937 mr	2957 mr
Millwrights	140,579 mr	75	1876 mr	2806 mr

DECLASSIFIED

HW-68343

Lapse of Control

Lapse of Radiation Control
Distribution by Reactor and Component

	<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</u> <u>Totals</u>
Processing	0	0	0	1	0	0	3	0	4
Maintenance	1	0	0	0	0	1	2	1	5
Supplemental Crews	0	0	0	0	0	0	2	0	2
Research & Engineering	0	0	0	0	0	0	1	0	1
Facilities Engineering	0	0	0	0	0	0	0	0	0
Central Maintenance	0	0	0	0	0	0	0	0	0
Reactor Areas	0	0	1	0	0	0	0	0	1
Assigned Totals	1	0	1	1	0	1	6	1	11
IPD General									
Outside IPD									

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.

Average Concentration of Radioisotopes in Reactor Effluent Water

The average concentrations of isotopes in reactor effluent water from samples taken during the month of December appear below. It should be noted that the high alum feed test at B Reactor was terminated on December 8.

<u>Reactor</u>	<u>As⁷⁶</u>	<u>p32</u>	<u>Zn⁶⁵*</u>	<u>Np²³⁹</u>	<u>Cr⁵¹</u>
Test B (Near)	100	8		130	310
Control B (Far)	270	20		250	380
C	290	25		310	310
D	340	36		230	580
DR	320	39		300	610
F	200	17		240	480
Control H (Near)	180	31		260	960
Test H (Far)	70	15		110	440
KE	60	8		220	160
KW	160	13		260	190

*The determination of Zinc-65 concentrations were not completed in time for this report because of laboratory counting difficulties.

Reactor Effluent Activity Reduction

Final data on the reductions in effluent activity afforded by the half pile water treatment modification tests recently completed at B and H reactors are as follows:

<u>Isotope</u>	<u>18 ppm aluminum sulfate feed - B Reactor</u>	<u>20 ppm aluminum nitrate feed - H Reactor</u>
P ³²	60%	70-80%
As ⁷⁶	75%	75%
Np ²³⁹	57%	65%
Zn ⁶⁵	33%	25%
Cr ⁵¹	25%	33%
Cu ⁶⁴	33%	33%

It is expected that the addition of 18 ppm aluminum sulfate and a filter aid during the months of August, September and October would reduce the peak concentration of P³² in whitefish to about 40% of that which otherwise would be encountered. Extending the period of high alum feed to include July, November, and December would improve the potential exposure reduction to an individual who eats whitefish regularly from perhaps 50% to about 40% of that which otherwise would be encountered. The effects of high alum feed rates on potential exposure from drinking water at Pasco will vary with the length of time the high feed rates are maintained.

Reactor Purging

A prolonged purge with 25 ppm of diatomaceous earth was conducted at 105-B on January 7, 1961. This was suggested by B Processing to improve cooling water flow rates and to reduce discharge area dose rates. An effort was also made to evaluate the river pollution and the potential of this principle for reactor decontamination. Flow rates were improved very slightly (about 200 to 300 gpm) and the significant improvement seemed to be limited to a few poison-bearing tubes. The discharge area dose rates appeared to be reduced about 18%. Evaluation of river pollution and reactor decontamination cannot be made until radioisotopic analyses are completed. Preliminary information would indicate that neither was significant.

DECLASSIFIED

PROCESS TECHNOLOGY OPERATION

REACTOR POWER LEVEL LIMITATIONS

During this report period, B, C, DR, F, and KE reactors were limited by rupture control considerations, D and H reactors by bulk outlet temperatures, and KW by the AEC administrative limit. C and H reactors were also limited by the administrative limit for a portion of this period until relaxation of the AEC limit was received.

PROCESS STANDARDS

HW-46000 B, Process Standards - Reactor

Six revised standards were issued during the month. These were:

Process Standard A-022 - "Bulk Outlet Water Temperature Limit"

Design changes have recently been completed where the former undervoltage relays for the 190 Building process water pump motors were replaced with underpower relays. The standard was revised to correct relay terminology.

Process Standard A-080 - "Emergency Water Supply"

High-tank valves in the water supply lines to the reactor were formerly required to be throttled after a process water failure in order to conserve the reactor coolant. Present power levels require that the valves remain unthrottled during this same period following process water loss. The standard was revised accordingly.

The former requirement that water be shut off the thermal shield after process water failure was deleted from the standard. Emergency water flow available to the process tubes is not based on the premise that this action will be accomplished.

Process Standard B-010 - "Gas Composition, Pressure and Flow"

One-half to one hour of outage time can be periodically saved by permitting the reactor gas atmosphere to contain more than two per cent oxygen after the rods are withdrawn for startup. The revised standard permits operation with the oxygen content greater than two per cent up to a level of one power unit, thus providing additional purging time without significantly increasing the graphite burnout rate.

A former requirement that the oxygen content of the reactor atmosphere be reduced to .05 per cent before exceeding rapid graphite oxidation temperature was revised to specify that the oxygen content show a decreasing trend when the graphite reached rapid oxidation temperature, and that the reactor be shut down if the oxygen content is above .05 per cent, 48 hours after startup.

DECLASSIFIED

Process Standard C-040 - "Graphite Temperature Limits"

A statement was added to the standard to exclude use of the graphite temperature relaxation table which could permit graphite temperatures to exceed a specified limit within one lattice unit of an uncooled process tube. A maximum limit was specified for graphite temperature following reactor startups.

Process Standard C-070 - "Horizontal Rod Withdrawal, Power Increase"

More rapid approach to criticality is permitted in the revision whenever two sub-critical monitor systems are in service.

Process Standard F-020 - "Make-Up of Tube Charges"

Major changes made to this standard were as follows:

- 1) Lengthy sections of "Advice" were deleted.
- 2) Displacement of up to 25 natural uranium charges any distance upstream or downstream is now permitted without creating a total control problem.
- 3) Relaxation of the requirement for re-positioning slug junctions in the process tube, to prevent tube pitting at these locations, was provided.
- 4) Minimum charge-length specifications designed to prevent cavitation of the front-face fittings and connectors was deleted. This information is covered in Process Standard A-050 which specifies minimum process-tube pressures which will prevent cavitation of these fittings.

HW-46000 D, Process Standards - Reactor

Five revised standards were issued during the month. These were:

Process Standard A-020 - "Bulk Outlet Water Temperature Limit"

Process Standard B-010 - "Gas Composition, Pressure and Flow"

Process Standard C-040 - "Graphite Temperature Limits"

Process Standard C-070 - "Horizontal Rod Withdrawal, Power Increase"

Process Standard F-020 - "Make-Up of Tube Charges"

Revisions to the above standards are identical to those for HW-46000 B, above.

(Note: A-021 for D Reactor is A-022 for B Reactor).

DECLASSIFIED

DECLASSIFIED

HW-68343

HW-46000 F, Process Standards - Reactor

Four revised standards were issued during the month. These were:

Process Standard A-020 - "Bulk Outlet Water Temperature Limit"

Process Standard B-010 - "Gas Composition, Pressure and Flow"

Process Standard C-040 - "Graphite Temperature Limits"

Process Standard C-070 - "Horizontal Rod Withdrawal, Power Increase"

These revisions are identical to those issued for HW-46000 B, above.

HW-46000 H, Process Standards - Reactor

Four revised standards were issued during the month. These were:

Process Standard A-021 - "Bulk Outlet Water Temperature Limit"

Process Standard B-010 - "Gas Composition, Pressure and Flow"

Process Standard C-040 - "Graphite Temperature Limits"

Process Standard F-020 - "Make-Up of Tube Charges"

These revisions are identical to those issued for HW-46000 B, above.

HW-46000 K, Process Standards - Reactor

Two revised and two new standards were issued during the month. These were:

Process Standard A-080 - "Emergency Water Supply"

The revision was made to clarify the intent which requires that the high-pressure crosstie line be restored to service during a crosstie flushing operation, whenever any important electrical power backup facilities are removed from service.

Process Standard B-010 - "Gas Composition, Pressure and Flow"

The format of the standard was changed to conform to other reactor area process standard manuals.

Process Standard L-010 - "In-Reactor Test Facilities"

Process Standard L-020 - "Front-To-Rear - General Purpose Facility"

Two new standards which provide specifications for semi-routine irradiation of regular production material, or non-fissionable materials during slack periods of special irradiations, were added to the manual.

DECLASSIFIED

PROCESS CHANGE AUTHORIZATIONS

Six process change authorizations were issued during the month to permit temporary deviation from Process Standards - Reactor, HW-46000, and one process change authorization was issued to permit temporary deviation from Process Equipment Standards, HW-41000. These were:

PCA #O-108 - "Ball 3X Functional Testing, C Reactor"

Process Standard C-110 specifies that all ball 3X hoppers be tested once per year. Functional testing of the ball 3X system at C Reactor was resumed in November, 1959, after a postponement of nearly two years while completing Project CG-741, "Renovation of Ball 3X, 105-C." During the testing of fourteen hoppers, about 20 pounds of 3X balls per hopper were lost in the graphite stack.

A method for testing hoppers which eliminates the need for dumping the balls into the reactor is currently under study as a solution to this testing problem. Meanwhile, it is desirable to cancel further testing on channels in which gaps exist in the graphite. Borescoping of vertical channels may indicate that testing on select channels should continue.

To ensure compliance with the total control criterion, it is necessary to compensate for any potential decrease in the reliability of the ball 3X system due to this delay in testing.

This process change authorized postponement of the ball 3X hopper testing until March 31, 1961, provided:

1. Total control strength of the ball 3X system is considered as the number of ball 3X hoppers in service minus the strength of two hoppers in the maximum poisoning region of the reactor.
2. Continued effort is made to complete testing of the ball 3X system.

PCA #O-109 - "Vertical Rod System - C Reactor"

Process Standard C-090 allows a maximum of three vertical rods out of service during reactor operation. Recently, another vertical rod failed to enter the reactor upon scram, which brought the number of inoperable vertical rods up to four.

Continued operation was authorized until January 30, 1961, with one of the four channels restored, using a B-Reactor-type rod, and another of the remaining three rods restored into the scram circuit. The latter rod will scram to within eight feet of full in.

PCA #O-110 - "Spline Insertion Monitoring - K Reactors"

Process Standard C-120 specifies continuous monitoring of the outlet water

DECLASSIFIED

temperature of a process tube receiving a spline. It further requires that the splining operation be stopped if an increase, or no drop, in outlet water temperature occurs when at least eight feet of spline have been inserted under the active zone charge.

The present standard was written for spline insertion during equilibrium operation. A reduction in non-equilibrium production losses can be obtained during reactor startup from a minimum outage if splines can be inserted during the period of time prior to receiving a significant temperature indication or when the temperature effect due to spline insertion could possibly be masked by rod movements.

This process change authorized, until February 28, 1961, insertion of splines under operating conditions such that the temperature decrease due to spline insertion may not be detected provided:

1. Tube temperatures and process tube pressures are surveyed for evidence that the splines are properly inserted. The tube power on a tube with a properly positioned spline should be lower than an adjacent tube of similar loading and the process tube pressure should be higher.
2. When both temperature and pressure indicate that a spline is not properly positioned, the outlet temperature and process tube pressure will be monitored hourly.
3. The reactor will be shut down upon any unexplained temperature change or unexplained pressure increase of 10 psi or greater.

PCA #0-111 - "Graphite Thermocouple Stringers, KE and KW Reactors"

Process Standard C-040 requires that the K reactors contain nine serviceable graphite thermocouple stringers. This standard also requires replacement of graphite thermocouple stringers within three months whenever the stringer is no longer serviceable. Serviceability is defined in the standard. This process change authorizes operation with less than the specified number of serviceable graphite stringers until February 24, 1961, provided:

1. Continued effort is made to (1) remove failed stringers, and (2) install a test stringer into stringer channel #5 at KE Reactor under Production Test IP-313-N.
2. Graphite temperatures in the unmonitored regions of the failed stringers are calculated as specified in section 40.04 of the referenced standard.
3. The 50°C increase (Figure 4, Production Test IP-312-A, reference 4) in the maximum limit for graphite within one lattice unit of (a) uncooled process tube channels, and (b) enrichment columns when helium percentage is over 95 per cent shall not apply to regions of the reactor not monitored by graphite thermocouple instrumentation.

DECLASSIFIED

DECLASSIFIED

HW-68343

PCA #0-112 - "Water Leak, DR Reactor"

Process Standard B-010 specifies the maximum permissible condensate collection rate from the reactor gas atmosphere.

On December 19, 1960, the water collection at DR increased slightly over that permitted in the reference standard. No loss in reactivity has been observed and a survey of tube powers did not show excessive amounts of water in the moderator. These data indicate the water leak is in the rear section of the reactor, and will not significantly affect reactor life.

In order to permit efficient job and manpower scheduling for the impending outage, continued operation was authorized by this process change until December 22, 1960, provided the following specifications were met:

1. The dewpoint of the inlet gas to the reactor should be maintained at less than 15°F.
2. Reduction in tube power should not be attributed to water in the moderator.

PCA #0-113 - "C Elevator Photocell Interlock, D-DR Reactors"

Process Equipment Standard D-050 specifies that a photocell interlock shall be provided for the C elevator which will prevent or stop elevator movement if an object interrupts the photocell beam. In April, 1959, D and DR were authorized to substitute interlocks on individual pieces of equipment, which might cause damage to the front-face assemblies, for the photocell which had become inoperable.

This process change authorized, until July 28, 1961, D and DR to continue without photocell protection on the C elevator provided either (1) the electrical interlocks on individual charging machines, or (2) the Interference Scanning Trolley, presently being developed, are maintained in service during reactor operation.

PCA #0-114 - "Removal of High Pressure Crosstie Flow Limiting Orifices, K Reactors"

Removal of the flow-limiting orifice from the high-pressure crosstie and safety circuit changes were to be made which would delay opening of the V-73 valve until five seconds after the aiding reactor has been shut down. These changes were made to increase the flow rate of the coolant backup system. The changes could also result in more flow being diverted than desired.

This PCA presented a valving procedure to be used at a shutdown K Reactor to minimize the potential for unwanted coolant diversion.

PROCESS ASSISTANCE

One engineer audited the conformance to process standards by making fourteen inspections at each reactor during the report period.

DECLASSIFIED

DECLASSIFIED

HW-68343

RUPTURE EXPERIENCE

<u>Failure Date</u>	<u>Tube Number</u>	<u>Lot Number</u>	<u>Type of Material</u>	<u>Exposure</u>	<u>Type of Failure</u>
1/2/61	0868-F	KL-534-D	I&E N	614	Unknown
1/9/61	3781-H	KL-550-H	I&E N	648	Unclassified
1/13/61	1366-D	CL-951-A	I&E N	512	Side Hot-Spot
1/13/61	3167-KE	KR-249-D	I&E N	642	Unknown
1/21/61	2676-D	KL-530-D	I&E NB	957	Side-Other
1/23/61	3090-KW	KS-228-F	I&E E (0.94%)	841	Side Hot-Spot
1/23/61	0982-H	KO-108-C(1)	I&E N	523	Side-Other
1/23/61	5384-KW	CR-865-A	I&E N	621	Hole
1/26/61	2878-D	KL-530-D	I&E NB	966	Side-Other
1/28/61	2657-DR	KH-219-D	I&E E (0.94%)	775	Side-Other
1/31/61	3379-H	KL-596-A	I&E N	757	Hole

(1) Six inch element with attached water mixer spool.

Legend

I&E N - This is the symbol for internally and externally cooled production reactor fuel elements of natural uranium.

I&E E - This is the symbol for internally and externally cooled production reactor fuel elements with uranium cores enriched in U-235. The weight per cent U-235 in the core material is stated.

I&E NB - This is the symbol for internally and externally cooled production reactor fuel elements of natural uranium which have projections (bumpers) welded to the fuel element jacket.

Unknown - Failed piece could not be located or had not been examined at the time of writing.

Unclassified - The failure did not logically fall into any of the usual types.

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

Side-Other - Failure probably caused by corrosion or water penetration of the external can wall or other unknown mechanism.

