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MONTHLY REPORT

68903

FUELS PREPARATION DEPARTMENT

FOR

JULY, 1958

Compiled by

Fuels Preparation Department

August 19, 1958

Richland, Washington

J.F.R.
by m.l.w.
5/15/73

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

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FUELS PREPARATION DEPARTMENT
MONTHLY REPORT SUMMARY FOR
JULY, 1958

MANUFACTURING OPERATION

Five hundred thirty-seven (537) tons of acceptable uranium fuel elements were produced which was 111% of forecasted production. The manufacturing yield for all products continued at a high level. An all-time high plant operating efficiency of 95% was recorded in July.

At month end there was a 1.4 month supply of bare uranium cores in storage. All types were in adequate supply throughout the month. A 1.3 month supply of finished material was on hand in the combined 100-300 storage areas.

Calibration of go and no-go areas in the same penetration standard is possible now by using an epoxy resin instead of AlSi to bond the can and uranium core.

One autoclave failure - a natural uranium I & E fuel element - occurred in July. Failure resulted from an external weld pinhole which extended into a non-wet area in the cap braze region.

I & E fuel element fabrication will increase from 50% of the total July production to 90% of the total December, 1958 production. By October, production commitments will require almost continuous operation of four canning lines per shift on I & E fuel elements.

ENGINEERING OPERATION

The rupture trend for July was normal except for an increase in enriched fuel element failures. Misalignment and bond porosity appeared to be the primary rupture factors. Studies indicate that AlSi braze porosity is more prevalent in enriched fuel elements than it is in normal. This re-emphasizes the need for control of hydrogen in uranium. Emphasis is being given to the improvement of uranium processing steps to reduce hydrogen content.

Bondtesters were modified to provide mapping of unbond regions. This permits detection of groups of small voids which in aggregate have harmful effects similar to those caused by large voids, 75 cm. or greater in length. A recommendation is being made to apply this more restrictive test to all production in the near future. This will undoubtedly result in a higher reject rate and an over-all decrease in yield. The major quality improvement in reactor operation should completely offset yield changes.

Examination of fuel cores cast by the American Bearing Company proceeded at HAP0 during July. These tests continued to indicate acceptable characteristics. Considerable economic incentive exists in core casting because of the elimination of costly machining steps in core fabrication.

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A revision to the project proposal for CG-713, Conversion to I & E, was forwarded to the AEC. This requested an additional \$80,000 and an extension of the completion date. All other design and project work is on schedule and within costs.

FINANCIAL OPERATION

Recommendations made by the Traveling Auditors were summarized and action taken or planned was documented. Monthly status reports are scheduled and all planned action is scheduled for completion by October 1.

AEC approval was obtained to cover assistance from other Company components to the extent of \$35,000 in FY-1959.

Revised FY-1959 budget based on current production forecasts and personnel requirements was completed. Work on a target budget, based on more conservative assumptions, was initiated.

Productivity Report for quarter ended June 30 was issued. This indicated a productivity gain over the previous quarter of 15% which is calculated to represent \$320,000.

MAINTENANCE & POWER OPERATION

There was one cost reduction completed, representing annual savings of \$8,000. This savings represents 39% of the quarterly cost reduction budget. The annual cost reduction budget realization is 67%.

A customer relations survey was initiated. Two hundred and thirty-six customers were contacted.

The initial work on the Darex Project has been completed.

Plant forces completed the installation of an 8" valve on the water line north of the 313 Building. This was done to prepare for the tie-in by construction forces of the water line loop in this portion of the 300 Area.

EMPLOYEE RELATIONS OPERATION

An eight hour course in Statistical Quality Control and Probability Statistics was presented during the month by Professor CoVan, a summer employee. Initial enrollment was 69, including two from another Department.

Approximately 85% return has been received on the Exempt Compensation Attitude Survey questionnaire to date. Results are scheduled for compilation and analysis by the first of August. Implementation of the new salary review and appraisal scheduling plan was initiated.

Eight grievances were processed at Step I during July. Of the eight grievances three involved jurisdiction, one each concerned ratio agreement, overtime, hours of work, transfer and responsibility.

The HAMTC has filed a Summons and Complaint in U.S. Federal District Court alleging breach of contract in the P. A. Lynch arbitration case. Damages claimed are in the amount of \$250.

As of month end the Department had completed 699 days without a disabling injury. The medical frequency rate increased slightly from 4.19 in June to 4.26 in July. There were no serious accidents or fires during the month.

PERSONNEL STATISTICS

Number of employees June 30, 1958	752
Number of employees July 31, 1958	748

OPERATION

	<u>EXEMPT</u>	<u>NON-EXEMPT</u>	<u>TOTAL</u>
General	1	1	2
Manufacturing	54	282	336
Engineering	52	26	78
Financial	16	20	36
Maintenance & Power	39	233	272
Employee Relations	14	10	24
TOTAL	176	572	748

Smattin
 GENERAL MANAGER
 FUELS PREPARATION DEPARTMENT

LLG/WMM/jak

MANUFACTURING OPERATION

July, 1958

I. CURRENT OPERATIONSA. Production and Productivity1. Statistics

	NORMAL				ENRICHED		
	8"	8" I & E			6"	6" I&E	
	Solid	C	K	O	Solid	C	Total
<u>Current Month's Production</u>							
Acceptable Fuel Elements Produced (Tons)	273	6	109	122	19	8	537
As % of Forecast Production	121		112		95	32	111
As % of Past 3 Month's Production Average	77		119		158	20	88
As % of Past 12 Month's Production Average	64		193		158	42	91
% of Forecast Achieved - Last Fiscal Quarter	119		99		90	122	111
% of Forecast Achieved - Last 4 Fiscal Quarters	105		94		96	84	101
<u>Operating Efficiency</u>							
Current Month (%)							95
Forecast (%)							91
Previous Month (%)							93
<u>Manufacturing Yield</u>							
Current Month (%)	89		83		88	61	
Forecast (%)	78		72		78	72	
Previous Month (%)	89		87		74	81	
Bare Uranium in Storage (Tons)							726
Finished Product in Storage (Tons)							737
Special Products Finished (Pieces) Poison							2,982
Uranium Utilization							95.8

2. Activitiesa. Production

During the first eleven working days in July the manufacturing plant worked on a two-shift basis with eight canning lines each day. Higher than forecast manufacturing yields and operating efficiency enabled the

a. Production - continued

plant to schedule seven canning lines each day for the remaining eleven working days. Operators released by this change in production scheduling were used for grooving "O" size I & E cans, for refacing and rewelding fuel elements, and for canning poison pieces.

Five hundred thirty-seven (537) tons of acceptable uranium fuel elements were produced which was 111 percent of the four hundred eighty-two (482) tons forecast in HW-55761-RD. Variance from forecast resulted primarily from a change in product mix, higher manufacturing yields and operating efficiency.

b. Yield Control

	<u>June Yield</u>	<u>July Yield</u>
8" I & E	86.7%	83.2%
8" Solid	89.4%	88.8%
6" I & E Enriched (0.94)	81.1%	60.8%
6" Solid Enriched (0.94)	73.8%	87.8%

Production quantities of "O" size fuel elements were produced for the first time. Tube wrinkling during spire insertion and increased braze layer contamination were the prime difficulties experienced in fabricating this new product. Surface inclusions increased coincident with the use of new lots of canning sleeves. Major modifications to equipment were made in the Finishing Area which caused a temporary increase in the marred surface rejects. In spite of these processing problems the combined efforts of both production and engineering personnel held the manufacturing yield at 83.2 percent for eight-inch I & E production.

Although there was some increase in the marred surface rejects the solid eight-inch yield continued at a high level of 88.1 percent.

The yield for solid enriched fuel elements was 87.8 percent compared to 73.8 percent in June. Porosity was lower in July than experienced during the previous month. Testing the solid enriched fuel elements with the new "memory" bond test total count circuit resulted in a slightly lower yield for solid enriched than for solid natural fuel elements.

Only a small quantity of six-inch enriched I&E fuel elements from re-process storage were finished during July. For this reason the yield figure is not considered significant and no analysis is made.