Hole - Failure occurred on the internal surface of an internally and externally fuel element. The failure was probably caused by water penetration through a weld.

WATER TREATMENT

Low-Grade Bauxite Feeder

The feeding of low-grade bauxite to produce low-cost alum has been proceeding satisfactorily during January, 1961, at 183-B.

DECLASSIFIED

HW-68343

OPERATIONAL PHYSICS OPERATION

PILE PHYSICS ASSISTANCE

Operation at most reactors was smooth and without appreciable reactivity and control problems in spite of higher-than-normal average pile residual exposures.

SUMMARY OF OPERATING DATA OF PHYSICS INTEREST
FOR THE MONTH OF JANUARY, 1961

Reactor	B	C	D	DR	F	H	KE	KW
ECT In January (1)	1510	1715	1510	1520	1465	1620	2490	2560
12-Month Average ECT	1480	1695	1495	1550	1445	1625	2515	2495
Equil. Scram Time (2)	14-17	18-22	15-17	30-35	14-20	25-30	25-30*	23-27*
No. of Scrams and Recoveries (3)	0/0	0/0	0/0	1/1	0/0	2/2	0/0	0/0
No. of Non-Scram Outages (4)	0/0	5/3	0/0	0/0	1/0	0/0	1/0	0/0
No. of Non-Scram Outages (4)	2/0	2/0	2/0	5/0	2/0	4/0	3/0	1/0
Recording Period								
From:	12-21	12-20	12-21	12-21	12-21	12-21	12-21	12-22
To:	1-23	1-24	1-23	1-20	1-20	1-23	1-23	1-24

*Equilibrium scram recoveries are not attempted at the K Reactors.

- (1) Effective Central Tubes: This value is defined as pile power level divided by the average of the ten most productive tubes in the reactor.
- (2) This is defined as the maximum time available in minutes between scram and first indication of startup.
- (3) The first pair of numbers shows the number of brief outages from which secondary cold startups would be made and the number of successful startups. The second pair shows the number of brief outages from which hot startups would be made and the number of successful recoveries.
- (4) 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 Reactor - J. H. Ferguson

A new record high equilibrium power level was achieved at B Reactor during the report period. Operating continuity was interrupted only by an unscheduled outage to repair a water leak early in the report period and by a scheduled outage.

Spline usage during equilibrium, initiated in December, was increased, and two splines were used for turnaround reactivity control for the first time.

C Reactor - D. E. Newbrough

High power levels and excellent flattening efficiencies characterized operation during the report period; a new record high power level was attained and the record high ECT established in November was equaled.

There were two full-length outages, one a scheduled outage and the other caused by a rupture. In addition, three recoveries were made from scrams caused by a Beckman malfunction and a Panellit trip, and for repair of a front pigtail leak.

Although C Reactor continues to have problems with sticking VSR's, (two VSR's were out of service and two would not fully insert during the last outage of the report period) total control requirements have been satisfied through use of unlocked Ball 3X channels and additional poison splines. More conservative startup procedures necessitated by the temporary loss of the flexowriter outlet tube temperature transcriber resulted in a startup efficiency decrease on January 21, conservatively estimated at 15 per cent of an equilibrium day's production

D Reactor - D. W. Constable/J. F. Jaklevick

A high flattening efficiency and seven-pump operation resulted in operation on bulk outlet water temperature limits during part of the operating period. Two outages, both caused by ruptured fuel elements, interrupted continuity. A new record high power level was achieved.

DR Reactor - J. F. Jaklevick/D. G. Montague

The fourth block discharge was taken on January 5, terminating the third block cycle. Although residual exposure of the central block reached a new high prior to the discharge (800 MWD/Ton), no significant operating problems were encountered, and startup efficiencies during the period were about normal. Of the four outages which occurred during the report period, one was the scheduled outage for the block discharge and the other three were due to water leaks. Subcritical monitor failure and improper P.C. chamber settings required that two startups be made using the Beckman high level flux monitors (demonstrated sensitivity of 200 watts); more conservative approaches to critical were made to ensure nuclear safety.

Spline usage at DR continued on a limited basis; just prior to the block discharge splines were gradually withdrawn to compensate for the long-term losses being experienced. Their use during the high exposure portion of the discharge cycle contributed markedly to the increased operating stability over that experienced prior to the third block discharge last September.

F Reactor - C. D. Wilkinson

A reactivity shortage caused by the increasing number of inactive tubes has required use of additional enrichment to compensate for the reactivity loss; this additional enrichment has required greater use of splines during shut-down to meet total control requirements. Flattening efficiency exceeded the

past average values, although it has also been somewhat limited by the tubes out of service. Operation during the report period was interrupted only twice, once by a water leak and once by a rupture.

Spline insertion performance has improved to about 60-70 per cent success in spline insertion attempts compared with a 50 per cent success rate up to this report period. Tube bowing has appeared to be the major cause of the spline sticking.

H Reactor - S. L. Stewart/A. R. Kosmata

Operation during the report period was interrupted by four outages - two for ruptures, one for repair of a Parker fitting, and one for a broken lug ring. In addition, a shutdown permitting a subsequent secondary cold startup was required for installation of a bayonet on an air channel.

Despite the high central zone residual and thus higher potential for distributional cycling caused by the block discharge, operation has been smooth with continued good flattening efficiency. The virtual termination of hot reactivity gains, thus stopping the continual insertion of control into the reactor, has been a primary factor in the stable operation.

KE Reactor - G. F. Bailey

Inability of the four newly installed shorter half-rods to hold water pressure resulted in KE starting up with no useable half-rods and no rods in these four locations (the new half-rods are "black" to neutrons over 40 per cent of the active zone length compared to 60 per cent in the former K Reactor half-rods). A consequent flux distortion to the near side caused a large prediction error; a 20 second rising pile period was attained before completion of the normal "first pull" of the horizontal rods. The subcritical monitors detected this condition, and the reactor was scrammed from about 500 watts; additional splines were inserted and operation was resumed without incident. Although control was difficult without half-rods, a relatively high ECT was maintained. During the final outage of the report period the short half-rods were reinstalled; the new rods appeared to function well, and no control or flattening problems arose in adapting operation to their use. Two natural uranium ruptures and a KER failure caused the three outages of the report period.

KW Reactor - R. A. Chitwood

Continuous operation for a 30-day operating period was terminated by a rupture 3 hours before a scheduled shutdown; the power level was restricted by the AEC administrative limit.

Long-term gains were compensated during the first portion of the long operating period by spline insertion; during the more cycle-prone second half the smoother control method of increasing helium concentration to lower graphite temperatures was used. Except for a minor distributional cycle for two days in the middle of the operating period control was very steady.

DECLASSIFIED

HW-68343

PROCESS PHYSICS STUDIES

Safety Control Studies

Total control calculations have been based on the assumption of 100 per cent equivalent operability of the safety system, a reasonable assumption in the case of isolated rods or ball channels temporarily out of service provided the other control element for that channel is still available. Recent C Reactor channel obstructions have posed a problem of possible simultaneous loss of VSR and Ball 3X from the same channel. Documentation is currently being prepared of the criteria used to define system "operability" in the case where only one of the two elements is in working order, in various cases of Ball 3X hopper lock-out, and in cases where both elements are out of service.

File Reactivity Studies

A document summarizing the functional requirements of NPR startup physics tests and the types of tests necessary to fulfill these functions has been prepared for issue in the near future.

A low-level small-block reactivity test for the E-N loading has been approved as PT IP-385-C and is to be carried out during the natural-uranium block discharge early in February. The E-N reject material to be used in this test will be discharged from the reactor prior to startup.

An analytical study on conversion efficiencies in support of the overbore and E-N programs indicates that the reduced fringe conversion ratio tendency noted in E-N test loadings is confirmed analytically for natural loadings as well.

The desk-model analog computer ordered by Operational Physics was received during the month. It is currently undergoing operational and calibration checks.

Shielding and detection equipment to provide longitudinal flux traverse information from irradiated splines has been fabricated by Equipment Development Operation, and initial results indicate the method's technical feasibility.

Control Efficiency Studies

Recommendations were made that H Reactor be given priority in spline coiler installation because of the special needs of the E-N program; the spline coiler project installation appears to be moving ahead at all of the older reactors.

It is encouraging that the cost of the boron-aluminum sintered splines has been coming down as their use has increased. In the last order for six thousand splines the cost of \$22.65 per spline is only slightly over half the original cost per sintered spline.

DECLASSIFIED

HW-68343

The six-channel prototype poison column displacement system has been removed from the KW Reactor pending redesign. Rewinding of one of the winch motors which failed due to water saturation was apparently unsuccessful.

PT IP-383-C, authorizing operator action to simulate automatic control parameters, has been approved for trial in the near future at the D Reactor. Automatic control studies are presently focused on establishing criteria for the necessary protective devices to ensure that a controller would disregard faulty signals.

Improvements in startup efficiencies with increased use of supplementary control during 1960 are pointed up by fourth quarter comparisons of 1959 and 1960 in the following table.

Comparisons of Potential Gains - 4th Quarter 1959 and 1960

	Ave. Effective Day Loss Per Startup		Level Oper. Efficiency, %	
	<u>4th Q. 1959</u>	<u>4th Q. 1960</u>	<u>4th Q. 1959</u>	<u>4th Q. 1960</u>
5 Older Reactors	.60	.33	93.8	96.9
C&K Reactors	1.0	.25		

Shielding Studies

Preliminary radiation checks on the three channels at C Reactor overbored and equipped with corresponding hardware during the month indicate dose leakage rates no higher from these channels than from surrounding regular-size columns. The ring and donut assembly for these outer channels includes 2" boron steel at the extreme outside and approximately 18" of iron-epoxy hydrogenous material in the outer half of the biological shield.

Reactor Fundamentals Training

The Winter-Spring session for pile operators was initiated during the month. This section includes pile operators from all shifts of Reactor Processing and Supplemental Crews Operation and several people with radiation monitoring assignments. This is the second such series; shift personnel from each shift involved attended one half-day class per month for four consecutive months. Reactor specialist classes continued during the month with guest Physicists also contributing.

A series of four 2-1/2 hour classes, one for each shift, is currently being presented for H Maintenance craftsmen; attendance has been approximately 15 per session. One 2-1/2 hour session on reactor fundamentals was presented for a group of 15 for Maintenance Practices Operation, primarily for instrument trainees.

TESTING OPERATIONIRRADIATION TESTINGDR-1 Loop

The MGCR-HDR-3 test element was loaded into the DR-1 Loop January 5. Operation with nuclear heat generation in the element, began January 8. The loop was operated a total of 372 hours, 187 hours at test reference conditions (1500 F cladding temperature). The test element has been thermally-cycled three times, between 1500 F and 450 F, without incident.

H-1 Loop

H-1 Loop was cooled by single-pass process water during the entire report period.

Sample Irradiations

The following samples were irradiated or undergoing irradiation during the month:

<u>Reactor</u>	<u>Test Hole</u>	<u>Facility</u>	<u>Request No.</u>	<u>No. of Samples</u>	<u>Material - Purpose</u>
KE	2D	Quickie	HAP0-184	12	Washington Designated Program.
DR		PCCF	HAP0-184	1	Washington Designated Program.
KE	2D	Quickie	HAP0-172	2	Effluent water(radio-isotopes concentration study).
DR		PCCF	HAP0-172	1	Effluent water(radio-isotopes concentration study).
KW	4C	Snout	HAP0-252	9	Flux monitors(determine the fast-to-thermal neutron ratio in reactor shield).
KE	2D	Quickie	HAP0-252	1	Arsenic(tracer isotope production).
KE	2D	Quickie	HAP0-253	2	Ceramics(radiation damage study).
KE	2D	Quickie	HAP0-254	2	Phosphorous(tracer isotope production).
F	E	Quickie	HAP0-223	6	Titanium(radioactive decay characteristics of NPR rod material).
KW	4C	Snout	HAP0-249	1	Graphite(damage studies).
KW	2C	Hot Graphite	HAP0-177	1	Graphite(damage studies).
KW	4B	Snout	HAP0-243	3	Reactor structural materials(fission damage studies).

DECLASSIFIED

Reactor	Test Hole	Facility	Request No.	No. of Samples	Material - Purpose
DR		PCCF	HAPO-218	2	Uranium(fission product release studies).
KE	0074	General Purpose	HAPO-223	15	Cobalt(production of cobalt-60 for Gamma Facility).
KW	3A, 3C	General Purpose	HAPO-236	2	Zirconium(creep test).
KE		Gamma	HAPO-171	11	Rubber and plastic (damage study).
		Gamma*		2	Cooling water precipitate(damage study).
		Gamma*		1	TV equipment(damage study).

*Gamma Irradiation Facility in Building 105-KE storage basin.

Borescoping Activities

Vertical Safety Rod Channels 12 and 13, DR-Reactor - These channels were inspected to determine why the VSR's were reluctant to enter the channel. The vertical liner blocks were found to be split, with some blocks tilting out into the channel and others broken off. Scratch marks from the rods in the channel, one at 10 feet down and one on the opposite side of the channel at 18 feet down, were observed.

Process Tube 2863, D Reactor - This tube was examined to determine the reason for the difficult charging of "bumper" fuel elements. A three-inch section of the tube, 9-1/2 feet from the inlet tube flange, was found to have a "blistered" appearance.

Overbored Process Channels 0954, 1453, and 1494, C Reactor - These channels were examined to investigate the reason for retubing difficulty. There were observed 3/16-inch shoulders in the graphite in each of the overbored channels.

Vertical Safety Rod Channels 50 and 59, KE Reactor - These channels were examined to determine the cause of reluctant VSR entry. The graphite filler blocks were found protruding into the channel approximately 1-1/4 inch at 13 feet down from the bumper block.

Process Channel 4163, H Reactor - The channel is blocked by a piece of graphite at 19-1/2 feet from the inlet tube sleeve. The tube blocks are all badly broken to this point. The channel is blocked at 17-1/2 feet from the outlet tube sleeve. The tube blocks are all cracked and split to this point. There is a small amount of aluminum in the inlet section of the channel. The total aluminum observed was less than 100 grams.

Vertical Safety Rod Channel 41, C Reactor - This channel was examined to determine the cause for the failure of the VSR to enter the channel. A broken piece of filler block, found blocking the channel at 12-1/2 feet down from the bumper block, was removed. The channel was re-inspected and

~~DECLASSIFIED~~

HW-68343

another piece of filler block was observed to be completely blocking the channel at 14-1/2 feet down from the bumper block.

Vertical Bowing Measurements

A summary of vertical bowing measurements follows. All distances are measured from the process tube inlet flange.

<u>Area</u>	<u>Date</u>	<u>Tube No.</u>	<u>Distance</u>	<u>Remarks</u>
105-H	12-28-60	4354-H	36 feet	Up .01 inch at 9 feet since 12-12-59. Down .24 inch at 19 feet since 12-12-59.
105-H	12-28-60	4674-H	36 feet	Up .01 inch at 7 feet since 8-8-60. Down .11 inch at 22 feet 8 inches since 8-8-60.
105-H	12-28-60	4393-H	36 feet	Down .08 inch at 10 feet since 12-12-59. Down .26 inch at 22 feet since 12-12-59.
105-DR	1-17-61	4675-DR	36 feet	Up .05 inch at 9 feet since 2-2-60. Down .36 inch at 19 feet since 2-2-60.

COOLANT TESTING

KER Loop Operations

KER-1 - Testing of ten 15-inch fuel elements with electron-beam-welded end caps as authorized by PT-IP-378-A continued throughout the month.

During the January 13 outage a new secondary clean-up heat exchanger was installed in Cell #1. The heat exchanger installation followed unsuccessful attempts to stop leaks at the tube-to-shell seal on the old heat exchanger. The new heat exchanger was relocated to a position between the primary pumps and the east wall to afford more convenient access for maintenance. The previous location was between the primary pumps and the west wall. Relocation was made possible by lowering and moving the KER mock-up tube closer to the west wall.

On January 19 the influent temperature thermocouple suddenly blew out of the front-face thermocouple block, resulting in a reactor scram. During the outage the front-face thermocouples were removed from the KER loops and replaced with pipe plugs pending further investigation of the thermocouple assembly design.

KER-2 - Testing of four 18-inch, 1.6 per cent enriched single-tube elements (KSE-3) and four coupon holders containing carbon steel, stainless steel, and Zircaloy-2 corrosion samples as authorized by PT-IP-363-A continued throughout the month.

On January 8 a pipe leak developed near the tee at the primary heat exchanger discharge. The loop was operated at minimum temperature and low pressure until the January 13 outage. During the outage, the leaking section was cut out and replaced. Examination of the removed section revealed a circumferential crack in the pipe wall approximately four inches beyond the downstream weld

DECLASSIFIED

HW-68343

of the heat exchanger tee.

KER-3 - Testing authorized and described by PT-IP-363-A continued throughout the month. The charge consists of four 18-inch, 1.6 per cent enriched elements (KSE-3) and is identical to the KER-2 charge.

On January 6 operating conditions were revised to allow a lower effluent temperature in order to produce uranium temperatures comparable to those expected in NPR.

KER-4 - Testing of four 18-inch, 1.6 per cent enriched elements (KSE-3) as authorized by PT-IP-363-A continued until the January 13 outage. The loop was then tray-discharged for the purpose of providing low exposure data pertaining to KSE-3 elements. These fuel elements were charged on November 11, 1960. The discharged elements were given particular attention because above-normal delayed neutron activity (approximately three times normal) and high beta activity (approximately ten times normal) was evident in the loop water since the reactor startup on December 16. No release of crud was noticed upon discharge. The discharged elements had a dull black appearance (in contrast to the normal shiny black appearance of ZrO_2) as if covered with lampblack. This easily rubbed off with handling in the KE viewing pit, disclosing areas with a gray metallic appearance. There was no evidence of shiny black ZrO_2 under the dull layer. cursory examination in the 105-KE storage basin disclosed what may be a small crack in the weld bead at the end of one element, but this could not be confirmed because of the conditions of examination.

The loop was recharged on January 14 with four 24-inch NIN-1 elements as authorized and described by PT-IP-377-A. Irradiation of the natural uranium, single tube elements is planned as a demonstration of the behavior of N-Reactor inner fuel tubes operating at N-Reactor conditions.

The loop was operated at minimum temperature and low pressure from January 17 through 19 because of a flange leak on the rear face. The leak was repaired on January 20, and the loop was returned to normal operation. Delayed neutron and beta activity levels have returned to normal.

1706-KE Single-Pass Tube Operation

All eight tubes were supplied normal process water by 105-KE throughout the month.

Outage Performance

A total of 38.7 outage hours (including one unscheduled outage) was charged to Coolant Testing during the month. Distribution was as follows:

<u>Production Test</u>	<u>Description</u>	<u>Time</u>
IP-363-A and 377-A	Discharge and recharge KER-4	4.8 hours
IP-378-A	Unscheduled outage--KER-1 thermocouple failure	33.9 hours

Ex-Reactor Facility Operation

1706-KE Mock-Up Tubes

Operation of three tubes continued throughout the month. Test objectives are as follows:

1. Determination of corrosion characteristics of improved nickel-plated fuel elements.
2. Determination of corrosion characteristics of aluminum cermet.
3. Prefilm carbon steel samples at different exposure temperatures in process water for later testing of candidate decontamination procedures.

Dowtherm - The carbon steel and copper-clad carbon steel heat exchanger tubes were removed on December 29 and replaced with new carbon steel tubes. Testing to determine the effects of raw water film build-up on the new tubes was resumed on December 31. Testing continued throughout January.

ELMO-4 - During the shakedown run started December 28, the loop recirculating pump failed. Disassembly and examination revealed that the rotor can had swelled, possibly because of a weld leak. The loop remained shut down pending repair of the rotor which was returned to the manufacturer.

ELMO-5 - Testing of Zircaloy-2, Haynes Alloy No. 41, and carbon steel subjected to various heat treatments to determine the uniform corrosion rate in 290 C, pH 10 water was continued during the month.

ELMO-6 - Corrosion testing of aluminum alloys X-8001 and A-288 at 300 C and pH 6 to pH 7 water continued throughout the month.

ELMO-7 - Testing continued throughout the month as follows:

1. Thermal cyclic tests were performed on two KER inner fuel elements.
2. Dummy fuel elements remained charged to determine the corrosion rates of various types of "suit-case-handle" supports.
3. A stainless steel tubular dummy remained charged in a Zircaloy-2 tube to determine the effects of chattering.

ELMO-8 - Loop rebuilding continued throughout the month.

ELMO-10 - Three decontamination cycles of test coupons which had been conditioned in CEP-1 were completed during the month.

CEP-1 - Testing associated with the effects of cyclic decontamination and operation on corrosion rates of galvanically coupled welds, mechanically-coupled stainless steel to carbon steel and Zircaloy-2, and mechanically-coupled carbon steel to Zircaloy-2 was completed on January 23. Eight decontamination cycles were completed during the life of the test.

CEP-2 - Testing of fretting corrosion characteristics on Zircaloy-2 was continued throughout the month.

DECLASSIFIED

CEP-3 - The loop is being rebuilt following the damage caused by the connector failure on November 22.

CEP-4 - The loop remained shut down during the month pending fabrication of new piping connectors.

REP-1 - One gross contamination-decontamination test was completed during the month.

COMPONENT TESTING

Irradiated Fuel Element Examination

Examinations were completed on fuel elements from the following 64 tubes during the month of January in the Metal Examination Facility (105-C).

<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>
84A	0769-B	216A	3976-C	216A	3463-KE	216A	3651-KW
	0772-B		4180-C		3659-KE		3982-KW
171A	0353-B		0865-F		3687-KE	321A	2157-C
197A	4963-KE		1373-F		3695-KE		2159-C
	5063-KE		1472-F		4351-KE		2279-C
216A	0871-B		1478-F		5675-KE		2284-C
	0873-B		2861-F		0674-KW		2561-C
	1881-B		4261-F		0789-KW		3264-C
	3174-B		0982-H		1267-KW		3287-C
	3874-B		1164-H		1280-KW		3383-C
	3884-B		1776-H		1467-KW	347A	1458-H
	4274-B		1957-H		1470-KW		1483-H
	2057-C		0783-KE		1872-KW		1663-H
	2080-C		2970-KE		2064-KW		1684-H
	3884-C		3186-KE		2551-KW		3463-H
	3962-C		3280-KE		2875-KW		3486-H

Sorting (out of 17 tube charges) of specially-selected bumper fuel elements for bare-core measurements has been completed, and the elements are awaiting stripping.

New Equipment

A new cartridge hoist was installed in the Metal Examination Facility (105-C). This hoist will be used at the ID Micrometer and Fuel Element Breaker stations.

Process Tube Corrosion Monitoring Program

In-reactor measurements of 325 process tubes were completed during the month. Listed below are the number of tubes measured for each reactor and document numbers of reports issued.

DECLASSIFIED

DECLASSIFIED

HW-68343

<u>Reactor</u>	<u>Number of Tubes Probologged</u>	<u>Report No.</u>	<u>HW Number</u>
H	33	69	67950
F	45	1	68009
DR	139	2	68112
B	20	3	68136
H	8	4	68137
F	34	5	68175
D	39	6	68200
C	7	7	68231

Visual examination, wall-thickness and rib-height measurements were completed on two tubes from B Reactor, one tube from DR Reactor and one tube from H Reactor.

Tubes 1276-B and 2379-B were leakers. Tube 1276-B was installed in March, 1956. The leak was located in the top half, 10-1/2 feet from the outlet tube flange and was caused by internal corrosion. Tube 2379-B was an original tube. The leak occurred between the ribs nine feet from the outlet tube flange.

Tube 4270-DR was examined to investigate the extent of damage due to a stuck fuel element. The ribs between 19 and 21-1/2 feet from the outlet tube flange were so severely gouged and flattened that no accurate measurements could be made. The tube contained a slight bulge at 21-1/2 feet from the outlet tube flange, caused by the ruptured fuel element.

Tube 3093-H was removed from the reactor because it was a leaker. A 3/4 inch transverse crack was found in the tube. The crack was located on the top half 19-3/4 feet from the outlet flange and approximately between the 1 and 3 o'clock position. The sample containing the crack was taken to Radiometallurgy Laboratory, HLO, for further studies to determine the cause of transverse cracks occurring in H-process tubes.

Assistance was provided to Hanford Laboratories Operation, Chemical Research Operation, in their effort to obtain samples from a C-process tube.

Front Face Flexible Connector Examination

Examination was made of 16 connectors removed from three different reactors. A detailed report of the examination has been issued.

Panellit System Programs

Gauges repaired,calibrated by Maintenance	-	277	
Gauges meeting examination criteria	-	237	(86 %)
-previous month	-		(92 %)
In-board gauge reliability examinations	-	1253	
Gauges meeting examination criteria	-	1177	(94 %)
-previous month	-		(86 %)
-average for past year	-		(89 %)

Response time determinations -	1253	
Meeting response criteria -	1186	(95 %)
- December, 1960		(97 %)
In-board coil leak examinations -	4693	
Non-leaking coils -	4681	(99.8 %)
- average rate for last two years		(99.5 %)

Critical component inspection of Panellit gauge components for warehousing and direct to user availability, is as follows:

	<u>Switches</u>	<u>Bourdon Coils</u>
Inspected	214	140
Rejected	10	5
Rejection rate	5%	4%

During the month, 132 gauges received routine failure analysis program attention.

Examination of Delrin pivots and bushings currently undergoing wear tests during the month, has shown that more-than-adequate wear performance can be expected from this material. Tests will continue until wear in other portions of the test gauges make them inoperable.

O. H. Greager
Manager, Research & Engineering

DECLASSIFIED

MANUFACTURING

PRODUCTION OPERATION

PRODUCTION PLANNING & SCHEDULING OPERATION

The discharge exposure plan was not changed during January. The average discharge exposure was 732 MWD/T, exceeding the high attained in CY 1960 by 18 MWD/T. Large high exposure discharges at DR and the K Reactors were primarily responsible for this high average discharge exposure.

Discharge Exposure Comparison (MWD/T)

	<u>Regular Solid</u>		<u>Regular I&E</u>		<u>Enriched I&E</u>	
	<u>6 Old</u>	<u>2 K's</u>	<u>6 Old</u>	<u>2 K's</u>	<u>6 Old</u>	<u>2 K's</u>
November	713	749	709	700	849	681
December	721	759	693	642	850	678
January	746	782	724	708	854	799

ESSENTIAL MATERIALS

Rail and truck shipments received in January were as follows:

Carload shipments for IPD	-	283
Carload shipments for other Depts.	-	242
Truck shipments for IPD	-	<u>110</u>
Total		635

MISCELLANEOUS ACTIVITIES

The Department's forecast of work assignments for use in the Manufacturing Training Program during calendar 1961 was firmed and forwarded to Mfg. Services. Preparations were made for the planning of Program member's transfers to other GE locations, beginning in June.

DECLASSIFIED

DECLASSIFIED

HW-68343

REACTOR OPERATIONS STATISTICS - PROCESSING													
MONTH													
JANUARY, 1961													
INPUT PROD.-PU (% OF FORECAST)													
TIME OPER. EFF. (% OVERALL)													
NO.OF REACTOR OUTAGES & HOURS													
SCHEDULED	NO.	HRS.	B	C	D	DR	F	H	KE	KW	TOTAL		
	1	152.4		114.3	92.3	90.6	113.3	82.8	112.9	118.5	106.6		
UNSCHEDULED - SCRAMS	-	-		87.5	75.3	73.6	80.3	65.5	85.2	90.3	79.5		
- OTHER	2	10.9											
TOTAL	3	163.3											
BREAK'D'N OF REACTOR OTGE HRS.													
PLANNED													
CHARGE-DISCHARGE													
TUBE REPLACEMENT													
PROJECT WORK													
PRODUCTION TEST													
MAINTENANCE													
MISCELLANEOUS													
SUB - TOTAL													
UNPLANNED													
CHARGE - DISCHARGE													
PRODUCTION TEST													
RUPTURE REMOVAL													
WATER LEAK													
MAINTENANCE													
INSTRUMENTATION													
PANELLIT													
MISCELLANEOUS													
SUB - TOTAL													
TOTAL													
NO.SLUG RUPT. (ALL TYPES)													
NO.NEW TUBES INSTALLED													
TYPE OF WATER LEAK - TUBE													
VAN STONE													
Helium Consumed M Cu. Ft.													

Remarks: (1) Removal of two ruptures charged under IP-262-A (Bumper)
 (2) Includes removal of metal from "D" elevator (90.0 hrs.); Replacement of leaking front Parker fittings and broken front nozzle lug ring (49.4 hrs.).
 (3) Trip caused by KER-1 Thermocouple slipping out of its seal.

[REDACTED]

HW-68343

REACTOR OPERATION STATISTICS – SLUG RUPTURES

[illegible]

DECLASSIFIED

HW-68343

MONTH	REACTOR OPERATIONS STATISTICS — POWER										SHEET 2	
	100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW	TOTAL			
WATER TREATMENT DATA												
AT BLDG. 182												
BLDG. 183												
MM GALS	2745.2	4775.2	3587.2	2518.0	3426.3	2910.5	7405.8	7682.5			35051.0	
MM GALS												
CHEMICAL CONSUMPTION												
CHLORINE (BLDG. 182)												
BLDG. 183)												
LBS.												
LBS	7857	16483	2800	1910	14088	10375	14000	24700			92213	
AVG PPM	0.3	0.4	0.1	0.1	0.5	0.4	0.2	0.4			0.3	
Aluminum Nitrate												
LBS												
AVG PPM												
Alumina												
LBS	25552	28374	80830	79209	101220	**108177	188400	220000			53926	
BLDG. 183)	2814	20015									800665	
AVG PPM	4.6	3.4	2.7	3.8	3.5	(2)	5.1	3.4			3.7	
LBS	50	50	0	0	118	110	0	0			328	
AVG PPM	.002	.001	-	-	.004	.005					.003	
SULPHURIC ACID												
(AS 100%)												
LBS	198959	318225	278593	197347	268113	204646	653900	576000			2695783	
AVG PPM	8.7	8.0	9.3	9.4	9.4	8.4	10.6	9.0			9.2	
DICHROMATE												
LBS	48026	44267	45593	43432	50239	38955	106400	111000			487912	
PURGE MATERIAL CONSUMPTION												
SOLIDS												
LBS	3750	0	0	1200	0	0	0	0			4950	

*Alumina and alum combined for PPM avg. in alum column.