Minor braze layer contamination in all products continues to be a problem. Some sporadic incidents have been corrected through correlation of contamination with specific welders and canning lines. A thorough study to detect and eliminate the difficulty at the source is continuing.

c. Other Activities

Three thousand lead-cadmium pieces were processed by the special canning crew to meet an urgent request of the Irradiation Processing Department.

c. Other Activities - continued

Their plans had called for obtaining this product from another source, so their request was unexpected. However, by expediting both purchasing and processing, the Manufacturing Operation was able to ship 2,000 pieces to the reactors by month end. Their request called for a total of 16,000 pieces, with deliveries scheduled at the rate of about 3,000 per month.

At month end there was a 1.4 month supply totaling seven hundred twenty-six (726) tons of bare uranium in storage. All types of cores were in adequate supply throughout the month. The bare inventory was reduced by 53 tons from the previous month with plans calling for a continued gradual reduction in the bare inventory until a one month supply is reached in December of this year.

Based on the forecast of reactor needs for August, a 1.3 month supply of finished material was on hand in the combined 100-300 storage areas. Finished inventory will continue high for some time in order to assure meeting reactor requirements even though production may be disrupted temporarily by the construction work in progress and in the run-in of new equipment installed under CG-713.

In July the projected annual turnover rate of essential material was 1.93. The following pieces were processed through the fuel recovery operation:

	<u>Pieces</u>
Solid 8"	2,639
I & E "C" 8"	7
I & E "K" 8"	2,155
I & E "O" 8"	2,541
Solid 6" Enriched	2,853
I & E 6" Enriched	9,003
Total	19,198

One shipment totaling 23,328.90 pounds of enriched uranium scrap was shipped to Oak Ridge for use in critical mass studies. After completion of the studies the material will be sent to National Lead Company of Ohio for reprocessing.

B. Plant Problems and Incidents1. General

As a part of CG-713 it was necessary to relocate the bond and penetration testers and to change the conveyor system in the Finishing Area. These changes caused many production problems such as backlogs, equipment outages, and production rescheduling. By careful planning and aggressive action the Manufacturing Operation was able to keep production flowing through the plant. The effectiveness of the effort was attested by the setting of an all-time high plant operating efficiency record of 95 percent in spite of the construction activities.

2. Non-Destructive Testing

Calibration of go and no-go areas in the same penetration standard is possible now as the result of using an epoxy resin instead of AlSi to bond the can and uranium core. This is another step forward in the development of non-destructive tests which will assure better and more uniform quality fuel elements for the reactors.

3. Autoclave Failures

One autoclave failure - a natural I & E fuel element - occurred in July compared to two in June and four in May. All failures resulted from external weld pinholes which extended into non-wet areas in the cap braze region. An additional inspection was continued between the etching and autoclaving operations to screen out weld pinholes which are not readily discernible at Weld Inspection. The program to improve cap wetting is discussed below.

4. Cap and Can Wetting

Can wetting was in good control on all products as a result of the cap and can wetting improvement program which has been in effect since June. Some improvement has been made in I & E cap wetting. Areas of investigation include the following:

- a. Cap preheat times from 20 to 30 seconds are being evaluated.
- b. Changes in the cap vibrator design as well as changes in the vibration period are being considered.
- c. A light machining cut was made on the outside diameter of the cap well of about 5,000 I & E caps to remove surface oxides and facilitate cleaning. By so doing cap well metal was removed without sacrificing spire wall thickness. About 3,300 of these were canned. Preliminary results indicated significant improvement in cap wetting.
- d. A search is being made for better cleaning solutions to replace those currently in use for aluminum components.
- e. Hanford Laboratories have been requested to provide more information about the wetting and bonding mechanism.

5. Cap and Can Cleaning Machine

Concurrent with the first production run of "O" size I & E fuel elements it has been necessary to change the methanol in the cap and can machine daily due to water carry-over by the "O" size spires. Dilution of the methanol has required continuous operation of the methanol still. Increasing amounts of "O" size material are to be processed in the coming months, so every effort will be made to reduce carry-over through chemical additives to reduce surface tension of the water and through design changes to the cleaning machine.

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C. Operating Plans

1. Bare Natural Uranium Quality

Bare natural uranium quality remained at the same level as during the previous six-month period. Less than one (1) percent of the cores were rejected for seams and striations. The porosity rate of canned pieces was less than two (2) percent.

2. Fuel Recovery

Total fuel recovery throughput was below normal in July due to the high manufacturing yields, recovery of about 3,100 pounds of uranium from 850 gallons of uranyl nitrate solution for the Hanford Laboratories, and an increase in enriched fuel element throughput. A limited quantity of rejected natural uranium fuel elements was processed through fuel recovery in July. The balance was stored for recovery early in August.

In an effort to reduce uranium weight loss during the fuel recovery process, time cycles in the diluted and concentrated caustic solutions were varied for 1,500 test pieces. Results of the test indicated that both the uranium weight loss and the pickle inspection reject rate of recovered cores were reduced substantially. A more extensive test is in progress to gather additional data.

3. Eddy Current Testing of Aluminum Cans

During July a non-destructive test of aluminum cans was started. The eddy current principle was used to test the cans for seams. Evaluation of the first 11,200 cans tested indicated that the equipment could differentiate between acceptable and defective cans. Application of non-destructive testing methods to inspection of aluminum cans is expected to upgrade the quality of finished products.

4. Production Scheduling

The program for charging I & E fuel elements in the old reactors is expected to proceed without delay. Starting in July one reactor per month is scheduled to charge I & E fuel elements until all old reactors are using this type of fuel. The demand for this product will increase I & E fuel element fabrication from 50 percent of the total July production to 90 percent of the total December 1958 production. Starting August 11 three canning lines of I & E fuel elements per shift will be scheduled. By October, production commitments for this product will require almost continuous operation of four canning lines per shift on I & E fuel elements.

5. Hanford Test Reactor

Reactivity values obtained on bare and canned fuel elements were normal and indicated no significant trends regarding the isotopic ratio.

Special tests, including some graphite testing, were made for the Irradiation Processing Department and for the Hanford Laboratories. All activities met nuclear safety specifications.

6. Splash Shields for Canning Personnel

Safer and better working conditions are expected when splash shields are installed on all canning furnaces. Test results of two prototypic shields indicate that the hazards from splashing molten metal are reduced greatly. In addition the shields reflect radiant heat rays away from the capping operators who will not be required to wear face shields while working behind the splash shields. Not only will the men work in safer but also more comfortable conditions.

D. Employee Relations

Members of the Operation were treated for 28 medical treatment injuries for a frequency of 5.07.

The frequency of exposures greater than 300 mrad per four-week badge period was 1; from 200-300 mrad per four-week badge period was 3; and from 100-200 mrad per four-week badge period was 28. A four-week film badge period, introduced during July, made it difficult to correlate exposure experience this month with previous performance. However, the four-week badge period is of benefit in evaluating exposure under very low level contamination such as exists in many parts of the fuel element fabrication plant.

II. PERSONNEL MATTERS

A. Reports of Invention

Members of the Operation engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during July 1958.

B. Meetings

Members of the Operation attended 28 staff meetings, 16 safety and security meetings and 6 informational meetings.

C. Significant Reports Issued

1. Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-56684	Fabrication History of Uranium Cores for June 1958	GB Hansen	7-9-58
HW-56699	Uranium Quality Control Analytical Results	GB Hansen	7-10-58
HW-56603	Monthly Report, Quality Control Operation, Fuels Preparation Department, June, 1958	KV Stave	7-1-58

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2. Non-Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-56826-RD	Official Production Forecast FPD, August 1958 through June 1964	HE Berg	7-16-58
HW-56654-RD	Production Assumptions, FY 1959 and FY 1960 Goal Budget FPD	HE Berg	7-16-58
HW-56836	Uranium Core Requirements, FPD August 1958 through March 1959	HE Berg	7-18-58

Stammatus
Manager - Manufacturing

WM MATHIS:RIB:rhs

YIELD STATISTICS - 8" ONLY

1958

G. X. BEARD

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ENGINEERING OPERATION

July, 1958

VISITORS

<u>Name</u>	<u>Company</u>	<u>Contact</u>	<u>Date</u>	<u>Reason</u>
CF Hall	National Lead Co. of Ohio, Cincinnati	RE Olson	7-30/31	Discuss carbonate and chloride heat treat- ment test results.
JF Shiltz FM Teetzel NE Hehner	" " "	RE Olson	7-14/16	Discuss induction heat treatment of uranium.
Hideo Taketnai MV Davis	Atomics International Canoga Park, Calif.	RS Paul	7-29/30	Obtain information on non-destructive testing.

TRIPS

TW Gore SG Forbes	Bunstead-Woolford Seattle, Wash.	DE Bumstead	7-22/24	Engineering details associated with CG-759
" "	Marshall & Barr Consulting Engr. Seattle, Wash.	DE Bumstead	7-22/24	" " "

PERSONNEL

<u>Name</u>	<u>Title</u>	<u>Nature of Change</u>	<u>Date</u>
Testing Methods:			
FR Busch	Eng'g. Ass't.	Transferred in	7-21
DR Cunningham	Tech. Grad.	" "	7-14
RD McCormick	Tech. Grad.	Transferred out	7-4
RE Rowley	Engineer	Transferred in	7-1
Design & Projects:			
K Drumheller	Engineer	Transferred in	7-1
RE Rowley	"	Transferred out	7-1
Advanced Engineering:			
K Drumheller	Engineer	Transferred out	7-1

PERSONNEL (cont'd.)

Drafting & Files:

GE Rushworth

Eng'g. Designer

Transferred to monthly 7-1

PROCESS ENGINEERING

Regular Production Rupture Experience

Seven solid normal uranium and eight (6 solid, 2 I & E) enriched uranium fuel element failures occurred in the reactors during the month. Of the solid normal uranium ruptures, one was classified as a split core, one as a hot spot, and the remainder were unclassified. Two of the latter had blunt-nose tru-line end contours. Four of the solid enriched fuel element failures were classified as hot spots, one as side other, and one was unclassified. One of the I & E enriched failures was classified as a split core and the other as a hot spot. Distribution of the failures by reactor was 2 in B, 3 in C, 2 in D, 4 in DR, 2 in F, and 2 in H.

As a result of the I & E enriched failures, which occurred in C reactor, the goal exposure in this reactor has been reduced to about 850 MWD/T. The split rupture is scheduled to be examined in the Radiometallurgy Laboratory to determine whether the rupture resulted from a metal quality problem or a power-temperature threshold may have been reached which corresponds to that for the early split failures in solid material. The processing of solid enriched fuel elements will be discontinued as soon as approximately 50 tons in inventory and the offsite production stream are utilized. Misalignment continues to be an apparent primary factor contributing to jacket failures.

In addition to the regular production fuel element failures, a "J" alloy piece failed in a J-N column in KW reactor.

I & E Program

Initial flow and temperature data on the revised "K" size I & E fuel elements, provided for flow laboratory and in-reactor tests, is essentially the same as IPD calculated values. Further IPD physics studies are in progress to determine the effect of reducing (15 mils) the core diameter of the natural I & E fuel element on reactor control, because of the added enrichment required.

Approximately 390 tubes of 1.445" OD I & E fuel elements were charged into D reactor in July. In addition, two tubes of prototype 1.440" OD, six-inch enriched were charged, to measure flow and temperature distribution in the reactors. Post-irradiation measurement of 23 tubes of solid dingot uranium fuel elements have not shown any significant difference in the dimensional stability of dingot and ingot uranium.

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Jacket Rupture Program

Circumferential spacing of the short 50 mil supports on I & E fuel elements, to be evaluated in "K" ribbed process tubes, has been reduced from 120° to 90° to prevent potential misalignment and associated hot spots.

Negotiations have been completed with IPD to accelerate the evaluation of aluminum components from potential new vendors.

It is planned to resume the processing and irradiation of X-8001 clad solid fuel elements next period. Further evidence of X-8001 alloy pitting was observed on I & E fuel elements in the #14 and 15 positions of a water-mixing column discharged from KE reactor. The #16 piece had a large hot spot on the downstream end, indicating either misalignment or excessive warp, which will be confirmed through C-Basin examination.

A horizontal duplex basket that tilts the core for unloading has been built and tested. Preliminary results show that very uniform bonds can be obtained. A production test involving a minimum of 200 pieces is planned as soon as a minor AlSi splashing difficulty is corrected.

A completely vertical open core holder has also been tested to determine the effect of core end travel in the bath. The cap end of the piece still had the typical brittle area as normal production pieces do.

Six-inch I & E enriched fuel elements from lots which have been failing in the reactor were sectioned and examined. Two extremes of compound layer formation were noted. The top or cap end had a very thick primary phase compound layer that is associated with brittle bonds. The base had a thin predominately second phase of U-Al₃ type compound as has been produced in a duplex furnace at the elevated lead temperature of 615 C with normal (10.5%) silicon AlSi. This non-uniformity is undesirable.

A test was run to evaluate the effect of precoating fuel elements with lead. By doing this, the piece is totally shielded from the initial AlSi freezeout that takes place when the cold piece is introduced into the duplex. No difference in the resulting compound layer could be determined between these fuel elements and others canned in a similar manner using the same canning conditions.

Support rails were attached to 77 I & E fuel elements using the spot welding techniques recommended by HLO. These techniques have produced satisfactory welded supports on a sizeable quantity of regular solid fuel elements.

IPD has requested 1200 water mixer fuel elements per month. Initial structural testing indicated that the present Mark II water mixers will withstand 25,000 pounds compression with no appreciable dimensional change as compared with 8,000 for previous Mark II mixers welded by the old method. New mixer spools will be ordered with blank ends so that the contour and final dimensions of the end may be machined after welding. This is to take care of any misalignment due to welding and also to make mixers the same diameter as the fuel element. Bond testing of water mixer elements after the mixer was welded on indicated that the welding did not affect the bonding structure.

Process Technology

Preliminary design is complete on a prototype mechanism to preheat caps and spires automatically. The cap preheater will lower the cap into the bath and raise it from the bath according to the setting of the timer. The machine should improve quality by heating all caps uniformly; it will also free the capping operator for a longer period to perform other duties.

An improved vibration assembly will be installed with the cap preheater in order to improve wetting.

A machine is being designed to automatically load a horizontal basket on the duplex agitator.

The five mechanical units for the automatic welders are in place and in various stages of completion. Unit No. 5 is approximately 90% complete. The remaining four units are approximately 50% complete. The argon and helium systems are approximately 25% complete.

The prototype mechanical buffer for the automatic welders has been installed in line with the prototype fully automatic welder. Testing is scheduled to start on 8-4-58. With the exception of the buffer approach to the work piece all operations are satisfactory.

Electron Beam Welding

A final report covering the work accomplished on the feasibility contract was received from G.E. X-Ray Department. Welds have been made on dummy fuel elements using a fixed beam and rotating the fuel element. Focal spot sizes from 3/16" to 1/2" have been obtained but a smaller spot size would be more desirable.

MATERIALS ENGINEERING

Uranium Development

Cast Fuel Cores

Samples of the 1000 fuel cores cast by American Bearing Company are being examined by HLO and FPD. These two independent evaluations are not complete but a few observations can be reported. The chemical analyses, as expected, show the metal to have the same impurity levels as standard production metal. Carbon analyses of 500-650 ppm indicate no carbon pickup during the casting operation. Four of five pieces sampled had hydrogen contents less than one ppm and the fifth had 1.16 ppm hydrogen. These values are lower than the standard rolled product.

Three sets of samples were examined in the metallurgy laboratory of FPD. All three sets had been beta heat treated by the vendor. The first set was in the as-received (beta heat treated) condition, the second set had been alpha annealed at HAPO and the third set was given a second beta heat treatment at HAPO. None of these samples exhibited any significant preferred orientation (X-ray diffraction). Most of the as-received samples had a macro grain size a little larger

than standard rolled ingot metal but one piece had an unusually large grain size on one side of the fuel core. This one piece will be more completely examined to determine the extent of the large grained area which was evident in both the transverse and longitudinal macro-photo.

Macro-photos of the alpha annealed pieces show a mixture of large grain aggregates and small grains. This peculiar structure suggests that the annealing time of 35 minutes at 610 C was not sufficient to obtain complete recrystallization. The pieces which had been heat treated a second time (12 minutes at 720 C) all exhibit a columnar structure adjacent to the external and internal surfaces. The average grain size appeared to be slightly smaller than the metal which had been heat treated only once.

Delay Quenched I & E Cores

Material ordered from the FMPC for further evaluation of an air delay between the beta heat treatment and the water quench will be shipped to HAP0 approximately August 15. Previous production tests with solid fuel elements indicated slightly less tendency to warp when the rods are held in air for about 45 seconds between the heating bath and the quenching bath. The material ordered will be used to determine possible warp improvement for I & E type elements.