**Based on (1) 360.7 MM gals treated, and (2) 2549.8 MM gals.

MONTH		REACTOR OPERATIONS STATISTICS — POWER										SHEET 1	
JANUARY, 1961		100-B	100-C	100-D	100-DR	100-F	100-H	100-KE	100-KW	TOTAL			
RIVER WATER (BLDG. 181)													
TO RESERVOIR (BLDG. 182)		13210		2366		4307	2398			22281			
TO FILTER PLANT (BLDG. 183)		61496		80358		76754	65200	165900	172100	621803			
TO FILTER PLANT (CSDR)		106977		56406						163383			
TO R & E (KER) & FEO				203				752		955			
TOTAL		181683		139333		81061	67598	166652	172100	808427			
TOTAL		8110.3		6219.8		3618.6	3017.6	7439.4	7682.5	36088.2			
RESERVOIR WATER (BLDG. 192)													
TO POWER HOUSE (BLDG. 184)		54		65		404	68			591			
TO COND. SYSTEM (BLDG. 190)				534		3872	2330			6736			
TO COND. SYSTEM (190DR & 183F)				1767		31				1798			
TO EXPORT SYSTEM Inc. NPR.		13156		0		0				13156			
TOTAL		589.7		105.6		192.3	107.0			994.6			
FILTER WATER (BLDG. 183)													
TO POWER HOUSE (BLDG. 184)		187		202		117	162			668			
TO PROCESS (BLDG. 190)		71990	85145	68877	65612	75030	60500	163444	170139	760737			
TO 108		2500	5000	148		1028	1240			9916			
TO 108DR				149						149			
TO FILTER PLANT (BLDG. 183DR & 183B)			14321	9728						(24049)			
TO F & S SYSTEM		100		248						672			
TO R & E (KER) & FEO				153		191	83		50	367			
BACKWASH & Basin		1040	2511	853	522	388	3215	214	1911	12682			
TOTAL		3384.5	4775.5	3587.2	2952.2	3426.3	2910.5	7405.8	7682.5	36124.5			
PROCESS WATER (BLDG. 190)													
TO REACTOR		71590	84745	68477	65212	74650	60000	158900	165800	749374			
TO REACTOR		85000	95000	83000	83000	87000	82600	180100	181800	877500			
POWER HOUSE (K AREA)								34	11	45			
108 (KE - KW)								4032	3928	7960			
TO R & E (KER)								78		78			
BUILDING USAGE		400	400	400	400	380	500	400	400	3280			
TOTAL		3213.6	3800.9	3074.7	2928.9	3349.3	2700.7	7296.2	7595.0	33959.3			
RIVER DATA													
ELEVATION (MSL, FT.)		388.3		380.8		367.2	372.5		383.3				
		384.3		377.4		364.0	369.4		379.0				
		386.9		379.1		365.8	371.3		381.2				
TEMPERATURE		41.3		45.8		46.0	45.9		43.9				

[REDACTED]

HW-68343

MONTH

JANUARY, 1961

REACTOR OPERATIONS STATISTICS — POWER

SHEET 3

ANALYTICAL DATA											
RAW WATER											
PH	PH AVG	8.0	7.8	8.2	8.2	8.1	8.1	7.7	7.5		
TURBIDITY	PPM AVG	5	6	6	6	5	3	7	7		
FINISHED WATER											
PH	PH AVG	7.1	7.1	7.1	7.1	7.0	7.1	7.0	7.0		
TURBIDITY	PPM AVG	.006	.007	.006	.007	.009	.006	.008	.009		
Cl ₂ RESIDUAL	PPM AVG	.05	.05	TRACE	TRACE	.05+	.06	.05	0.6		
DICHROMATE	PPM AVG	1.80	1.40	1.80	1.80	1.80	1.80	1.80	1.80		
STEAM DATA											
		100-B	100-D	100-F	100-H	B-D-F-H TOTAL	KE	KW	KE-KW TOTAL		
GENERATED (MAX)	LBS/HR	117000	141000	74000	82000	414000	47000	60000	107000		
(NOR)	LBS/HR	96600	81000	60000	66631	304231	-	-	-		
(AVG)	LBS/HR	97200	104294	58300	63784	323578	35815	33444	69259		
TOTAL	M LBS	72301	77595	43377	47455	240728	26646	24882	51528		
TO PLANT	M LBS	61311	65800	38171	40242	205524	23981	22394	46375		
COAL RECEIVED	TONS	5776	4821	3511	2923	17031	-	-	-		
CONSUMED	TONS	3871	4212	2528	2759	13370	-	-	-		
IN STORAGE	TONS	17925	19513	15581	17079	70098	-	-	-		
GEN. STEAM/LB. OF COAL		9.34	9.21	8.58	8.60	9.00	-	-	-		
OIL RECEIVED	GALLONS						0	368169	368169		
CONSUMED	GALLONS						253050	230409	483459		
IN STORAGE	GALLONS						934458	1304436	2238894		
GEN. STEAM/GAL. OF OIL							105.3	108.0	106.6		
ELECTRICAL DATA											
TOTAL GENERATED KW HRS.							1512000	1719200	3231200		
							24000	231200	255200		

ak Demand Control

APPLIED REACTOR ENGINEERING OPERATIONINDUSTRIAL ENGINEERING OPERATIONRear Face Improvements, All 105 Reactor Buildings

Alterations to the original purchase order have been issued to Pacific Plastics, Inc., of Seattle, Washington, for the remaining 130 nozzle cap trays. Total cost for the remaining 180 trays is \$2,562.60. This total price includes a mold cost of \$975.

Program of Tube Replacement Improvements

Training classes have been completed for the lead reactor installation of the final phase of improved tube replacement job scheduled for January 29, 1961. Approximately 50 first-line Maintenance supervisors and 110 Maintenance craftsmen have attended the sessions conducted at the White Bluffs Mock-up location. Preparatory work for the outage is continuing and includes new methods, tools and equipment.

Water Leak Study, 100-F Area

A unique current flow phenomenon was discovered some time ago and reported in an Unclassified document "Electric Current Flow From Process Tubes" by R. D. Gilbert, dated November 3, 1959. It was found that a small electrical potential existed between the front face process tube flange and ground at the 105-F reactor. When tube flanges were connected to ground through an ammeter, it was found that a small current flow existed. The potential and current flow were observable when the reactor was operating but were not observable when the reactor was shut down. The magnitude of potential and current was found to be approximately reproducible from one operating period to another for each process tube (about 25) on which current measurements have been made to date.

Plans have been made to have signal wires welded to process tube flanges on reactors during the nozzle replacement program for bumper fuel elements. A satisfactory means for affixing the signal leads to the process tube flange has been developed. Time Analysis of the welding operation indicates that complete installation of leads will add about 3 to 7 per cent to cost of exchanging nozzles in the bumper fuel program.

Training Films

The library of motion pictures of Irradiation Processing Department work activity continues to be available to all interested personnel. The library now includes 307 reels of 16 mm motion picture film. The titles are listed in the catalog; and its supplement issued January 4, 1961. All industrial motion pictures of Irradiation Processing Department work activity are classified Confidential-Unclassified.

Usage of the film library included the following:

Equipment engineering used film to determine impact on nozzles by charging machines during connection.

Equipment Development used film to assist in planning the next overboring operation at C Reactor.

Work Improvement, 105-C Metal Examination Facility

Planning master cards have been prepared. Voucher and schedule copies have been reproduced. A Planning Board has been fabricated. Simulation of the complete operation based on the Irradiation Processing Department Planning system has been started.

Resident Industrial Engineering Service

100-H and 100-F Areas

Nozzle Exchange for Bumper Fuel Elements

Flow sheets of the operation were prepared to illustrate the recommended plan for performing this work. A pallet design for nozzle handling was completed and a prototype was fabricated and tested. Further work on this problem will be by an engineer in H Maintenance Operation.

100-B and 100-C Areas

Aluminum Dummy Improvements

Processing Managers approved the elimination of unnecessary aluminum dummy types in the adoption of a design, thereby effecting a substantial Irradiation Processing Department savings for the purchase of these essential materials. Actual cost will be reduced from \$70,030 to \$51,430 in one area.

Panellit Test Bench Layout and Methods

A film of the Panellit gage test facility in 105-C was taken to provide W. D. Hamilton, Maintenance Engineer, additional information for possible design improvements to lessen the time and effort required for testing gages.

Work Area Layout and Procedure

A work area layout for processing evaluation lots of fuel (canned by three manufacturers) at B Reactor was furnished B Processing. Use of this procedure provides for charging rates of about 72 tubes per hour on sizeable setups.

100-N Area

Charge-Discharge Activities

Approximately 80 per cent of the time during the past month was spent in the

study of, and familiarization with, the charge-discharge equipment, including elevators, charging machines, and other related charging equipment. A flow diagram has been prepared of the charging in N Reactor which shows the inter-relationships between the work that must go on on the three elevators involved in this operation. This preliminary study shows that the charging rate of 8 tubes per hour is attainable with the equipment as described in the present design criteria documents and prints.

In order to obtain a realistic picture of the activity, time standards were constructed for some of the operations using synthetic timing techniques.

Front and Rear Nozzle Closures

In the course of investigating the charge-discharge activities it was determined that the internal closure on the nozzle as designed for the NPR would be unsatisfactory from the standpoint of performing maintenance and charge-discharge work on the front and rear elevators. As a result of this determination, a design change will be issued correcting the deficiencies.

Butterfly Valves for Controlling Tube Flows During Shutdown

It was determined that considerable time loss and possible safety hazard could exist if butterfly valves are provided which fail in an open position. The studies led to recommendations that fail-as-is butterfly valves be procured.

MAINTENANCE PRACTICES OPERATION

Gas Purification Proposal

Production Test Authorization for purification proposal is in preparation and Equipment Development is preparing a new scope, cost estimates, and installation drawings based on agreements made at the last meeting with 100-C personnel and Research and Engineering people. Present plans are to obtain the necessary chromatograph through an alteration to the existing gas improvement project.

Engineering Request No. 9 - Elevator Modifications

It has been agreed that the first work to be scheduled is a weight and loading study followed by work on elevator safety devices. A firm schedule has not yet been established on this work. A letter was directed to the plant managers concerning resubmission of this item for the FY-1962 Budget in the sum of \$200,000.

Elmo 15 Heater Vessel

At the request of Coolant Testing through Hanford Laboratories Operation, the proposed stresscoat testing procedure of subject vessel was reviewed. Shell and nozzle calculations were rechecked with current drawings. It was agreed that the particular head closure was too complicated to be calculated with

complete confidence and a proof test will be made concurrently with the stresscoat test at a minimum adjusted pressure of 12,600 psig.

Process Channel Straightening Device

Because of difficulties which have been experienced at the older reactors in installing new process tubes and charging 8-inch metal through the vertical bow of the process channels, a request for effort directed at developing a channel straightening device has been forwarded to Facilities Engineering Operation.

Rear Face Connectors - Older Reactors

Twelve thousand eight hundred feet of Inconel tubing was ordered and the fabrication order placed for the first 3,200 connectors. The vendor's schedule calls for delivery of pigtails by April 1, 1961.

The purchase order for the fabrication of the first lot of pigtails has options good for six months for fabrication of pigtails for approximately \$5.00 and delivery ready for shipment in two weeks after receipt of the second batch of tubing.

The low bid for the second supply of 31,200 feet of Inconel tubing was declared "no bid" because of failure to agree to some of the legal conditions of the contract.

Rear Crossheader Fittings

Crossheader fitting failures were experienced by 105-B Reactor on January 13, and again on January 27. The first of these was connected to a stainless steel Y-type zone temperature monitor pigtail and the second to a J-2 pigtail adapter. A similar fitting failed at D Reactor just previous to this.

Service Manuals and Procedures

Manual Writers - N Plant

The N Plant manual writers spent two and one-half days at White Bluffs to become oriented with regard to Maintenance Practices Operation and Applied Reactor Engineering Operation, and their relationship with N Plant. These men were also given an opportunity to work directly with the White Bluffs manual writers to gain experience in the business.

Instrument

Instrument service manuals on the oxygen analyzer and the HAPD dose integrator were completed in rough draft.

Electrical

The 105-C horizontal control rod operation description and inspection check sheets are completed in rough draft form and circulated for comments.

The Ball 3X Safety Circuit Service Manual for 105-B, D, DR, F, and H has been distributed.

Craft Training

Instrument

Four instrument training classes each week are presented to the 24 trainees on a yearly scheduled basis. Duration of each class is six hours, with an attendance of six trainees per class.

The 12 most recently employed trainees attended an orientation lecture on reactor processing fundamentals and a film on nuclear physics.

Mechanical

F Reactor has been chosen to pilot the installation of an Engineered Method of Tube Replacement. An over-all Irradiation Processing Department improvement in tube replacement time is necessary to reach the 1961 goals. In support of the F test, twelve 4-hour training sessions have been presented jointly by Industrial Engineering Operation and Maintenance Practices Operation. Forty-eight supervisors and 85 craftsmen attended these sessions. Two Maintenance Practices Operation people will work with Industrial Engineering Operation during the tube outage to assist with the installation of the method and to evaluate the effectiveness of the training.

Safety

Serious Accidents

There were no serious accidents investigated within the Irradiation Processing Department areas in the past month.

Fires

One fire was reported in the 105-KW Building. The sliding shoe on the transfer area crane did not make positive contact and an arc to the power cable caused \$30.00 damage to the insulation and cable.

Instruction

All maintenance employees in the B-C Area were instructed on the use of fire extinguishers. Two classes on fire extinguishment were also held in 100-D Area.

Noise

The noise level of the new dummy decontamination machine on the wash pad in 105-C was taken. Facilities Engineering will reduce the noise level to an acceptable level.

PLANT EQUIPMENT ENGINEERING OPERATIONInlet Nozzle Integrity

Recommendations were issued to the Plants that broached nozzles for bumper fuel be installed after specified inspection procedures, and that a period of about three months be allowed to complete work in progress on evaluation of nozzle service loads before deciding on installation of safety sleeves or replacement nozzles. A document was issued in support of these recommendations summarizing the work to date on nozzle testing, stress calculations, and material properties. A test simulating the recent nozzle failure at B Reactor was performed, and data are currently being analyzed.

Audible Alarm Standardization

The need for standardization within Irradiation Processing Department in the application of audible alarm devices for stimulating personnel reaction to off-standard or dangerous situations has long been apparent. An "Audible Alarm Criteria" has now been approved for use in Irradiation Processing Department. Purchase of new equipment to conform to the criteria will begin immediately.

Nozzle Lug Rings

The existing lug ring has three lugs welded to the ring, and a weld failure often results in loss of a lug. Although one lug is all that is required to maintain safe operation, practice is to shutdown and replace the ring at failure. A unit cast design developed by K Plant Maintenance Engineering was extensively tested and adopted for replacement use at the K Reactors. Tests have been completed on the existing lug ring and a proposed modification made of the existing design. Results indicate that the welded lug ring is basically unsatisfactory unless costly quality control of the welding and special coatings to prevent corrosion are employed.

It has been recommended that all reactors adopt the cast lug ring for replacement use as the standard spare part.

B-C REACTOR OPERATION

OPERATING EXPERIENCE

B Reactor attained a new high equilibrium power level and 24-hour production record during January, for the third time in three consecutive months. C Reactor set a new record for monthly production among the six old reactors and achieved a new high power level and daily production record for the second consecutive month. Further increases of power levels were prohibited by tube power limitations at B and by the planned rupture control program at C.

EQUIPMENT EXPERIENCE

At B Reactor, 160 double orifices were installed in replacement of single orifices to permit I&E fuel element loading in fringe tubes.

Sixty-one new tubes were installed at B in replacement of three relocated PCCF tubes, 57 with thin walls, and one leaking tube. Two Parker fittings were replaced and 14 others were reamed to original size to restore normal flow conditions.

At C Reactor, a 4-inch cube of displaced graphite was removed from VSR channel No. 41; traversing of other channels continued in connection with rehabilitation of the system.

Both B and C Reactors were purged with diatomaceous earth to reduce film buildup in process tubes.

At Building 190-C, impellers of No. 1 and No. 9 pumps were replaced with vendor modified impellers.

At Building 181-B, excessive vibration of the No. 13 river pump unit was eliminated by overhaul of pump and motor.

IMPROVEMENT EXPERIENCE

Three C Reactor tube channels were overbored 550 mils, fitted with oversize, smooth bore, zircaloy tubes and new hardware, and charged.

Design Changes completed at B Reactor during the month included the following:

- No. 270 - Revision of Horizontal Control Rod Instrumentation, providing replacement of capillary temperature elements with thermocouples.
- No. 285 - Backup Water Supply For Loop Header, providing process water backup to the loop.
- No. 373 - Replacement of VSR Switches, providing new, more reliable rod control switches.

A second closed circuit television camera was mounted at B Reactor to provide a more complete view of the discharge area.

Construction and installation work continued in connection with: 1) CGI-791, Reactor Confinement, 2) CGI-871, Dummy Decontamination Facilities, 3) CGI-889, Effluent System Modification, 4) CGI-904, Gamma Monitor System Improvements and, 5) Connection of the 181-B and C Pump Suction Wells.

RADIATION MONITORING EXPERIENCE

At B Reactor, a Maintenance employee was exposed to unknown dose rates while leak testing the rear face gas seal; subsequent survey indicated a maximum dose rate of 1250 mrad/hr; the employee's dose was estimated at 104 mrad.

The inner tube of the "A" Hole Sub-Critical Monitor Facility was replaced; maximum dose rate to any involved employee was 20 mr/hr.

At C Reactor, five cases of personnel contamination occurred during work on VSR channels; maximum contamination was 300 c/m. All cases were reduced to releasable limits.

No personnel exceeded the three r/yr working limit during 1960.

All critical mass monitoring packets now in service have been fire-proofed as directed by the AEC.

DECLASSIFIED

DECLASSIFIED

HW-68343

D-DR REACTOR OPERATION

OPERATING EXPERIENCE

Operating levels at D Reactor were limited by bulk outlet temperature and non-equilibrium conditions. The predominant limitation at DR Reactor was the Operating Severity Index limit. Both reactors established new records in power level and daily production.

The three unscheduled outages at D Reactor were from ruptures, two in material of PT-262 (bumper fuel elements) at exposures of 950 MWD/T and 966 MWD/T. Unscheduled outages at DR Reactor were from a valving error in the water plant, a tube leak and a rupture. DR experienced two scrams from which recovery was made.

Eight poison splines were successfully removed from the DR pile, using a spline chopper, for DR's first spline removal experience.

EQUIPMENT EXPERIENCE

New front face nozzles, converted for bumper fuel elements, have been installed at both reactors, 389 at D and 64 at DR.

Two vertical safety rod channels were boroscoped at DR Reactor to investigate binding of the rods when run in under power. Broken liner blocks, and bowing of the channels, were noted to be the causes. Investigation is continuing.

A 1 1/2 ton magnetic pulley on the No. 2 coal conveyor in the power house burned out, was replaced with a rebuilt pulley and will be sent off-site for repair.

IMPROVEMENT EXPERIENCE

Upgrading of the raw water back-up system, within 100-D Area was completed in January. Surges in the system, amplified by the length of the system, had caused failure in leaded joints resulting in reactor outages. Repairs were accomplished by reinforcement of all leaded joints with Dresser couplings.

Improved illumination of the rear face at 105-DR, was accomplished by installation of 8 spotlights on the underside of the D elevator. The lights are attached to conduits which slip vertically through small channels, permitting relamping from the elevator deck.

RADIATION MONITORING EXPERIENCE

There were two lapses of radiation control, one at each reactor, involving low level contamination in unregulated areas. There was no overexposure to personnel.

F REACTOR OPERATION

OPERATING EXPERIENCE

A new record high power level of 1845 was established on January 26. Production was considerably higher than forecast due to deferment of a scheduled major tube outage.

Water collection remained near the record low of the past three years.

Gas loss experience during the last operating period averaged 14,000 cubic feet per day. This is a reduction of 5,000 to 8,000 cubic feet per day.

Production interruptions during the month were due to a Panellit scram, a water leak, and scheduled maintenance.

EQUIPMENT EXPERIENCE

A recent traverse of tube 4676-F showed that the graphite growth at a point 10-1/2 feet downstream from the front Van Stone has increased 0.15 inches during the past five months.

Preparatory work for charging bumper fuel elements in the enriched columns has progressed to a point where a limited number of tubes can be charged. (Two tubes were experimentally charged by hand during a previous outage.)

Two of 102 tubes probologged were found to have severe external corrosion and 10 were found to have medium external corrosion.

A leaking bourdon tube on Panellit gage 0955 was the cause of a reactor scram on January 2. This was our first known experience with a leak on this type of coil.

Three water leaks were corrected. Two were due to gasket failures and one was due to a cracked Van Stone. Other significant items replaced were: 2 front and 25 rear water connectors, 29 process tube thermocouples, 40 pressure monitor Panellit gages, and 6 process tubes. Lack of available manpower curtailed planned tube replacement activities.

IMPROVEMENT EXPERIENCE

Turco decontamination of the rear face components was accomplished for the first time at F Reactor. This work, completed on January 31, required 14,000 pounds of treatment materials. Background radiation was reduced to 80 per cent of former level.

The far riser vent was modified by the installation of a longer vent line and larger anti-percolating chamber. This extension was installed to eliminate

the spillage of effluent water on the roof of the reactor building caused by surges in the riser during periods of high water flow.

Automatic synchronization installations on 4500 HP motor units in the 190-F Building was completed on January 13.

Conversion to pneumatic flow transmitters for the 190 turbine drive pumps was completed on January 27.

RADIATION EXPERIENCE

The F Processing Operation has assumed monitoring responsibility for machining of front face nozzle assemblies in the 185-F Building. This additional work is due to relocating the Hot Shop from 108-D to the 185-F Building.

DECLASSIFIED

H REACTOR OPERATION

OPERATING EXPERIENCE

Input production was 82.8 percent of forecast. The highest level attained was 1855 MW and was limited by bulk outlet temperature due to seven-pump operation. Operating continuity was interrupted by seven outages, all unscheduled, for a loss of 256.5 hours.

On January 10, 1961, fifty-nine irradiated I & E enriched fuel elements were accidentally discharged onto the discharge area elevator. This occurred during routine charge-discharge operations when the elevator apparently ran itself down from its normally up position when a control switch malfunctioned. The irradiated fuel elements were successfully removed in 90 hours, using rakes operated through the rear shielding wall access holes and a General Mills remote manipulator. The incident was formally investigated and reported in document HW-68213, "Radiation Incident Investigation Report."

A water leak from the front nozzle of process tube 1377 was the cause for a reactor shutdown on January 16, 1961. Cause of the leak was an improperly installed lock nut on a newly installed broached nozzle. To correct the leak, a new fitting assembly was installed shortly after shutdown, which required the momentary interruption of water flow to the process tube. Investigation of the process tube and fuel elements indicated that no damage had occurred. The incident was formally investigated and reported in document HW-68297, "Tube Flow Interruption Incident."

EQUIPMENT EXPERIENCE

A total of 214 front face nozzles were replaced with broached nozzles in preparation for bumper fuel element loading. Twelve hundred and eighty-six remain to be installed.

The process water pumping load was returned to eight-pump operation on January 24, 1961, after having been on seven-pump operation since December 28, 1960. Seven-pump operation was placed in effect during this period to facilitate installation of two Class "B" 4500 hp motor stators.

The No. 8 process water pump was removed from service on January 15, 1961, after four hours' running time due to temperatures 5 degrees above normal on the No. 2 shaft bearing following installation of a Class "B" motor stator. A comprehensive inspection revealed damage to Nos. 2 and 3 shaft bearings and the gear thrust bearing from a misaligned coupling spacer. Repairs were made and the unit returned to service on January 19, 1961.

IMPROVEMENT EXPERIENCE

Coal screening equipment was installed during the month to permit screening of storage coal for removal of foreign material, thus preventing damage to the boiler stokers when this coal is used. Operation of the screening

DECLASSIFIED

DECLASSIFIED

HW-68343

equipment should allow a reduction in the quantity of stored coal and provide a more reliable source of coal back up.

Modification of the discharge area elevator controls is being done by installing waterproof controls on the elevator and replacing the labyrinth controls with new ones. In addition, an inspection of the elevator electrical controls will be made at the beginning of each outage to insure that the controls are in proper operating condition. This inspection will be continued until the rear face pigtail problem is corrected.

The first-stage filters for the CG-791 "Reactor Confinement Program" were placed in service during the month. No problems were encountered. The second-stage filters, new fan motors, etc. will be installed as they become available.

RADIATION MONITORING EXPERIENCE

Fifty-nine I & E enriched fuel elements, which were discharged onto the discharge area elevator on January 10, 1961, generated dose rates of 250 r/hr at 60 feet. The elements were removed from the elevator using remotely operated equipment. There was no undue exposure to personnel as the maximum personnel dose for the removal work was only 100 mr.

The charge elevator radiation alarm was actuated on January 18, 1961, shortly after reactor startup, by radiation from the front of empty process channel 4163 which had been left unshielded. Dose rates of 500 mr/hr gamma and 300 mrem/hr neutrons at 12 feet to the side of the front end of the channel were encountered. There was no undue exposure of personnel. The reactor was immediately shutdown and shielding placed in the channel.

CENTRAL MAINTENANCE OPERATION

Broaching of front face nozzles for the bumper fuel element program proceeded without incident during the month. A total of 494 nozzles were broached and the broaching operation is now considered routine.

DECLASSIFIED

HW-68343

KE-KW REACTOR OPERATION

OPERATING EXPERIENCE

The following new records were achieved during the month:

New Operating Level Record of 4030 - (KE Reactor)
Monthly Production High for a HAP0 Reactor - (KW Reactor)
Average Operating Level of 3897 - (KW Reactor)
Combined Monthly Production High for the K Reactors

EQUIPMENT EXPERIENCE

The inlet water thermocouple of KER Experimental Loop Number 1 blew out of its fitting in the front face causing a scram of KE Reactor. During the reactor outage, the inlet thermocouples of the other in-pile experimental loops were removed as this instrumentation was not critical to loop operation. Similar type fittings on the reactor rear face and in the 1706-KER Building were checked and tightened according to the vendor's recommendations.

Leaks developed in the motor air cooling coils of river pumps Number 2 and 6 at 181-KW. Repairs were completed and the pumps were returned to normal service.

A prototype impeller, the third design to be tested on plant under Project CG-883, was installed in the Number 1 high lift pump at 190-KE for testing. Preliminary test results were satisfactory.

IMPROVEMENT EXPERIENCE

At KE Reactor, four horizontal control rod tips with neutron absorption materials along 60 per cent of their length were replaced with tips having 40 per cent poisoning. The change was made to improve the control characteristics of the horizontal control rod system.

Under the cost reduction program to reuse poison splines, the first group of salvaged splines were inserted into selected process tubes for turnaround control at KW Reactor. New splines used for startup control were withdrawn from the reactor onto reels with removable sides for reuse in the future, after the necessary period of radioactivity decay.

Manager, Manufacturing

OC Schroeder/

FACILITIES ENGINEERINGREACTOR MODIFICATION DESIGN OPERATION

Distortion of the graphite stack at C Reactor has rendered two vertical safety rods inoperable and has caused binding of five additional rods. Preliminary design efforts have been directed toward conversion of an existing spare C rod assembly to flexible operation. Drawings of the proposed rod modification have been transmitted for comment.

A test at C Reactor confirmed study predictions that existing downcomers were adequate to handle flow increases to 115,000 gpm provided the downcomer trays were perforated and individual tray vents were removed.

An analysis of the safe maximum diameter overbore for C Reactor has been completed. Results confirm previous estimates that approximately 600 mils is the maximum safe overbore with the existing third safety system. This value is based on zirconium process tubes, 1700 effective central tubes, 115,000 gpm flow, bulk temperature increases of 83C, spike and radial enrichment and exposures of 700 - 900 MWD/T; however, these results are unsupported by critical assembly tests.

Study drawings of proposed inlet and outlet process tube assemblies for modifying C Reactor for use of self supported fuel elements have been approved for prototype procurement. Two concepts have been developed, 1) proposed equipment with existing tube sizes and 2) proposed equipment with overbore tube sizes.

Procurement specifications have been completed for the purchase of 10 prototype inlet and outlet process tube assemblies of the existing tube size concept. Procurement requests are being prepared for the overbore concept.

DESIGN PROJECTSCG-775 - Water Plant Expansion - 100-K

A third impeller has been furnished by the vendor and installed in the prototype pump at the 190-KE Main Pump House for in service testing. Results of the preliminary tests indicate that pump performance complies with head and capacity specifications. The impeller will be inspected for cavitation damage following approximately three months of operational service.

Continued cavitation of the 190-K high lift pump test impellers has prompted a study of the design of the pump suction passages. Negotiations have been initiated with Oregon State College to conduct half scale model tests of the secondary pump case.

CGI-791 - Reactor Confinement

High efficiency filter banks have been installed in the filter buildings at all reactor areas and leak tested in place with portable DOP testing equipment. Approximately three percent of the filters indicated leakage. These leaks were corrected by either replacing the filters or tightening the compression bolts on the filter heads.

DECLASSIFIED

The capacity of the existing portable fresh air pump intended for use in the filter buildings proved to be inadequate; a larger capacity pump has been procured. A portable skid is being provided for use with the pump.

Humidity in the exhaust air from H Reactor continues to approach saturation due to excessive leakage from the reactor rear face piping. An inspection of the filter banks revealed them to be very wet but otherwise in good shape.

The project oriented development and testing program has been completed except for the Environmental Component Test which has been in progress in the 105-B and F Reactor exhaust air tunnels since October 1959. During the test period the pressure differential across these high efficiency filters has increased approximately .2 inch water gage at 105-B and .4 and .5 at 105-F.

CGI-839 - Modifications of Fuel Element Test Facilities - 1706-KER

Drawings of the cell piping and of the process tube nozzle assembly for Loops No. 3 and No. 4 have been transmitted for construction approval. The high temperature and pressure strain gage tests have been completed. Difficulty was experienced in maintaining a seal with the solid "O" ring in the nozzle to tube joint at pressures in excess of 3,800 psi at 600 F. Although the objective pressure in the design test was 5,400 psi code requirements are met by 3,300 psi at test temperature. The strain tests have been discontinued since sufficient data has been collected for a projected stress analysis of the nozzle.

Several points concerning the KER loop pumps were discussed with the vendor, Byron Jackson Pumps, Inc. Points discussed were welds on the 275 horsepower units that cannot be x-rayed, non-removable electric terminals, special tools to remove the pump heat barrier, pump service dolly, and hydraulic testing and progress to date. The decision was made to accept welds on three partially assembled pumps pending results of the x-ray analysis of welds on the pumps which have not had the wear rings installed.

CGI-844 - 100-K Coolant Backup System

Detail design is 75 percent complete. Comments have been returned on the 182 Pump House drawings, specifications and acceptance test procedures. Purchase specifications for valves, fuel tanks, air receivers and air compressors are being held pending final decisions regarding electric controls, actuating mechanisms and fuel systems.

Only one bid was received for the 190-K Main Pump House steam condenser. Additional information has been requested to assist in evaluation of the offered equipment.

CGI-883 - Increased Process Water Flow - 100-K

Detail design is 72 percent complete. A technical specification for a fixed price contract covering the 190-K Main Pump House ventilation modifications has been issued.

DECLASSIFIED

DECLASSIFIED

HW-68343

A long delay has been encountered in placement of the purchase order for the submersible motor driven pumps for the 181-K River Pump House. The purchase requisition was forwarded to the AEC in November 1960 with a recommendation that the pumps be purchased from Byron Jackson Pumps, Inc. on a negotiated basis since this was the only known manufacturer that had fabricated units of this type and size and could meet the requirements of the specifications. As the result of interest shown by various pump manufacturers, the decision has been made to advertise for competitive bids. Procurement specifications have been revised to permit this action.

A Project Representatives Meeting was held to discuss results of studies of the filter plant and reactor effluent systems.

CGI-844 - Rear Face Crossunder Lines, - B, C, D, DR, F and H Reactors

The decision was made to replace the electric motor valve operators with air motor operators. A revised design progress schedule which includes C Reactor in the project scope and installs air motor operators and associated control equipment on the crossunder control valves has been transmitted to the AEC for approval. Based on the revised progress schedule, design is estimated at 63 percent complete.

EQUIPMENT DEVELOPMENT OPERATION

DECLASSIFIED

EXISTING REACTOR WORK

Reactor Modification Program

From January 18 to January 21 an on-pile demonstration, overboring three tubes 550 mils, installing new oversize zirconium tubes, new prototype hardware, and oversize fuel elements, was completed. The new tri-bore machines were used to bore shielding rings, thermal blocks, and counter-bore the first graphite packing block. Some difficulty was encountered in inserting the tube when it was found that the graphite counterbore was not concentric with the overbored graphite channel. While this occasioned some delay on the outage, its resolution in the laboratory is not expected to be difficult.

All hardware needed to complete a 20-tube demonstration has now been received. Four complete sets are in use on C reactor -- three on the channels bored during the limited demonstration, one with standard tube and fuel using special adapters. Except for installation of the remaining hardware, this essentially completes the expansion hardware development program.