Modified Heat Treating Cycle

The FMPC has been requested to heat treat a large portion of the HAP0 fuel cores after the first machining step rather than in rod form in order to expedite treatment of production quantities of uranium in chloride salt. According to present plans this modified heat treatment will start on October 1. Under the proposed method, the rods will be air cooled after rolling, straightened in the Medart straightener and machined to oversize fuel core blanks. The blanks will be heat treated in a chloride bath and then machined to final dimensions.

Braze Porosity in Enriched Fuel Elements

In an effort to improve the quality of the canned enriched fuel element, the bond testers used for enriched fuel elements were recently modified to reject elements with groups of small voids as well as those with large (0.75 cm in length) voids in the bonding layer. This resulted in higher reject rates. During the past several months, destructive testing as well as rejecting rates for enriched fuel elements have indicated that enriched uranium produces more AlSi braze porosity during canning than does normal uranium. These facts have re-emphasized the need for control of hydrogen in uranium, and an understanding of the different processing conditions for enriched uranium.

Basically, the processing of enriched metal is the same as natural uranium but, due to the need for segregation, the enriched metal is processed in a separate building except for rolling and heat treating. In the past, the heat treating bath at Fernald has been responsible for the hydrogen problem. In the case of enriched metal, some other processing step must be examined because both metals are heat treated in the same bath.

A certain amount of hydrogen is known to exist in the ingot, and the heat treating bath is known to add hydrogen to the rods. Since heat treatment is the same, the difference between enriched and natural uranium must be in either ingot casting or machining. Machining variables have not been shown to affect the hydrogen content of fuel cores but ingot casting techniques are known to affect gas contents of the metal. Discussions with engineers of the National Lead Company indicate that the casting step is responsible for the higher braze porosity of enriched fuel elements. One variable which may be responsible is the quantity of scrap which is recycled. As the scrap rate goes down the ratio of derby metal goes up and the scrap metal has been partially outgassed by previous melting in vacuo. Even though uranium is melted under a partial vacuum the pressure at the bottom of the molten charge is higher than one atmosphere. Changes in melting and casting techniques will be discussed with NLO in the near future to see what improvements can be made.

Pilot Plant Development Activities

Approximately 3,500 fuel elements were canned in the pilot plant during July. Sixteen hundred of these were six inch "C" size I & E, water-mix fuel elements which were part of a 3,100 piece quantity being canned as a semi-production item. These were manufactured in the pilot plant instead of the 313 production facility to alleviate a product mix problem with six inch enriched cores, and also because of process development requirements in welding the mixing beads.

Other canning involved small quantity processing of:

1. Solid fuel elements to evaluate modified duplex agitators in brittle bond studies.
2. AlSi canning of "Doe" fuel elements with special alloy components for reactor performance evaluation.
3. Conversion of undersize "C" cores to "O" size cores.
4. Depleted test fuel elements for KER loop.
5. Processing of I & E caps in Aluminex (caustic) in place of Duponal to evaluate wetting characteristics.
6. New "C" size enriched I & E fuel elements.

Pilot Plant Equipment Development

Modifications of equipment to increase the flexibility, efficiency and quality of the AlSi canning process and finishing of fuel elements were made during the month of July.

A new agitator shaft and sleeve for the lead-AlSi furnace operation was designed to be used with the new air cylinders. The new one-piece shaft will be 4" longer and be splined the full length to give greater flexibility and dependability in normal use and also when used with a horizontal type agitator basket.

Vibration studies on the canning jack and cap vibrator are in progress. Measurements of the frequency and amplitude were made and steps are being taken to provide efficient vibration isolators for both. The cap vibrator has been nearly isolated from the furnace and appears to be more effective and quiet.

The air compressor intake was modified to take low humidity air from the outside of the building. The large amount of condensate collected in the compressor this summer has been hampering the operation of the compressor and the equipment it supplies.

The ultrasonic cleaning equipment has arrived and installation is in progress.

The lathe head adapter has been designed for the Warner-Swasey so that cap and base ends of fuel elements can be machined without changing tools. Lathe chuck jaws for the Bardons & Oliver, and the Warner-Swasey are being made. The interchangeable nylon pads of the jaws afford better gripping of the different sized fuel elements during machining. A new shaped cut off tool has been tried and proven quite successful.

TESTING METHODS

Fuel Element Testing

No unusual operating problems were experienced with either the 313 building or pilot plant testers. Evaluation of the new "fixed head" transducer design for the Transformation Test gave good results in the pilot plant and its use on the production units will be recommended.

Equipment is being assembled for bond and penetration testing small quantities of Savannah River Project I & E fuel elements.

Emergency measures were taken to relieve a component shortage by nondestructively testing fuel element cans which had been withheld from production because of suspected defects. Previous canning experience with this material had shown a low incidence of seam type defects visible only after canning. Eleven thousand cans were tested in the laboratory with high sensitivity eddy current equipment. Ninety-four gave signals which were considered cause for rejection. A few of the "rejects" have been canned and one exhibited a slight seam after canning. Six thousand of the "accepted" cans have been processed with no evidence of any seams after canning. Can testing equipment is being assembled for loan to Manufacturing for further testing of the remaining 90,000 suspect cans.

A report is being prepared giving details of the new long-memory count-rate reject system for the Bondtesters. This will substantiate a forthcoming recommendation to apply this more restrictive test to all production upon installation of the new project CG-713 testers.

Project CG-713 - 313 Building I & E Conversion

Debugging of the new Bond-Penetration testers continued throughout the month. The first complete station was moved to the 313 building July 28. It is expected to be ready for production use August 4. The other new mechanical system and the other four electronic systems are to be installed during August at about one week intervals.

Mechanical operation of the new test conveyors has been excellent and performance appears significantly improved over that of the prototypes. Minor electronic troubles have developed as usual when installing new instruments in a production area. These are being resolved and are not expected to delay availability.

Some late design changes were required in the servo actuated probe for the external penetration tester and efforts are continuing to further peak its performance. The signal-to-noise ratio of the servo probe is not yet quite as good as that of the older tape-head probe when the latter is very carefully aligned under optimum conditions. However, the inherent self-correcting feature of the servo system promises more consistent and more stable performance than is obtained with the tape-head probe under normal production use. It should also eliminate the down time and improper operation caused by mechanical problems with the tape system.

NPR and Category II Development

The ultrasonic test tank has been completed for laboratory testing of small diameter rods. Another tank is being modified for external and internal testing of three foot long tubular elements. One of these has been received for testing.

The design of mechanical systems for pilot plant testers is proceeding concurrently with the laboratory developmental studies.

Procedures have been devised for using an image-storage oscilloscope (Hughes Memoscope) for mapping bondtest results. This permits expanded maps of unbond regions of interest to be produced easily.

New Methods Development

Work is underway on instrumentation to improve the accuracy of determining AlSi composition by the thermal arrest method. This is based on a similar device developed at Savannah River.

Promising results have been obtained from studies of a new type of transducer mounting for scanning type testing. The sensor (ultrasonic or eddy current) is mounted between small spring supported wheels. Combinations of wheel designs and spring tensions have been found which maintain proper probe spacing despite bouncing and vibration of the test specimen. This mounting has immediate application to some of the NPR testing problems and may be of potential use on the production testers.

Development of the prototype ultrasonic attenuation analyzer is continuing using sample uranium cores fabricated with small untransformed regions.

DECLASSIFIED

HW-57111

Hanford Test Reactor

The test reactor was shut down for about a week for repair and adjustment of the control rod position indicator and the differential galvanometer system. Negotiations are underway with the Babcock and Wilcox Company regarding special cross-section measurement on graphite for the Liquid Metal Fuel Reactor Experiment.

DESIGN & PROJECTS

Status of Projects

CG-713 - Conversion to I & E Lead-Dip Fuel Elements: The second major equipment relocation was accomplished on the 4th, 5th, and 6th of July.

The first welder power supply arrived on the plant site and is being connected with the number 5 welder.

After the major equipment move it became apparent that additional funds would be required to complete the project. A revision to the project proposal requesting \$80,000 additional funds and extension of the completion date to 1-1-58 was prepared and transmitted to the AEC.