Along with the work on overboring and external hardware, improved shielding do-nuts have been inserted in overbored channels in an effort to determine whether radiation exposure rates can be reduced on the front face elevator during operation. Measurements with unshielded instruments show lower exposure rates than on adjacent channels. These measurements are not conclusive and are probably conservative.

Remote Rear Face and Operational Charge-Discharge

The status of the remote rear face equipment at KE reactor is unchanged this month. Intensive laboratory testing was initiated on a balanced hydraulic charging machine which makes use of a front nozzle flapper valve to permit charging in operation -- one slug at a time -- with a hand operated charger. Laboratory tests so far indicate that this can be done and that a tube can be charged in approximately 20 minutes. A new inlet nozzle is being tested for K reactor which incorporates the flapper check valve required by the charger.

High Speed Scanner

The vendor's engineer has been on site since January 10 to put the high speed scanner system into operation and check out all sections for shipping damage, performance, and calibration. At month end all but one section were performing acceptably and acceptance test equipment had been checked out.

Other Existing Reactor Work

Equipment which monitors the activity of a spline as it is withdrawn from the reactor, for the purpose of obtaining a front-to-rear flux traverse,

has been tested at 105-D and KW. Although testing is incomplete and no completely useful record has yet been obtained, the feasibility of taking this data appears to have been proved.

Equipment Development participated in the removal of two fuel charges from the rear elevator at H reactor during the week of January 9. The surplus remote manipulator purchased some time ago proved to be a useful, if clumsy, tool for such emergency operations.

NEW PRODUCTION REACTOR WORK

High Pressure Fittings

The current program effort has been directed toward accomplishment of a rolled tube-to-nozzle joint for the front face of NPR with which a packing gland type gas seal is to be used.

Packing material has been found which meets the leakage criterion, at least on a short term test.

Design Tests

Design test activity for NPR continued. The following design tests were completed this month:

- DT-1043-B - NPR Horizontal Rod Gunbarrel Assembly
- DT-1051 - Static Tube Deflection Test
- DT-1055 - NPR Graphite Cooling Connectors
- DT-1057 - Moderator Coolant Flow Monitor

The following new NPR design tests were received:

- DT-1087 - NPR Lighted Push Button Heat Test
- DT-1088 - NPR Sub-Critical Monitor Chamber Positioner
- DT-1089 - NPR Horizontal Control Rod Gas Seal
- DT-1090 - NPR Clare Mercury Wetted Relay Test

Nuclear Instrumentation

Additional on-reactor testing of two prototype log ion and period meter systems, by different vendors, exhibited deficiencies in both which the vendors would have to correct before adoption. Off-reactor testing of the instrument submitted by a third vendor indicated deficiencies in circuit performance for which corrective measures cannot yet be specified. Ten bi-stable magnetic amplifiers have been connected in a circuit simulating the proposed octant monitoring arrangement to check the effect on the galvanometer as the magnetic amplifier units went in and out of a trip condition. Further tests on this circuit mockup are scheduled.

DECLASSIFIED

PLANT ENGINEERING OPERATION

DRAFTING OPERATION

Summary of services provided by the Drafting Operation is as follows:

New Engineering Drawings	159
Revisions, Layouts and Sketches	115
Microfilm Prints Reproduced	397
Microfilm drawings added to file	1246
Microfilm drawings retired from files	342
Ozalid check prints reproduced	864
Customers serviced microfilm files	244
Customers serviced catalog file	31
Catalogs added to files	227

REACTOR, PLANT ENGINEERING

Rear Crossheader Vibration - B, D, F, DR and H Reactors

Efforts to minimize crossheader vibration and stresses were continued and sample flexible joint materials were received. Additional types of flexible joints were investigated, and requisitions prepared for samples which include all metallic joints and special Dresser fittings which have provision for extensive side motion. Plans for a sample installation of the elastomer flexible fittings have been completed.

Rear Crossheader Parker Fitting Failure - 105-B and D

Three rear face crossheader Parker fittings have recently broken in or near the thread relief section. Analysis of these breaks indicate varying degrees of stress fatigue and cavitational effects. Emergency repair measures for broken crossheader fittings have been formulated. After sealing the broken fitting, a new crossheader entrance hole is drilled to the side of the broken fitting. Using a Dresser Service Saddle, previously prepared with a new Parker fitting, the unit is clamped to the crossheader over the new entrance hole. Only a slight modification of configuration is required on a helical-type connector to adapt it for use with the service saddle entrance unit.

Poison Splines

Vendor liaison efforts have resulted in a recent bid of under \$23 for poison splines. This is a 34.5 percent reduction in costs from the previous order. Liaison aimed at further decreases is continuing.

River Data Telemetering

Installation of permanent equipment is complete. Debugging and operational tests are in progress. Intermittent trouble has developed in the equipment at Priest Rapids Gaging Station. However, the vendor has agreed to replace the suspect chassis.

DECLASSIFIED

HW-68343

WATER PLANT AND UTILITIES ENGINEERING

Effluent Activity Reduction

Preliminary engineering efforts continued on the experimental water treatment facilities for 1706-KE for investigation of process water treatment changes to reduce effluent activity. Conceptual design is nearly complete. Formal cost estimation has not yet been completed.

Effluent System Modifications

The change in emphasis for effluent activity reduction from post-treatment to pre-treatment necessitates renewed attention to the condition of the 107 Basins especially D and F. A budget study is underway which considers need in the basins and diversion facilities in light of this changed emphasis.

Columbia River Studies

Since January 20, 1961 river flow is being held at near 71,000 cfs while Grand Coulee is being drained to 1258 feet (down 30 feet). The purpose is to allow Coulee spillgate maintenance. This steady flow is reflected in a steady river temperature.

Hanford Atomic Products Operation has requested the cooperation of the Inter-Company Pool, the Bonneville Power Administration, and the Grant County Public Utility District to maintain river flow below 85,000 cfs to permit construction work at 181-B Building; the first request of this type.

River Curtailment

On January 7, 1961, at 4:23 p.m., the loss of station power at Priest Rapids caused the loss of their hydro-turbines and river flow curtailment to 10 to 12,000 cfs for less than five minutes. The effect was noticed at the river gage 1.6 mile below the dam and at the 181-B Building intake at HAPO. The road on the cofferdam below the dam was lost when the spillway gates were opened, and a worker required rescue.

On January 9, at a meeting with the Public Utility District at Priest Rapids, the emergency set-up at the dam was examined and improvement measures suggested by the P.U.D. and General Electric. Additional bus ties in the emergency circuits will be provided as will automatic operation of the station service diesel. It was understood that they would receive favorably a recommendation for the installation of a portable diesel generator on the spillway gates. This incident has been described in a separate report.

4500 HP Motors

Two stators with Class B coils were installed in 190-H-A positions No. 4 and No. 8. The first stator to be modified with Class A coils was installed in Position No. 2 in 190-DR-A. A schedule listing the target dates for completing the modification of the first ten of the subject stators has been issued to interested personnel, and copies forwarded to the Atomic Energy Commission for integrated planning with the vendor.

DECLASSIFIED

PROJECT ENGINEERING OPERATION

PROJECTS

CGI-791 - Reactor Confinement

The following is a list of the dates when the exhaust air from the 105 Building was being routed through the absolute filters in both A and B cells of the filter building:

100-F	12-12-60	100-DR	1-4-61
100-C	12-21-60	100-D	1-5-61
100-B	12-22-60	100-KE	1-24-61
100-H	1-18-61	100-KW	1-22-61

100-B - The interior of the sample building has been painted. Work is nearing completion on exhaust turbine fan No. 9.

100-C - The turbine kit for exhaust fan No. 8 has been installed and functional tests are being run.

100-D - The turbine for exhaust fan No. 9 has been installed and work has started on installation of the other turbine.

100-DR - The old exhaust turbine No. 9 has been removed. The new turbine base has been poured. Work is progressing on the installation of the piping for the turbine.

100-F - The valve platform on the eight inch steam line has been replaced, pressure switch wiring and conduit runs to No. 9 and 10 turbines are complete.

100-H - The zone control doors have been essentially completed. The No. 5 electric exhaust fan has been tested.

100-KE - The tie-in to the stack breeching was completed so that air could be routed through the big stack. Work is progressing on the installation of the new No. 2 fan and motor. The 105 Building sensing lines are being calibrated.

100-KW - The removal of the old stack breeching was started on January 9, 1961 and air routed through the filter building on January 19, 1961. The temporary stack has been removed. The 105 Building sensing lines are being calibrated.

CGI-861- Expansion of Electrical Distribution Systems - Buildings 105-B, D, F

The purpose of this project is to design, procure and install equipment to expand the 105-B, D and F electrical distribution systems. New unit sub-stations were supplied by General Electric and have been installed at each of the areas ready for connecting up. Modifications have been completed in the vicinity of the valve pits which re-arranged the clothing storage area and provided a space for new switchgear units. As of this period, the first of the switchgear units is being installed at 105-B.

CGI-871 - Improvements to Dummy Decontamination Facilities - Buildings 105-B, C, D, DR, F, and H

The purpose of this project is to provide improved dummy and poison slug decontamination equipment in Buildings 105-B, C, D, DR, F, and H. The first feeder sorter unit has been tested in a mock-up and is now installed at 105-C. The electrical and mechanical installation is approximately 99 percent complete. During the week ending January 29, 1961, the equipment was being operated at high speed and the noise generated by the vibrator on the hopper portion was determined beyond the tolerable limit. Steps are now being taken to lower the noise level to an acceptable range. During the preliminary testing which has been going on, it is evident that the equipment will function as desired. Components for B, D, F, and H Areas are on order from Syntron and shop fabrication is being accomplished by Central Maintenance for all other associated material.

CGI-883 - Increased Process Water Flow, 100-K Area

On January 20, the No. 4 primary pump motor in 190-KE was removed and an upgraded motor installed in its place. The motor was shipped to Westinghouse, Portland, for upgrading.

CGI-889 - Effluent System Modifications - 100-B/C

Design is complete and the construction was assigned to the J. A. Jones Company. The Jones Company in turn subcontracted a six inch water main to the 107-B basin and the installation of an underground electric cable. An incident occurred during the excavation for the electric cable when a subcontractor reported to the area for work on Sunday, January 22, without knowledge of either J. A. Jones or General Electric forces. Excavation of a portion of this line required SWP conditions. This was a potentially hazardous area. Steps have been taken to eliminate the occurrence of a similar incident, and an informal investigation with J. A. Jones, AEC, and G-E personnel in attendance was held on January 31. During the week ending January 8, J. A. Jones forces repaired two packing glands in the 60 inch crosstie system, box No. 18. Excavation has been completed for the new 66 inch lines. The 66 inch pipe procured by J. A. Jones has arrived on site. This pipe, which will be connected by Dresser 60 type couplings, will be installed as soon as the couplings arrive.

CGI-899 - Cask Handling Facility - 105-KW

This project will provide monorail and hoist equipment at the 105-KW Reactor for the purpose of transporting an eight ton cask from the reactor to the outside of the 105-KW structure. J. A. Jones is performing the work and as of this period the monorail and hoist equipment have been installed, the concrete footings have been prepared on the outside of the building, and supporting structural steel for the monorail is in the process of erection. The project, which is scheduled to be complete on February 28, 1961, will be complete by that time.

PROJECT PROPOSALS

Project Proposals Returned Unapproved

CAI-868 Columbia River Scale Model
Rev. 1

CAI-868 Columbia River Scale Model
Rev. 2

The above two revisions returned to General Electric Company January 12, 1961, without action.

CGI-910 Process Tube Hot Cell, 105-C Building

Returned to General Electric Company January 23, 1961, without action.

Project Proposals Approved

CGI-791 Reactor Confinement

Directive No. HW-469, Mod. No. 9, dated January 6, 1961, increased funds by \$720,000 to total of \$6,900,000.

Project Proposals Submitted to AEC

CGI-802 Process Safety Monitoring System - High Speed Scanning Type for Temperature Monitoring

CPFF CONSTRUCTION SERVICE CONTRACTOR - LIAISON

We have issued eight new work orders, one new project release, and supplemented two old jobs for a total of \$276,787 to J. A. Jones in the month of January.

PLANT FORCES WORK REVIEW

The Labor Standards Board approved five jobs for assignment to Plant Forces, which are estimated to cost \$75,057.

Manager, Facilities Engineering

RT Jessen:dgm

DECLASSIFIED

DECLASSIFIED

HW-68343

NPR PROJECT

PROCESS DESIGN OPERATION

Research and Development

Tests are in progress to determine basic data on the underwater release of high temperature water and steam. Earlier tests indicated the feasibility of this concept for the NPR primary loop dump. Further data is necessary on sparger systems, required intermixing and final temperature effects. Data to date has indicated no serious vibrations during discharge to the buried concrete tank. Dump water ranging from 270 to 600 F appears satisfactory although vibration increases at the lower temperatures. Sparger design does not appear critical in that intermixing has been adequate in all cases tested and no free steam has broken through to the surface.

Studies and tests are being conducted to determine the consequences of loss of cooling water to the NPR graphite cooling tubes. Zirconium has been used for the tube material to minimize the extremely unlikely consequence of loss of water followed by a melt-down of an aluminum tube and the associated clean-up problems. Loss of water to a zirconium cooling tube will result in high temperature exposure to the tube for an extended time since graphite temperatures cannot be reduced rapidly even when the reactor is scrammed. Data and tests to date indicate that the tube may still be serviceable even after loss of water although further investigation is necessary.

Representatives of the Atomic Energy Commission, Burns and Roe, Inc., and General Electric met on January 10 and 11, 1961, for further NPR conversion discussions. The bases and objectives of the Burns and Roe optimization studies for converting the NPR to dual-purpose operation were established. General Electric's document HW-68314, "Variation in Reactor Parameters and Steam Conditions for NPR Phase II," was issued January 31, 1961.

Project CAI-816

Discussions with Burns and Roe on instrumentation and control of the heat dissipation plant was held January 24 and 25 in Richland. The basic concepts of control for the primary and secondary loops during normal operation had been resolved earlier; however, areas of differences have existed in regard to the reactor scram transients on the secondary steam system largely related to surge tank capacity. The original concept involved a programmed increase in steam pressure and a programmed sequential valve manipulation in the secondary system during scram. During December joint meetings in Hempstead, a constant pressure approach appeared advantageous. Burns and Roe has now proposed a reduced constant steam pressure with a minimum of valve operation. Agreement was reached on this basic concept although further study is necessary to verify equipment capacities. General agreement has now been reached on the basic concepts of control for the primary and secondary systems and therefore a comment issue of the control and instrumentation specification should be forthcoming.

DECLASSIFIED

HW-68343

Project CAI-816 (Continued)

On January 6, 1961, General Electric inspectors reported that defective tubes were found in the heat exchanger units No. 1 and 2. The collapsed tube walls are located approximately 1 inch from the face of the tube sheet. Several tubes were found to have collapsed to such an extent that plugging will be required. An indefinite number of tubes have also been found that have a throat diameter below the minimum .525" and will require repairing. Combustion Engineering has recommended that the following repair procedure be utilized:

1. Tubes which have collapsed to such a degree that the tube wall is dangerously near the rupture point shall be plugged.
2. Tubes which have collapsed to a lesser degree and show no sign of damage shall be rerolled to a minimum of .525" I.D. Such tubes to be re-evaluated after rolling.
3. Tubes having slight restrictions in the weld area shall be considered satisfactory without rework.

During previous tube rupture studies the forces tending to lift the graphite have been well established. Understanding of the resistance of the graphite to lifting is dependent on the complex bridging action of the graphite above the tube rupture. A model representing 1/4 of the graphite stack above the most critical tube rupture has been constructed. This model is 1/12 scale in dimension and 1/6,000 in weight. Process tubes and thermal shield have been included and designed in accordance with model laws by thin metal strips. Data to date indicates considerably more rigidity and lift resistance than was earlier assumed. Information from this model will be utilized in future tube rupture tests to set the resisting force which is adjustable on the tube rupture test equipment.

The fabrication of enough layer 1 graphite details has been accomplished to permit the first series of compression tests to be initiated. Assembly of the compression test apparatus has resulted in a jurisdictional dispute between two construction crafts and all graphite fabrication has ceased pending settlement of the dispute. Pre-test preparation for the stack compression test has been completed. All necessary equipment, instructions and data sheets have been supplied to the test site.

The prototype development program conducted in the vendors plants for the inlet and diversion valves has been making some progress. Three of the four vendors have fabricated valves and have tests underway. All vendors are experiencing some fabrication or test difficulties particularly during the high temperature tests. One vendor has not yet assembled a prototype valve. Resolution of the problems demonstrated in fabrication and testing during this prototype period should greatly reduce future difficulties with these critical valves.

DECLASSIFIED

DECLASSIFIED

HW-68343

DEVELOPMENT AND TESTING OPERATION

Listed below are significant developments for the New Production Reactor primarily reported by the Equipment Development Operation of Facilities Engineering.

Five development items were completed, and five were started.

Completion of ten dump system tests indicated that design of four energy dissipators tested is not extremely critical for acceptable operation. Ring, draft-tube, up-and-down cross and horizontal stub energy dissipators were immersed in a pool at approximately 1/400 scale of anticipated design. Acceleration in the dump pool was measured at less than gravity for the first nine tests but the final run using a horizontal stub, low temperature and pressure showed acceleration of approximately twice gravity. All dissipators evaluated were apparently no more effective than a previously tested straight pipe directed vertically downward into the center of the pool.

Further development to assess desirability of using a rolled zirconium tube-to-front-face nozzle joint was carried out. A prototype assembly was installed in the Component Test Loop where temperatures were cycled between 480 F and 600 F and a bending load of 1400 foot-pounds was applied during each cycle. The fluid stream pressure was maintained at 1800 psi. No leakage was visible after 800 cycles were completed out of a planned 1000-cycle run.

Development activity increased to determine equipment necessary for gradual energy absorption of falling fuel elements. Assembly of slug recovery facilities has started at Building 190-D. A rear nozzle tipoff was fabricated and found capable of controlling angle of fuel element impact on the water with some measure of success.

A General Electric flux amplifier and power-rate meter prototype showed a significant improvement in high voltage regulation, flux amplifier accuracy, linearity and trip stability after factory-recommended design changes were made. No serious adverse effects resulted from rigorous environmental temperature tests.

FIELD AND OPERATIONS ENGINEERING OPERATION

Construction

105 and 109-N Buildings

As of January 25, 1961, approximately 15,800 cubic yards of concrete had been placed in the 105-N substructure by Sound Construction and Engineering Company. As of this same date, this organization had placed approximately 14,140 cubic yards of concrete in the 109-N substructure.

As of January 25, 1961, Kaiser Engineers had placed approximately 3,800 cubic yards of concrete in the 105-N superstructure and approximately four cubic yards of high density concrete.

The electrical subcontractor on the 105-N substructure has now installed approximately 60 percent of the cable tray work included in his subcontract and has completed approximately 98 percent of the embedded conduit work. As of January 15, 1961, the electrical subcontractor on the superstructure of the 105-N Building had installed approximately 18,000 pounds of embedded steel conduit.

The mechanical subcontractor for the 105-N substructure is now in the process of correcting numerous omitted or misplaced embedments.

The embedded mechanical work being done by Kaiser on the 105-N superstructure is now proceeding on a two-shift basis and a shop has been established at the job site for fabrication. It had been originally intended to obtain the fabricated items by off-site procurement. Many problems were encountered with this practice because of the difficulty of providing information to off-site inspection in time to obtain the necessary inspection coverage. Since this shop has been established at the job site, the situation has improved considerably.

The installation of a crane on top of the left side outer rod room has now been completed by Kaiser Engineers. The crane has been placed on a steel structure at elevation approximately (+)52 feet. The concrete work on the outer rod room has been completed to elevation (+)40 feet.

Subcontracts were awarded this month to the Bay Company for the gas facility and drainage piping in the 105-N Building, and to Harder Construction Company for the general mechanical work in the 105-N Building. Representatives of the Bay Company visited the site during the week of January 16.

151-N Building

The installation of heating, ventilation, and lighting in this building has been made and the painting is about 50 percent complete. The Phase I work on the building itself is nearly ready for preliminary acceptance from the subcontractor.

DECLASSIFIED

HW-68343

163-N and 183-N Buildings

Work has continued to progress on these buildings, and the pouring of the filter bottom was started during this reporting period.

166-N Building

The hydrostatic test for the large fuel oil storage tank has been completed and work is now underway on the installation of the pipe insulation.

181-N Building

The excavation of the forebay is continuing and good progress has been made on the installation of the travelling screens.

182-N Building

The demineralized water storage tank footing is partially formed. The afterheat removal tank storage base has been poured.

184-N Building

Approximately 25 percent of the ground level floor slab has now been placed.

1734-N Building

This building is now essentially complete with the exception of painting, which is in progress.

230 Kv Transmission Line

Very little progress was made during this reporting period.

Underground Electrical and Pipe Distribution System

The subcontractor for this work, Cleveland Consolidated, started work on their subcontract, SC69, on January 16, 1961.

Temporary Construction

Drawings and specifications for alteration of existing first aid facilities are being incorporated in a bid package by Kaiser Engineers for a subcontract award.

Kaiser Engineers is proceeding with foundation and floor slab work for General Electric TC facilities. A request for bids for moving the existing army nurses' quarters building in North Richland and setting it up at the N-site is being assembled.

DECLASSIFIED

HW-68343

Graphite

All moderator fabrication and associated work in the 2101 Building was suspended at 1:45 p.m. on January 17, 1961. Work stoppage was caused by walk-out of construction millwrights following an alleged error in work assignment by Kaiser Engineers supervision. Basis of the dispute centers around an apparent jurisdictional dispute over optical tooling between the millwrights and technical engineers. As of this date, there is no indication of when normal work will resume.

For the first half of the month, total production of completed details was approximately 60 percent of the number scheduled. During the report period, the average number of bars which were acceptable after the notching operation averaged slightly under 110 bars per shift compared to the scheduled 200 bars per shift. Operation of the Arrowsmith machine continued to be erratic and replacement of the ram guides is planned to be made sometime in February.

The modified Sundstrand machines which will also be utilized for notched details were shop tested in Seattle and delivered to the 2101 Building on January 17. Installation and final acceptance tests are delayed pending resolution of the current work stoppage.

Delivery of graphite to the 2101 Building remains essentially on schedule. Over-all production of finished details is approximately 29 percent complete compared to the scheduled 40 percent.

Zirconium

Tube Delivery Summary

Three hundred and eighty-four NPR process tubes and 352 graphite cooling tubes have been received to date. Progress by individual zirconium fabrication is as follows:

Chase Brass

Failure to meet original delivery commitments resulted in notification of this vendor by the Commission that failure to meet a revised schedule would place them in default. The new schedule requires completion by April 14, 1961. This schedule is currently being met.

Allegheny-Ludlum

Delivery of this order is complete. Approximately ten tubes have been accepted on a conditional basis pending final testing and inspection at HAPO.

Harvey Aluminum

Pilot order of this vendor is complete. Production order shipments are on schedule.

Wolverine Tube

Although the original completion date of December 20, 1960, has been exceeded, Wolverine is now making satisfactory progress and has scheduled the final tube shipment for February, 1961.

On-Site Work Summary

Of the tubes received to date, preliminary testing is 36 percent complete compared to the scheduled 79 percent. Autoclaving was initially scheduled to be 22 percent complete as of this date; but because of necessary processing equipment modifications, autoclaving is now scheduled to start on February 1, 1961.

Turco Cleaning Tank

The cleaning tank was lined with stainless steel, thereby eliminating the problems of rust contamination and flake-off of the paint coating in the cleaning solution.

Dye Penetrant

Carry-over of the fluorescent contamination continued to present a major problem. The presently used wet developer will be replaced with dry developer to correct this condition.

Etch Facility

Minor equipment breakdown limited output of this facility. Replacement parts, to preclude similar breakdowns in the future, are on order.

Autoclaves

Modification of autoclave No. 2 as recommended by Bovay Engineers is complete. This consisted of removal of vent and drain headers, re-wiring heaters to give independent top and bottom sector control and to reduce heat applied to shell to one-fourth of the original input, and lowering of drain end four inches to facilitate draining of tubes. The trial run of the modified autoclave with a full load of tubes is scheduled for January 30, 1961.

Modification of autoclave No. 1 is in progress; however, the full extent of the modification will not be determined until the recommendations from Bovay Engineers have been received and reviewed. The approximately 14-inch bow which exists in autoclave No. 1 prohibits modification of this vessel in the same manner as for autoclave No. 2.

DECLASSIFIED

Pile Erection

Developing and testing work continued on the front nozzle rolled joint concept with assistance furnished from this organization. Preparation of erection procedures and inspection guides and the design and procurement of inspection tools and facilities continued.

Procurement

Yuba Consolidated Industries continued to have numerous problems in crate fabrication. The personnel changes promised have not yet been effective in bringing about necessary improvements in engineering or production. High cost of relocating this work dictates that every effort be made to encourage this company to fulfill its contract.

Primary Loop

Following was the status of approval data on the HUICO subcontract as of January 25, 1961:

Total number of items received	582 (including 32 received for information only)
Number approved	87
Number approved with exceptions	104
Number not approved	339
Number currently being reviewed	20 (including 12 resubmittals)
Number received for information only -	32
No approval required	
Number of resubmittals received	268
Number of resubmittals returned	256

During the month, a series of meetings was held with HUICO and their lower-tier subcontractors for the purpose of discussing manufacturing procedures and drawings in order to resolve differences and gain architect-engineer approval. These meetings were attended by representatives of the Atomic Energy Commission, Kaiser Engineers, Burns and Roe, Inc., General Electric, HUICO, and HUICO's various lower-tier subcontractors.

Nineteen meetings were held with HUICO and seven lower-tier subcontractors, and as a result 44 additional manufacturing procedures were approved. The approval of these key procedures allow HUICO to place firm orders for a significant amount of the piping components required for the job. With respect to the total requirement for engineering approval of contractor's procedures and drawings, the percentage of approvals advanced from four to seven percent of the anticipated total of 1200 items.

DECLASSIFIED

DECLASSIFIEDTesting Program

Investigation of the ATP program for the purpose of establishing a preliminary schedule for performance has resulted in a proposal for establishment of a task force for integration of all the testing programs, including Title III, ATP, engineering and physics, and operational tests. This group will be composed of one representative each from Kaiser Engineers, Burns and Roe, GE Design, Field and Operations Engineering, 100-N Operations, and IPD Research and Engineering. The purpose of the group is integration of the administration of each program to assure adequate, valid test results and to prevent unnecessary duplication of effort in the over-all NPR testing program.

Administration

The following material was processed by Drawing and Specification Control during the period of December 26, 1960, through January 22, 1961:

Drawings	477
Specifications	51
Criteria	11
Requisitions	115
ATP's	3
Others	<u>28</u>
Total	685

Accumulative total since March 25, 1959: 13,380

Reviews were completed and formal comments were offered on engineering material as follows:

On detail drawings	60
On specifications	10
On scope	0
On ATP's	<u>0</u>
Total	70

Accumulative total since June 23, 1959: 5,534

Operational Planning

Consultation was offered to Burns and Roe representatives regarding GE concepts of manning the 109 Building as guidance for their detail design of control instrumentation.

The detailed outline of systems descriptions is 80 percent complete. It remains to complete the outline of instrumentation and control systems and review the entire outline. The estimated total number of systems descriptions is 600, of which 60 flow diagrams and narrations are presently in rough draft form. The previous estimate of 94 man-months to complete this assignment appears to be accurate within ten percent.

DECLASSIFIED

HW-68343

Manual writers were assigned for some time at White Bluffs in training to insure consistency of their work with that being prepared for the other plants. Two manual writers are working on manuals for 181 Building inlet screens. The electrical manual writer is working on the manual for the ball recovery system.

A Productive Maintenance index has been prepared for items now in the M&E List.

A revised procedure has been adopted whereby BPF data are being reviewed and approved by Maintenance Engineers, rather than by design personnel.

Six orders were placed for spare parts during the month with a total value of \$23,000. Stock Adjustment Requests have been issued to move \$34,640 in value of spare parts from 100-N warehouse to 2101-M Building.

PROGRAM EVALUATION

Design Status

	<u>Wt'd Total</u>	<u>Certified Schedule</u>	<u>Actual % Complete</u>
<u>Reactor Plant as of 2/1/61</u>			
<u>Title I</u>			
Scope		100	100 (1)
<u>Title II</u>			
Drawings	70	83.0	87.6
Specifications	8	98.0	82.3 (3)
Requisitions	8	52.0	49.3
ATP's	4	28.0	15.8
Development and Testing	<u>10</u>	<u>79.0</u>	<u>75.5</u>
Total	100	79.0	80.0
<u>Heat Dissipation Plant as of 2/1/61</u>			
<u>Title I</u>			
Scope Criteria		100	98.75
<u>Title II</u>			
Detail Design		77.0	88.0
	<u>Req'd</u>	<u>No. Issued to 1/21/61</u>	
		<u>Scheduled</u>	<u>Actual</u>
Criteria	23	23	21
Preliminary Drawings (bid)	860	760	760
Detail Drawings (for const.)	920	620	620
Specifications (bid)	155	141 (2)	137 (2)
Requisitions	170	147 (2)	143 (2)
ATP's	-	0	0
<u>Composite Design Completion as of 2/1/61</u>			
<u>(Reactor and Heat Dissipation Combined)</u>			
Total		<u>Certified Schedule</u>	<u>Actual % Complete</u>
		80.7	85.7

- (1) This percentage represents only the completion of 44 criteria and does not include updating or revising.
- (2) Schedule is under revision. Listed numbers are based on the Burns and Roe Inc. A-E report dated 1/7/61.
- (3) Based on revised required number of specifications.

DECLASSIFIED

Cost Estimate

The Budget Control Cost Estimate meeting was held during the 2nd and 3rd week of January, and will be issued during February 1961.

To date, very few subcontract change order cost estimates have been submitted to the Architect-Engineers for analysis.

Schedules

Kaiser Engineers are now preparing a revised construction schedule. In a letter from D. J. O'Neil (Director, Construction Engineering and Supply Div. of the AEC) to R. C. Hammersmith (Resident Manager, Kaiser Engineers) dated January 31, 1961, Mr. O'Neil made the following statement. "We recognize the project difficulties and reasons for your opinion that the completion date of October 1962 is problematical, however, we believe it necessary at this time that the revised schedule be prepared on the basis of a completion date of October 1, 1962. When, in your opinion, project circumstances make it impossible to meet that date, consideration will be given to a revision to the schedule."

HUICO has submitted a schedule for installation of the 105-N process piping. A schedule for installation of the 109-N piping is being prepared.

Manager, NPR Project

JS McMahon:mf

DECLASSIFIED

DECLASSIFIEDFINANCIALGENERAL ACCOUNTING OPERATION

During January ten employees submitted expenses for attendance at Professional and Trade Society meetings. Total expenditures amount to \$1,208.

The quarterly custodial inventory of Precious Metals was taken on December 31, 1960. No discrepancies were noted.

The KAPL-120 (H-1) Loop has been transferred to IPD from Westinghouse. Estimated first cost is \$386,000.

IPD's portion of the fully depreciated account, Plant and Equipment Not Used Nor Currently Useful, amounting to \$5,624,000, has been written off the books per direction of the Commission.

The regularly scheduled quarterly Equipment Expenditure Pattern was reviewed with IPD managers and transmitted to C&AO January 20, 1961.

Additional IPD Miscellaneous Capital fund allocation in the amount of \$42,000 was obtained January 9, 1961.

PRODUCT COST AND BUDGETS OPERATION

Preparation of FY-1963 and revision of FY-1962 budgets has been started. The personnel requirements budget was reviewed and submitted to Contract Accounting on schedule.

A summary of IPD Overhead Costs, as shown in the FY-1961 Midyear Review Budget, was prepared. Copies were distributed to all HAPO Cost Managers.