Work was curtailed to keep within the authorized funds and allowable overrun until additional funds are available.

CG-759 - Additional Steam Generating Facility - 300 Area: Dismantling of Building 284-West is proceeding quite satisfactorily and at month's end total project construction was approximately 6% complete. The 284-West dismantling is approximately 78% complete.

Final design drawings have not been submitted. The architect-engineer reports at month's end a total completion of 55%. Foundation drawings on 384 Building will be forwarded to GE for review and comment early in August in order that excavation can begin in 300 Area.

Present scheduling indicates actual boiler move will be made by late September. Necessary scheduling for the actual move is underway with all organizations affected HAPO wide.

CA-774 - 300 Area Water System Modification: Construction work started July 17, 1958. Installation of 725 feet of 8 inch line in 303 Area is complete except for testing. Excavation has started on the 382 Building addition and 225,000 gallon reservoir. Total construction work is approximately 5% complete.

CG-787 - Sprinkler System - 313 Building Addition: The Contractor is awaiting "L" clearance for field personnel. Preparation of fabrication drawings can start after measurements are taken on the 313 building. Clearance is anticipated early in August.

CA-792 - Warehouse Space - FPD: The Contractor submitted part of the shop drawings for AEC approval July 31, 1958. G.E. Review is in progress. Start of construction work on this project may be held up until the boiler on Project CG-759 has been moved.

Research & Development

Several reports on extrusion work were prepared during the month. The principal purpose of these reports was to define the present status of development work, and indicate the areas which require study to insure satisfactory operation of a pilot plant for extrusion work.

The reports covered process and equipment specifications before and after extrusion, and general requirements in the extrusion area.

Work is continuing in this area to provide a detailed program of development requirements.

DRAFTING & FILES

Major Jobs in Drafting

306 Building:	Electron Beam Welder-Design Layout, some parts detailed NPR Ultrasonic Test Tank										
313 Building:	Sleeve Cleaning Machine Demister Control Diagram Acme Gridley Unloader Autoclave Area - Basket Elevator Loader Acme Gridley Lathe										
300 Area General:	300 Area Outside Waterlines										
Miscellaneous:	Fully Automatic Wiring Diagram & Control Panel Layout Graphite Press Chamber										
Drawings Produced:	<table border="0"> <tbody> <tr> <td>New</td> <td>60</td> </tr> <tr> <td>Revised</td> <td>91</td> </tr> <tr> <td>Large Charts</td> <td>14</td> </tr> <tr> <td>Small Charts</td> <td>25</td> </tr> <tr> <td>Miscellaneous</td> <td>7</td> </tr> </tbody> </table>	New	60	Revised	91	Large Charts	14	Small Charts	25	Miscellaneous	7
New	60										
Revised	91										
Large Charts	14										
Small Charts	25										
Miscellaneous	7										

DECLASSIFIED

HW-57111

INVENTIONS

All Engineering Operation personnel engaged in work that might reasonably be expected to result in inventions or discoveries advise that to the best of their knowledge and belief no inventions or discoveries were made in the course of their work during July, 1958 except as listed below. Such persons further advise that for the period therein covered by this report, notebook records, if any, in the course of their work have been examined for possible inventions or discoveries.

"Melt Conditioning to Increase Corrosion Resistance"

by J. T. Mommsen

Acting Manager - Engineering

JW Albott:mbs

FINANCIAL OPERATION

JULY, 1958

GENERAL

A review of the financial aspects of the Department's activity in FY-1958 was presented by the Manager-Finance to level 3 and 4 managers. Items discussed included the Financial Operation organization, comparative balance sheet, summary of operating and production costs and other information regarding research and development, productivity, plant and equipment, personnel accounting, internal auditing and responsibility accounting. This same review was also presented to all employees in the Financial Operation.

AUDITS AND PROCEDURES

A progress report was prepared on action taken on suggestions by GE Traveling Auditors. With only slight modification, all recommendations will be accepted and implemented within the next few months.

The scope of Department internal auditing during the past year was reviewed with a representative of HOO-AEC Audit Branch. The only additional coverage the AEC plans to undertake during the current audit year will be to review FY-1958 fourth quarter transactions of certain accounts which have not been audited subsequent to March 31, 1958.

Revised process material inventory control procedures were agreed to by the five principal functional operations involved and changes were largely effected by month-end. A considerable amount of procedures development was required to successfully exploit the initial step recommended by the Traveling Auditors. This involved transferring certain responsibilities from Manufacturing to Financial Operation. Following is a summary of work reduction effected:

Elimination - One materials ledger, two card records, a monthly report, and supporting forms for the previously required monthly physical inventory.

Combination - Four forms totaling 11 copies replaced by a three-part NCR paper form, and four other forms totaling 11 copies replaced by a four-part NCR paper form.

Simplification - Elimination of report scrolls by typing one report, partially preprinted, directly from ledger cards and completing the other by hand.

Recommendations for integrating and simplifying other closely related procedures will be made after a few month's experience with the new system.

A review was made of the 305 Test Reactor paper work procedures and forms were designed to implement a simplified system. Effect of the revised procedure was the

AUDITS AND PROCEDURES (continued)

elimination of two records and redesign of three records to significantly decrease the time required for maintenance, and design of two new forms to simplify SS Material inventory activities.

GENERAL ACCOUNTING OPERATION

Approval No. 212 - Technical or Consulting Work or Other Special Services to be performed by Other Components of the General Electric Company as Assistance to Hanford FY-1959, was approved by the AEC on July 22, 1958. Work will be authorized as required during FY-1959. Limits of approval are (1) total authorization not to exceed \$35,000 for the fiscal year, and (2) maximum amount of each authorization without specific AEC approval limited to \$5,000. Authorizations in excess of \$5,000 are to be submitted individually to the AEC for approval.

Effective July 1, 1958, amounts reflected in the investment accounts, SS Material Received from Offsite, and SS Material Shipped Offsite will represent current fiscal year values only, rather than accumulated values since decentralization. During each current fiscal year, all other FPD investments are reflected in the various HAPO component current accounts. A new account, Investment - Prior Years, was established to accumulate total Department investment applicable to prior fiscal years.

Allocation was made to level 3 operations of the \$5,500 budget for Attendance at Meetings of Professional and Trade Societies during FY-1959.

No allocation of the \$1,800 budget for Attendance at Offsite Courses and Seminars during FY-1959 will be made.

A new property management Advice, Control of Property of Others, was issued in July. This Advice establishes the procedure for accountability and control of property and materials owned by an offsite Company or Agency, which is in possession of the Department as a result of work being performed for the owner.

A new guide setting forth the Department policy for implementing provisions of the Company Vacation Plan has been included in the OPG System. The guide incorporates information previously cover in an Advice.

The Reduction of Force guide has been completely revised to comply with the HAPO OPG. The revision establishes the "bumping" procedure to be followed in placing non-bargaining employees affected by a reduction of force. Information previously covered in both an Advice and an OPG has been combined into one guide.

A section has been added to Advice B 1.1.1 - Organization Structure Changes, to spell out responsibility for publishing organization charts and directories, types of charts and directories issued, and revision requirements.

Currently, the cost of building service equipment is included as an element of building valuation on property records. It is now proposed to segregate the cost of each building service system from the building structure. Thus, the following units of property would replace what is currently one unit.

1. Building (structure only)
2. Building Service System - Heating
3. Building Service System - Ventilation
4. Building Service System - Electrical
5. Building Service System - Sanitary Water
6. Building Service System - Fire Protection and Alarm System

This proposal would improve present property records in that separate costs would be maintained by significant categories thus providing for increased accuracy. Establishment of property retirement units would also be permitted, thus improving property control. Catalog property record units are currently being revised in accordance with the proposal and when complete, will be reviewed with Contract Accounting and FPD Operating Components. Efforts toward adopting this proposal are being coordinated with the Property Management Operation, Relations and Utilities Operation.

Three Appropriation Requests totaling \$21,440 were processed, approved, and committed during July.

A data sheet and project proposal on Project CGF-810 - 306 Building Pilot Plant Modification were forwarded to local AEC for Review Board approval. Local approval was granted and it is expected that the project proposal will be forwarded to Washington AEC on August 15, 1958.

The second revision to the original project proposal on CG 713 - Conversion to I & E Lead Dip Fuel Elements, has been forwarded to HOO-AEC. Review Board approval was obtained August 7, 1958. Transmittal to Washington AEC is expected by August 15, 1958.

IBM listings of uninstalled cataloged equipment are currently being reviewed and corrections made prior to RUO issuing a revised HAO Property Record Unit Catalog.

The original catalog was prepared two years ago and has undergone considerable change since publication.

Estimated FY-1959 expenditures for equipment not included in construction projects were made. A summary of these estimates follows:

Commitments from FY-1958	\$ 169 000
New FY-1959 Activity	<u>576 000</u>
Total Requirements	745 000
Less: Commitments to FY-1960	<u>224 000</u>
Estimated FY-1959 Expenditures	<u>\$ 521 000</u>

GENERAL ACCOUNTING OPERATION (continued)

Estimated FY-1959 expenditures are broken down by quarter as follows:

First Quarter	\$ 60 000
Second Quarter	120 000
Third Quarter	149 000
Fourth Quarter	<u>192 000</u>
Total	<u>\$521 000</u>

The tentative allocation of equipment funds available in the initial financial plan for FY-1959 is \$510,000.

MEASUREMENTS

The Department goal report covering performance during the January - June period was issued. Performance in relation to each individual department goal was analyzed and ratings assigned, based on predetermined weightings and performance standards. This analysis was summarized by Key Result Areas and submitted to the General Manager.

Information on production cost data was developed for the General Manager's use in a mid-year business review and for presentation to the Military Liaison Committee.

PERSONNEL ACCOUNTING OPERATION

Managers - Personnel Practices, Union Relations, Communications, and Personnel Accounting met with members of supervision of Manufacturing Operation at an informal luncheon meeting on July 30, 1958. The meeting was one of a series designed to afford managers and supervisors an opportunity to ask questions and express opinions about functional work of the four operations.

The Sales and Distribution Department in Seattle returned four FPD Employee Sales Certificates for cancellation and reissue due to price discrepancies. Prices shown on the certificates were the dates at the time the certificates were issued. However, subsequent to the date of issuance, price changes were received with retroactive effective dates. In two cases the dealer had been informed of the price change and charged the employee accordingly. In the other two cases reissuance of the certificates should result in employees receiving refunds. Investigation reveals that price change lists are consistently received subsequent to the effective date. This fact has been called to the attention of Sales and Distribution Department.

During July benefits paid on 149 insurance claims processed totaled \$17,899. This represents the largest number of claims processed and benefits paid in any one month since September 1, 1956.

An increase in the Consumer Price Index for June to 123.7 resulted in a .59% increase in the "adder" factor to nonexempt salaries effective 7-28-58. The next point at which the Index will provide for an increase is 124.1.

PRODUCT COST OPERATION

Recast unit costs reflecting current reporting procedures have been prepared for FY-1956 and FY-1957. Unit costs were given to the Specialist, Measurements for data to be used in the August 4 meeting of the Department General Manager and the Military Liaison Committee.

A comprehensive analysis is being made of prior years' costs as related to budgeted costs for FY-1959. The results are to be presented to the Department General Manager on August 7.

A five-year cost forecast for FY-1959 through FY-1963 is being prepared. The forecast requires a cost breakdown by type of work and component detail and will be completed and submitted by August 15, 1958.

Manufacturing Operation requested a cost estimate for the production of 3,000 mixing fuel elements. The estimate included shop cost, work order charges for machining 8" regular I & E pieces to 6" lengths, and the resultant scrap loss.

The productivity report for the second quarter CY-1958 was completed and issued. Output sold per dollar of basic input was 2.00 during the second quarter as compared to the first quarter ratio of 1.75. Analysis of the productivity ratios reveals a productivity gain during the second quarter of approximately \$320,000 or 14.9%.

A new type Stores withdrawal report requested from Data Processing several months ago was issued for the first time in July. This report, issued on a weekly basis listing description of materials purchased, has experienced a good reception and is being utilized in pricing and analysis work.

New landlord rates based on a standard price per type of space occupied (office, storage, manufacturing), rather than an average rate per building were placed in effect with July business.

A Summary of Operations for the month of June, 1958 and for FY-1958, prepared on a responsibility accounting basis, was forwarded to the HAPO General Manager. All literature available from other libraries on responsibility accounting was obtained by the Plant Library. After a thorough search, it appears that no author has ever experienced a cost flow similar to that of FPD, or ever faced accounting on a responsibility basis for a department not organized on a responsibility basis. For this reason, the greater portion of July was devoted to writing hypotheses and recasting FY-1958 costs to test the hypotheses. Our major problem entails a method of billing customers for IME that would have been prorated to servicing operations by functional accounting. Several alternatives tried proved to be too time-consuming. The most favorable approach is to regard Maintenance and Power as a separate entity and to utilize end-function coding for servicing work of Manufacturing and Engineering. A separate write-up is being prepared on this approach. The coding structure and the work order procedure will both need slight modification.

One employee was granted sick leave until October 6, 1958. No effort was made to replace her as a General Accounting employee will be utilized during rush periods. Complications, tight schedules, and vacations may force additional overtime during August.

A revised FY-1959 budget, based on HW-56654, has been prepared. Also, a revised schedule of personnel estimates and level 3 component cost schedules have been completed. Operating cost statements by level 4 operation are currently being prepared for distribution to all managers. Plans are to report budget on the August, 1958, operating statements.

Inventory value of materials decreased approximately five million dollars during July, 1958. Contributing to the decrease was a reduction in value of material in transit and a decrease in value of materials assigned to Research and Development. The value of process materials increased approximately 4% over the previous month's ending balance.

Change in billing procedure of interdepartment SS material transfers places FPD in control of the value of materials transferred to and from production inventory accounts. Previously, the department relieving its records made the billing and calculated the value on the basis of average unit price. Under the new procedure, interdepartment billings involving either charges to or from FPD's production inventory accounts will be calculated by FPD Product Cost.

Manager - Finance

WS Roe:mh

MAINTENANCE AND POWER OPERATION

JULY 1958

GENERAL

There was one cost reduction completed, representing annual savings of \$8,000. This savings represents 39 per cent of the Quarterly Cost Reduction Budget. The Annual Cost Reduction Budget realization is 67 per cent.

The Goal Performance Report for the 2nd Quarter CY-1958 was prepared and issued.

The Customer Relations Survey was initiated. Two hundred and thirty-six (236) customers were contacted.

A hutment (3722-B Building) was turned over to Bumstead & Woolford Company. This hutment will be used by the contractors during the addition to the 384 Building power house.

A detailed inspection of the roof of the 313 Building was made. The roof is generally in good repair; however, some reservicing is required near the auto-clave exhaust at the north end of the building and at the caustic exhaust at the south end of the building.

AREA MAINTENANCE

Duplicating

<u>Process</u>	<u>No. of Orders Processed</u>	<u>No. of Impressions</u>
Multilith	729	468,260
Verifax	64	2,496
Ozalid	96	3,843

There were 5 Formal Reports completed, consisting of 2,065 copies and 222,311 pages.

The Functional Organization Charts for FPD, HIO and IPD were printed, collated, and bound. The CPD Directory was collated. In addition, a Spare Parts Catalogue was printed and collated for Stores. The extra work from other Departments has increased the backlog to about 100,000 impressions. The normal backlog is approximately 30,000 impressions.

General Maintenance

Conversion of seventy-five 300 hole fuel element pallets was completed.

The Plexiglass guards, previously reported as being installed in the canning area of the 313 Building on a trial basis, have proven satisfactory. Additional guards are being fabricated for the remaining furnaces.

The initial work on the Darex Project has been completed. Performance tests to prove adequacy of design and operability are being conducted by the Chemical Research Operation. Subsequent work will consist of modification and alteration.

A sheetmetal shearing machine capable of working 9/32" mild steel or 1/8" stainless steel was installed in the 3717 Shop. In addition to shearing, this machine will also do circle cutting, forming, beading and louvers. Two factory representatives conducted a training program to insure complete and proper utilization of this equipment.

INSTRUMENT AND ELECTRICAL

The Portable Shop repaired 1,062 portable radiation detection instruments. Average time per instrument was 0.992 man-hours.

The extension of the welding circuit in the 321 Building was completed. This extension permits the welding electrode holder and foot control to be plugged in at 8 different locations in the canyon.