An estimate was prepared for the AEC of the cost of removing two more pumps from the H-1 Loops. The balance of the property in the loop has been transferred to HOO by the Pittsburgh office.

Code 625 has been established to accumulate cost of non-representative Pu. A Purchase Requisition for \$30,000 worth of buckets has been received chargeable to this program.

PERSONNEL ACCOUNTING

Total number of personnel assigned to the Department as of January 31, 1961, was 2,274.

PROCEDURES

A project to simplify the paperwork and clerical effort in handling of essential materials was initiated. The purpose of this study will be to determine if the forms presently in use are necessary and to determine if the number of such forms can be materially reduced.

Acting Manager-Finance

RELATIONS PRACTICES

Four technically trained candidates were interviewed during January with one offer extended. One rejection was received leaving two offers open at month end. Six monthly employees transferred into the Department from other HAPO components and four transferred out of the Department. Three employees resigned: two to accept employment with the Atomic Energy Commission and one for health reasons.

A total of \$151.50 was paid to 17 suggesters. The largest award was \$25.

Communication included publication of ten Management News Bulletins, one priority message, five Headliners, and four special letters to Managers and Supervisors. GE NEWS coverage included fourteen items about IPD activities totaling 360 column inches.

The 1961 Department salary review and appraisal programs were completed.

One security violation was reported for the Department during the month. There were no disabling injuries in January; 84 medical treatment cases were reported. The Health & Safety Specialist made a trip to the Bureau of Mines, Albany, Oregon, to review their methods for handling scrap zirconium.

H. A. Shanks

Manager, Relations Practices

DECLASSIFIED

~~DECLASSIFIED~~

HW-68343

SIGNIFICANT REPORTS ISSUED

<u>Number</u>	<u>Classification</u>	<u>Author</u>	<u>Date</u>	<u>Title</u>
HW-68196	Unclassified	LM Keene MH Schack	1-19-61	Report on Preliminary Testing PT IP-234-AE, Sup. 2, Project CG-775, Prototype Testing of the 190-K Process Pumping Units.
HW-68257	Unclassified	LM Keene	1-25-61	Project CGI-883, Representatives Meeting No. 11, January 13, 1961.
HW-68130	Unclassified	FJ Kempf	1-6-61	CGI-884, Project Representatives Meeting No. 4.
HW-65345 Sup Addendum	Unclassified	CE Frantz	1-25-61	PT IP-327-D and IP-335-K Flapper Cap Reactor Discharge Nozzle and Flapper Cap Actuator.
--	Unclassified	JH Fastabend	1-26-61	Interim Report - Packing Type Dynamic Gas Seal for NPR.
HW-67169 Sup A	Unclassified	JD Maguire	1-13-61	Supplemental Test of D Reactor Nozzles Modified for Bumper Elements.
HW-68191	Unclassified	RJ Robinson	1-18-61	Design Test - 1051 - Static Tube Deflection Test.
--	Unclassified	JD Maguire	1-19-61	D Nozzle Test - Sup B.
--	Unclassified	JD Maguire	1-19-61	Interim Report - Lug Ring Test.
HW-68270	Unclassified	LC Cole	1-25-61	Chute Liner Material Test Report.
HW-68289	Unclassified	MT Vea	1-27-61	Trip Report - Engineering Liaison Trip on NPR Inlet and Diversion Valves.
HW-68086	Unclassified	AJ Lindsay	1-3-60	Final Report - DT-1057 Moderator Coolant Flow Monitor.

<u>Number</u>	<u>Classification</u>	<u>Author</u>	<u>Date</u>	<u>Title</u>
HW-68144	Unclassified	HF Jensen	1-12-61	Reactor Basin Discharge Mattress Plates.
HW-68179	Unclassified	JP Cooke	1-17-61	Helium Recovery Proposal in Relation to Nitrogen Atmosphere, PT at 105-C.
HW-68180	Unclassified	JP Cooke	1-23-61	PT Reduction of Helium Gas Losses.
HW-68203	Unclassified	HF Jensen	1-19-61	Interim Report No. 4 PT IP-279-AE, Reactor Test of VanStone Seal Insert for F Reactor.
HW-66954	Secret	LB Brinkman VG Blanchette	1-12-61	Short Range Modification Program for Improved Productivity.
HW-68227	Confidential	JP Corley HA Kramer	1-18-61	Incident Report - Priest Rapids Dam Flow Curtail- ment - January 7, 1961.
--	Unclassified	HA Kramer	1-24-61	Trip Report - November 28-29, 1960 - Water Quality Conference - Pullman, Washington.
HW-68093	Secret	DL Condotta	1-16-61	Reactor Design Analysis Monthly Report.
HW-68121	Secret	JR Larson	1-13-61	C Reactor Overbore Graphite Temperatures.
HW-68152	Confidential	HR Kosmata	1-16-61	NPR Primary Flow Range
HW-68170	Unclassified	GT Haugland	1-16-61	Trip Report - NPR Thermal Shield Castings.
HW-68225	Secret	DE Simpson	1-20-61	Some NPR Production Variables.
HW-68256	Unclassified	JD Agar	1-27-61	Elastomer Review
HW-68314	Confidential	HR Kosmata	1-31-61	Variations in Reactor Parameters and Steam Conditions for NPR Phase II.

DECLASSIFIED

<u>Number</u>	<u>Classification</u>	<u>Author</u>	<u>Date</u>	<u>Title</u>
--	Unclassified	WJ Love	1-4-61	Attendance at ANS-7 Committee Meeting and Visit to APED, 12-14-60 Through 12-16-60.
--	Unclassified	WJ Love	1-9-61	Shippingport Performance Since Startup.
HW-68169	Unclassified	WJ Dowis	1-16-61	Hanford Review of Two Graphite-Moderated, Steam-Cooled Reactor Designs for Effects of Graphite Contraction.
HW-67952	Secret	AB Greninger	1-12-61	Plant Improvement Program, IPD, Fiscal Years 1962 Through 1971.
HW-68162	Unclassified	GJ Rogers	1-18-61	Integrity of CG-558 Inlet Nozzles Modified for Bumper Fuel Elements.
HW-68213	Unclassified	FE Owen	1-19-61	Radiation Incident Investigation Report.
HW-62897	Unclassified	IL Huffman	1-27-61	Tube Flow Interruption Incident.
HW-68030	Secret	AB Greninger	1-12-61	Production Forecast - IPD, 1-1-61 through 7-30-66.

TRIPS

<u>Name</u>	<u>Firm & Location</u>	<u>Date</u>	<u>Purpose</u>
FAR Stainken	Western College Placement Ass'n., Seattle, Wash.	1/19-20/61	Participate in annual conference as HAPO member of Company's Western Region engineering recruiting team.
DF Watson	Cleveland Diesel Engine Division, Cleveland, Ohio	1/3-6/61	Discuss installation of diesel engines.
LM Keene MH Schack	Oregon State College Corvallis, Oregon	1/2-3/61	Discuss model testing of 190-K pump cases.

DECLASSIFIED

HW-68343

<u>Name</u>	<u>Firm & Location</u>	<u>Date</u>	<u>Purpose</u>
LM Keene	Albrook Hydraulic Laboratory, Washington State University, Pullman, Washington	1-10-61	Discuss progress on down-comer orifice plate model tests and rear face cross-header expansion joint hydraulic tests.
ER Rudock	General Electric Co., APED, San Jose, California	1-11-61	Discuss solid state design safety circuits.
ER Rudock	Byron Jackson Pumps, Inc., Los Angeles, California	1-12-61	Discuss KER pump problems.
ER Rudock	Consolidated Electrodynamics, Inc., Pasadena, California	1-13-61	Discuss time sampling solid state switching devices for use in safety circuits.
RL Jeffery EA Wegener CA Munro	Norfin, Inc., Seattle, Washington	1/3-5/61	Operational inspection of machines being provided by Norfin, Inc., under Contract DDR-109.
PB McCarthy	The Harms Tools Co., Seattle, Washington	1-3-61	To discuss delivery time and problems in fabricating prototype 0.550 hardware.
A. McDonald	General Electric Co. Service Shop, Seattle, Washington	1/4-5/61	To observe and record data relative to 4500 HP rehabilitation.
RT Jaske HA Kramer VG Blanchette	Grant County PUD Priest Rapids Dam	1-9-61	Review notification and emergency procedures, electrical arrangement and to request additional features.
WW Windsheimer	General Electric Co. Service Shop, Seattle, Washington	1/26-27/61	Review 4500 HP motor rehabilitation.
HA Kramer	Grant County PUD Priest Rapids Dam	1-11-61 1-20-61 1-27-61.	Routine contact supporting liaison efforts.

UNCLASSIFIED

HW-68343

<u>Name</u>	<u>Firm & Location</u>	<u>Date</u>	<u>Purpose</u>
A. McDonald	General Electric Co. Service Shop, Seattle, Washington	1-26-61	To observe and record data relative to 4500 HP rehabilitation.
	Westinghouse Electric Co., Seattle, Washington	1-27-61	To discuss new method of operating 190 steam turbine pumps.
	Instrument Laboratories Seattle, Washington	1-27-61	At the request of AEC Purchasing, reviewed repair techniques used on Hanford instruments.
WC Royce DM Diediker	General Electric Co. San Jose, California	1/10-11/61	Determine fault in neutron monitor equipment - CGI-839.
	Byron-Jackson Co., Los Angeles, California	1-12-61	Review equipment needed for 2 out of 3 trip equipment - CGI-839.
	Consolidated Dyanmics Corporation, Los Angeles, California	1-13-61	Review equipment needed for 2 out of 3 trip equipment - CGI-839.
FD Collins	Stetson-Ross Company Seattle, Washington	1/5-13/61	Witness first run-ins and final shop tests of modified Sundstrands.
CE Love	Wolverine Tube Co. Allen Park, Michigan	1-23-61	Review progress on NPR zirconium cooling tubes.
	National Carbon Company Clarksburg, West Va.	1-24-61	Review progress on graphite procurement.
	Speer Carbon Company Niagara Falls, New York	1-25-61	Review progress on graphite procurement.
	Harvey Aluminum Co. Los Angeles, Calif.	1-26-61	Review progress on zirconium process tubes.
JE Stice AB Dunning	Yuba Consolidated Industries, Benecia, Calif. Todd Shipyard Corp., Seattle, Wash.	1-16-61	Review progress in fabrication on primary shield and hydraulic elevators.

<u>Name</u>	<u>Firm & Location</u>	<u>Date</u>	<u>Purpose</u>
GT Haugland	Stearns-Roger Mfg. Co. Denver, Colorado	1-12-61	Discuss fabrication and inspection requirements for NPR thermal shield cast iron blocks.
JF Nesbitt	A.M.F. Atomics Greenwich, Conn.	1/5-6/61	Discuss progress on irradiated metal handling system.
	Pride Machine, Los Angeles, Calif.	1/9-10/61	Discuss tests on components for ball system.
WJ Love	AEC, Washington, D.C. New York, New York	1/23-2/2/61	Attend meetings on advanced reactor study. Attend American Standards Assoc. Subcommittee 6.3.
WJ Dowis	AEC, Washington, D.C. New York, New York	1/26-27-/61 1/30-31/61	Attend meeting on the supplement to FPC report. Attend AIEE meeting. Visit Burns & Roe, Inc. to discuss data for AEC computation on NPR unit costs.
RV Dulin	General Electric Co., APED, San Jose, Calif.	1/10-15/61	Obtain information on reactor instrumentation and canned motor pumps.
	Byron-Jackson Co. Los Angeles, Calif.		" "
	Consolidated Electro-dynamics, Los Angeles, Calif.		" "
RW Benoliel	General Dynamics General Atomics Division La Jolla, California	1/18-20/61	Attend meeting of ASTM Subcommittee on Nuclear Graphite Standards.
DH Curtiss	Harvey Aluminum Co., Torrance, California	1/24-28/61	Discuss process tube procurement.
	Reynolds Metals, Inc. Phoenix, Arizona		" "
RE Trumble	University of Wash. Seattle, Wash.	1/25-27/61	Presentation on reactor safety to graduate engineer seminar.

DECLASSIFIED

<u>Name</u>	<u>Firm & Location</u>	<u>Date</u>	<u>Purpose</u>
WW Walker	Seattle, Washington	1/30/61	Attend annual meeting of the Washington State Boiler and Pressure Vessel Inspectors.

VISITORS

RB Keely	Northern States Power (A Private Utility)	1-11-61	Discuss Industrial Engineering Activities.
HV McCormick	Ingersoll-Rand Co. Portland, Oregon	1-19-61	Met with Industrial Engineering to test pneumatic wrenches.
TE Harryman Leroy Elrey	Government Accounting Office, Seattle, Washington	1-11-61	Observed C Reactor facilities.
HC Hopkins	General Dynamics General Atomic Division La Jolla, California	1-9-61	Observe operation of the DR-1 Loop.
RR Krom P. Loewenstein	Nuclear Metals, Inc., Concord, Mass.	1/11-12/61	NPR Fuels Review Meeting.
GT Lewis M. Zizza BJ Bucalo AJ Fiehn	Burns and Roe, Inc. Hempstead, New York	1/24-26/61	Discuss secondary loop control schemes based upon constant steam pressure with the intent of simplifying operational procedures and instrumentation.
AJ Del Buono	Taylor Forge & Pipe Works Chicago, Illinois	1-5-61	Discuss welding procedures for primary pipe.
BE Sherrill	Daugherty Company Cincinnati, Ohio	1-6-61	Sales promotion for pipe fabrication.
HB Evans	Associated Piping & Engineering Company, Compton, California	1-10-61	Discuss manufacturing procedures for primary piping.
GG MacLay DK Greenwald E. Christensen WW Warren	Ladish Co., Cudahy, Wisconsin	1/12-14/61	Discuss manufacturing procedures for primary piping.

DECLASSIFIED

HW-68343

<u>Name</u>	<u>Firm & Location</u>	<u>Date</u>	<u>Purpose</u>
HS Swan	H. S. Swan Company Portland, Oregon	1-15-61	Discuss welding procedures for primary piping.
H. George	Tube Turns, Louisville, Kentucky	1-16-61	Discuss manufacturing procedures for primary piping.
EG Haswell	U. S. Steel Corporation Ellwood City, Pa.	1-17-61	Discuss manufacturing procedures for primary piping.
R. A. Perry	U. S. Steel Corporation Spokane, Washington	1-17-61	Discuss manufacturing procedures for primary piping.
C. Murray D. Uhlik	Weldex Corporation Los Angeles, Calif.	1-20-61	Discuss non-destructive testing procedures for primary piping.
HB Evans	Associated Pipe & Engineering Company, Compton, California	1-21-61	Discuss quality levels for primary piping.
HR Erickson	Bergen Pipesupport Corp. New York, New York	1-23-61	Discuss problems of pipe support for primary piping.
Dr. EO Bergman	Independent Consultant San Marino, California	1/23-27/61	Consultation on reactor piping problems.
EW Legas	Chicago Pneumatic Seattle, Washington	1-10-61	NPR tooling discussion.
FK Clement	General Electric Co. ANP, NRTS Idaho Falls, Idaho	1/24-25/61	Discuss reactor confinement system design and performance.
BA Pearson	Norfin, Inc. Seattle, Washington	1/11-13/61	To discuss Contract DDR-109 with CA Munro.
RJ Margraff	Monitor Systems, Inc., Fort Washington, Pa.	1-9-61 and continuing	Check over high speed scanner delivered by Monitor Systems, repair any shipping damage, check each section for performance and recalibrate where required, and certify for acceptance testing.

DECLASSIFIED

HW-68343

<u>Name</u>	<u>Firm & Location</u>	<u>Date</u>	<u>Purpose</u>
Paul DeRienzo	Burns & Roe Hempstead, N. Y.	1/11-17/61	Discuss NPR metallurgy with JM Fox.
Bruce Sherill	Grinnel Co., Providence, R. I.	1-6-61	Discuss methods of pip- ing erection.

END

DATE
FILMED

2 / 5 / 93