Work was completed on the automatic film racking device and remote glove box control for the Jaco emission spectrograph in the 325 Building. This installation allows the Chemical Research Operation to utilize one power supply at two different arc stands; within a glove box and external. In addition, the shutter, arc and arc timing can be controlled from within the glove box.

A pulse height analyzer was converted for the Chemical Research Operation to provide two separate "window" widths. These "window" widths are 0 to 5 volts and 0 to 50 volts. The wide window allows the operator to look at approximately 1/3 of the gamma spectrum. This permits rapid analysis of large portions of the spectrum to determine the location of energy bands and greatly accelerates the speed of analyses of unknown materials.

A recorder and two mode temperature controller was installed and calibrated for the Metallurgy Group in the 326 Building. The equipment will be used for in-pile and out-pile studies of the properties of Uranium and will permit the determination of the effect of the in-pile flux on the Uranium.

A small battery charger was modified to provide a control and visual indication of the charging rate. This charger is used to maintain the batteries for a Model D.U. spectrometer in the 325 Building. The control and visual indication of the charging rate enables the operator to adjust the rate to match the usage of the instrument and thus results in a minimum voltage drift.

POWER

<u>Statistics</u>	<u>July</u>	<u>June</u>
Average Steam Generated (M lbs/hr)	21.4	23.1
Maximum Steam Generated (M lbs/hr)	30.0	38.0
Total Steam Generated (M lbs)	15,954	16,648
Coal Consumed (Tons)	995.75	1,106
Evaporation Rate (Steam/#Coal)	8.01	7.53
Efficiency - Actual	*	61.4
Efficiency - Theoretical	*	64.7
No. of Boilers on: 2 1		
Date of Change : 1 13		
Sanitary Water from 3000 Area (Million Gals.)	68.1	62.0
Total Water from 3000 Area (Average Rate, GPM)	1,525	1,436
Total Water from #3 and #4 Wells (Million Gals.)	12.4	11.7
Total Water from #2 Well (M Gals.)	.30	.30
Peak Water Consumption for 24 Hours (Million Gals.)	2.5	2.4

* Work associated with the installation of new export steam meters in the 384 Building does not permit the accurate determination of actual and theoretical efficiencies. This will be reported as usual when accurate date is once more available.

The high evaporation rate in July was the result of:

1. The use of Utah Coal received from off-plant rather than Kemmerer Coal. Utah Coal has a BTU content of 13,010 BTU/lb. Kemmerer Coal has 10,100 BTU/lb.
2. The use of coal from the stockpile from July 15 through July 22. It was necessary to use coal from the stockpile during the annual miners' holiday. Stockpile coal contains 60 per cent Utah Coal.

On Monday, July 28, an electrical outage occurred within the 384 and 382 Buildings. Service was restored by manual switching in the generator room of the power house. High ambient temperature plus the automatic starting of #3 Air Compressor caused the interruption. The time delay period on the Air Compressor solenoid valve has been increased to prevent a recurrence of this type of outage.

The No. 5 Boiler was inspected on July 14 by a representative of the Travelers Indemnity Company and was found to be in satisfactory condition.

The #2 Well pump failed. Subsequent inspection revealed a broken pump shaft and general wear of the spiders and rubber bearings. New parts were ordered.

The installation of the new flash tank and heat exchanger was completed and the unit is functioning satisfactorily. The old equipment has been removed from the 384 Building.

Plant Forces completed the installation of an 8" valve on the water line north of the 313 Building. This was done to prepare for the tie-in by Construction Forces of the water line loop in this portion of the 300 Area.

Four adjustable louvers were installed in the induced draft fan room. This will greatly improve the working conditions in this location.

The responsibility for the administration of the Productive Maintenance Program was transferred from General to the Power Operation:

Outstanding orders as of 6/30	- 48
Orders issued in July	- 34
Orders completed in July	- 12
Outstanding orders as of 7/31	- 70

PLANT ENGINEERING

There were 40 training classes held for craftsmen of HLO and FPD. This represents 347 man-hours of craft training. In addition, 4 training classes representing 72 man-hours were held for janitorial personnel of the 100-K and 100-B Area Maintenance Operation, IPD.

Eight "Let's Pretend" safety meetings were held for FPD and HLO personnel. These meetings were based on a course which simulates the difficulties encountered by persons who have lost the use of their eyes.

A rough draft manual on the I & E Non-Destructive test equipment has been issued.

The Lubrication Manual for the 328 Building was issued. Lubrication schedule cards have been installed on each machine at this location.

FIRE PROTECTION

<u>Fire Responses</u>	<u>No.</u>	<u>Loss</u>
HAPD	2	None
Construction	0	--
Private	0	--
Outer Area	3	\$10.00

INVENTIONS

All personnel of the Operation engaged in work which might lead to inventions and discoveries advised that, to the best of their knowledge, none were made in the course of work during July, 1958.

SAFETY, SECURITY AND RADIATION EXPERIENCE

Medical Treatment Injuries	24
Frequency Rate	5.52
Disabling Injuries	0
Near Serious Accidents	0

There were no radiation overexposure cases reported.

There were no security violations reported.

MEETINGS

Round Table-Staff	25
Safety and Security	33
Information	7

Manager
Maintenance and Power Operation

E. Hilgeman:JPF:mkm

EMPLOYEE RELATIONS OPERATION

July, 1958

PERSONNEL DEVELOPMENT

Personnel Development course presentations for the balance of CY 1958 were developed from Personnel Development Review records. Ten courses in all are planned.

The fall PBM-I presentation was arranged and the pre-course meeting scheduled for early in August.

During the month, a summer placement professor began presentation of an eight hour course in Statistical Quality Control and Probability Statistics. Initial enrollment totaled 69, including two HLO participants.

About two dozen profile work sheets are being developed by individuals in the Department as part of a pilot run in developing the Fuels' inventory of exempt personnel.

The FPD portion of the HAPO orientation for new Tech. Grads. and summer placement people was arranged. Complimentary remarks were received directly and from the Tech. Grad. Program Administrator.

One Tech. Grad. completed his orientation within Fuels and two others joined the Department during July, leaving a total of seven Tech. Grads., plus four summer placements in FPD at month's end.

COMMUNICATION

Operation Upturn communication included distribution of Operation Upturn stickers to employees at month's end, two full page GE News features (one related to improved working conditions and the other to the FPD Hand Safety Program), and distribution to supervisors of cards to aid in conducting "customer relations" meetings with employees.

Three General Manager's meetings were arranged during the month, one with exempt employees and two with non-exempt. Two FPD Newsletters and seven Management News Bulletins, including three special issues, were prepared and distributed.

GE News coverage of FPD activities and employees totaled 188 column inches during July. Of this number, five column inches were devoted to routine items and 183 column inches to planned communication in support of FPD programs. The total represents an average of nearly three-fourths of a GE News page per issue.

Other communication activities during the month included the Safety Topic, distribution of information rack booklets, announcement of meetings and organization changes, and planning for a first line supervisors' communication training program.

Approximately 65 Tri-City business leaders visited the FPD Test Reactor as part of the Community Relations' meeting and tour for business leaders. A talk on Safety in Industry, prepared by the FPD Health and Safety Specialist, was placed in the HAPO Speakers' Bureau.

Communication concerning visit of the Red Cross Bloodmobile to the 300 Area during August included Management News Bulletin notices and a special flier sent to all Fuels' employees.

SALARY AND WAGE ADMINISTRATION

There were no positions audited in July. Excluding Level 2 and 3 Managers and vacant positions, 18 of the 112 positions as of January 1, 1958 have been audited or 55% of the two year goal on a monthly basis.

To date approximately 85% return has been received on the Exempt Compensation Attitude Survey questionnaire. Results are scheduled for compilation and analysis by August 1, 1958.

Implementation of the new salary review plan was initiated with the issuance of instructions to supervisors of exempt employees regarding an informal mid-year review.

A peak clerical work load was handled during the month as necessitated by the revision and publication of Functional-Organization Charts, Organization Directories, Position Relationship Data sheets, and the Polar Chart, as well as Pay-Performance work sheets for all exempt. A few errors in the latter have been detected and steps are being taken to prevent recurrence in the future.

The nonexempt compensation study is progressing on schedule. The over-all task force study schedule was formulated during the month and the ranking of all study jobs in both the semi-technical and clerical-functional job clusters is completed.

The audit program for all nonexempt jobs in the Department, scheduled for completion by September 1958, was completed early this month with the issuance of the Manufacturing Operation job study.

A complete review of HAPO nonexempt Metallography assignments was made in order to provide the Supervisor, Analytical Laboratory, FPD, with information concerning evaluation of Metallography jobs. Metallography work in 325 and 306 buildings (HLO) and 189-D building (IPD) was reviewed. It was determined that the FPD Metallography work was presently classified properly with respect to other Metallography work being performed at HAPO. A summary of the findings was issued to those concerned.

A detailed inventory of the currently processed records has been completed and submitted to the Specialist, Audits and Procedures, Financial Operation. This work is in support of the intensive records study initiated in June.

UNION RELATIONS

The HAMTC has filed a Summons and Complaint with the Company alleging breach of contract in violation of Article VII, Section 11, concerning the P. A. Lynch arbitration case. The action was filed in U. S. Federal District Court. Damages claimed are in the amount of \$250. At the same time a general action for breach of contract was filed against the Company together with several other specific suits similar to the P. A. Lynch case.

Grievance Statistics

	<u>Unit</u>
Received this month	8
Received since 1/1/58	75

Step I	
Answer unsatisfactory	6
Answer satisfactory	1
Pending time limit to close	3
Settled this month	7

Step II	
Discussed this month	3
Pending time limit to close	3
Settled this month	4
Pending arbitration	5

Subject of July Grievances: (8 Total)

	<u>Mfg.</u>	<u>Eng.</u>	<u>Maint. &</u>	<u>Emp.</u>	<u>Fin.</u>
	<u>Oper.</u>	<u>Oper.</u>	<u>Power Oper.</u>	<u>Oper.</u>	<u>Oper.</u>
Ratio	1		0		
Jurisdiction	1		2		
Overtime	0		1		
Hours of Work	1		0		
Transfer	1		0		
Responsibility	1		0		

Subject of Grievances for 1958: (75 Total)

Jurisdiction	10	37
Seniority	0	2
Overtime	5	3
Absence	6	0
Unsafe Equipment	1	0
Transfer	2	0
Responsibility	3	0
Hours of Work	3	1
Health and Safety	0	1
Ratio	1	0

HEALTH AND SAFETY

	<u>July</u>	<u>June</u>
Disabling Injuries	0	0
Serious Accidents	0	0
Medical Treatment Cases	52	49
Medical Treatment Frequency	4.26	4.19
Employee Hours of Exposure	122,116	116,813
Orientation Presentations	1	1
Attendance	7	8
Inspections	20	21
Suggestions Evaluated	6	2
Safety Meetings Attended	1	1
Number Present	25	26
Safety Instruction		
Technical Graduates and Test Participants	3	4

Medical examinations for June totaled 44 which was 157.14% of quota.

Program

The Medical Treatment Frequency rate climbed .07 of a point over the June figure. Reduction in hand injuries continues with a slight drop during July.

Of the total injuries reported during the past three months hand injuries accounted for 65% in May, 45% in June and 40% in July, although fluctuation in numbers of injuries to other parts of the body have resulted in slight variation of the overall frequency rate.

The Fuels Preparation Department completed 699 days without a Disabling Injury for a total of 2,836,276 hours through July 31.

The monthly safety meeting for Department office personnel was conducted on July 23. E. N. Wells presented a home safety program covering accidents and fire.

A safety program designed to encourage sustained personal contacts on safety between first line supervisors and their respective employees, was introduced to management for use in Manufacturing and Maintenance and Power Operations. Entitled, "Supervisor - Employee Safety Contact Program," the prepared folder furnished each supervisor, contains selected lead subjects to guide safety discussions with employees over a one year period.

Hand safety was developed as the July program theme by the Health and Safety Program Council. A topic of the month and full page GE News publicity item were prepared on the value of hand protection.

Activities

Job contacts for advice on health and safety items during July included the following: Explosive atmospheres, passenger transportation, traffic control, cranes, materials handling, construction contracts, publicity, scaffolds and staging, safety meetings, elevators, storage, floor loading, high work, pressure vessels, home safety, employee orientation, eye protection, shop equipment, welding, accident investigation, guarding, safety instruction, painting, inspection, zoning, water supply, compressed gases, insect control, production equipment, lighting, special physical examinations, safety shoes, chemical use, steam, and ventilation.

FIRE PREVENTION AND CIVIL DEFENSE

	<u>June</u>	<u>July</u>
Fires and Investigations	0	0
Fire Los	0	0
Number of Inspections	53	39
Fire Surveys Completed	0	1
Hazard Reports Submitted	18	7
Orientation Presentations	2	3
Attendance - Nonexempt	8	7
Attendance - Technical Graduates	4	2
Attendance - Test Program Representative	0	1
Suggestions Evaluated	1	3

A Fire Prevention Committee was appointed from Fuels Preparation Department Level 3 Operations, and the Hanford Laboratories Operation Program Council to plan and promote an area-wide program for October. The first meeting was held on July 29.

Construction was started on July 18 to expand the 300 Area water system to meet fire code requirements.

Since FPD has the maintenance responsibilities for the Area Monitoring Stations located in each of the Tri-Cities and Benton City, arrangements were made to have the grass fire hazard removed from the vicinity of each building.

Developed and furnished special fire hazard tags for firemen to use to tag out unsafe equipment encountered during building fire-watch tours, as present stock tags are not appropriate for this use.

Approved proposed locations for a maintenance warehouse and two Minor Construction buildings provided they are adequately equipped with fire protection devices to offset the substandard spacing.

Obtained a change in Water Expansion Project plans to relocate a sectional control valve in the water main for better control of service water to 313 Building.

At the request of HLO, developed fire standards for installing a 2000 gallon anhydrous ammonia tank at the PRTR site.

Assisted Manufacturing Maintenance Engineering with inspection of 303-J Building to determine the amount of maintenance work necessary to bring the building up to reasonable standards for use as an essential materials warehouse.

Exercise Opal 58, the Federal Action Phase of a Nation-wide Civil Defense Practice, was conducted at HAPO during the week of July 14, with a representative from FPD management participating. The results of the week-long practice were excellent according to AEC Civil Defense Authorities.

Other activities during the month included the following subjects: Review and approval of Engineering blueprints; updating as-built blueprints; assistance to Engineering on area construction projects; standards for spacing of new buildings; welding permits; laboratory test of chemicals; gas bottles and installations; standards for testing fire alarm devices; fire door tests; rebuilt surge retarders for replacement on sprinkler systems; proposed sprinkler systems; and advice and counsel on routine hazards.

PERSONNEL PRACTICES

Employment

Personnel added: 11 Removed: 12

Reduction of force: By FPD 1
 By seniority bumping 0

Transfer requests active at month end: 47

Procurement:

Offers: 5 Requests for personnel: 14
Interviews: 9 Transfers (all): 7

Upgrades within FPD: 0

Attendance Awards: 8

Service Pins: 3 - 10 year; 3 - 5 year

Employee Benefits and Service

Benefit Plans participation:

Pension: 99.9%
Insurance: 100.0%
Stock Bonus: 62.7%

Nonveteran employees subject to selective service:

10 in 1-A; 7 in 2-A; and 10 others. In addition there are:
7 technical occupational deferments active; 13 standby and 36 ready
reservists; 3 employees on military leave.

Suggestion Plan

	<u>JULY 1958</u>	<u>Year to Date</u>	
		<u>1958</u>	<u>1957</u>
Average number of eligible employees	572	583	608
Number of FPD suggestions received	27	313	369
No. per 100 eligible employees	4.7	67.8	62.6
No. of suggestions adopted	0	121	106
Net annual savings	0	\$20,241	\$23,084
Amount of awards	0	\$ 2,665	\$ 3,156
Percent of total awards to savings	-	13.17	13.67
Average amount of awards	-	\$ 22.02	\$ 29.77

Technical Personnel Placement

	<u>July</u>
Openings referred, FPD	7
FPD candidates offered	1
PhD candidates referred to FPD	3
Other candidates referred to FPD	13
Active transfer of FPD people	2

Nonunit Grievances

Received this month	0
Received since 1-	2

Both of these cases answered satisfactorily at Step I.

General

Clarence G. Grown in Maintenance and Power, retired on July 21, 1958 with 12 years of

Security Violations, Department this month: 1

Manager - Employee Relations

**DATE
FILMED**

2 / 5 / 93