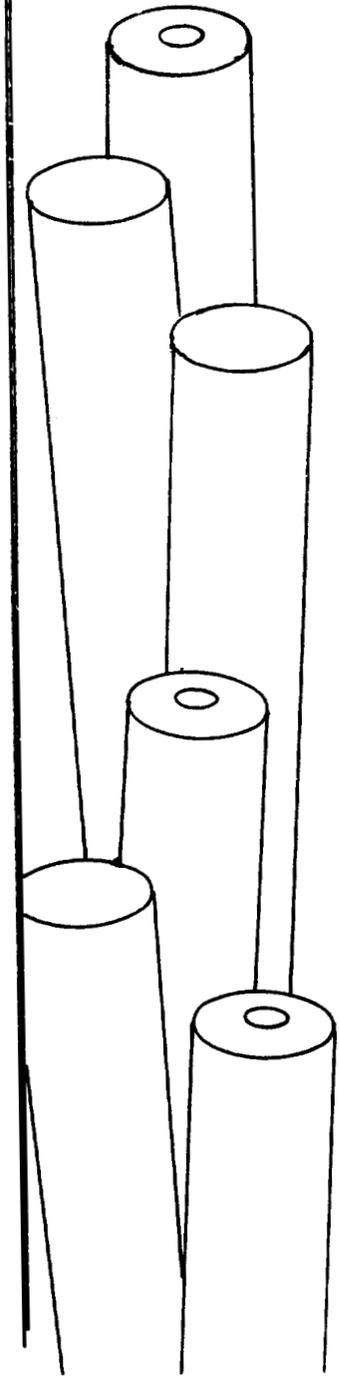


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MONTHLY REPORT

JANUARY 1959

FUELS PREPARATION DEPARTMENT

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MONTHLY REPORT

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FUELS PREPARATION DEPARTMENT

By Authority of

PR-24

FOR

DS Lewis 6-25-42

JANUARY, 1959

by J. T. ... 7-1-42

Compiled by

PM Eick 7-2-42

Fuels Preparation Department

February 23, 1959

Richland, Washington

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
JANUARY, 1959

MANUFACTURING OPERATION

Five hundred eight (508) tons of acceptable uranium fuel elements were produced which was 108% of forecasted production. The manufacturing yield for eight-inch I & E fuel elements increased to 82.6% from 81.9% in December. This was the fifth consecutive month of yield improvement for eight-inch I & E material. Braze porosity was reduced by improving vibration of the canning jacks and by increased use of chloride heat treated cores. Also, improvements were made in component and finished fuel element cleanliness. Six-inch I & E enriched fuel elements yield increased from 84.6% in December to 86.2% in January.

At month end there were eight hundred six (806) tons of bare uranium cores in storage. Finished fuel element inventories in combined 100-300 Area storage varied from about a three-month supply of eight-inch "K" size I & E to a three-fourth month supply of eight-inch "O" size I & E fuel elements.

No autoclave failure occurred in January compared to one in December and four in November. Adoption of spire etch is largely responsible for this improvement.

The one millionth (1,000,000) eight-inch piece was sent to storage during the week of January 5 climaxing a two-year transition period from 100 per cent solid production to essentially 100 per cent I & E production.

Culminating discussions of more than a year, the National Lead Company of Ohio informed us that they are planning to ship enriched fuel element cores by truck rather than by the baggage car formerly used. This method will decrease shipping costs by almost two-thirds. The decision is based upon a series of criticality studies conducted by Mr. Callahan, at ORNL, in which he was unable to cause twelve tons of .94 enriched uranium to go critical regardless of the geometrical array even when submersed in water.

ENGINEERING OPERATION

The favorable trend in rupture frequency continued during January. This is attributed to: (1) changes made in reactor conditions, (2) the use of tighter bond test standards, and (3) process changes initiated in the bond improvement program. The major cause of I & E failures is still non-wets. A number of these failures occurred in material charged prior to the initiation of process changes to reduce non-wets. About one-half, however, involved HAPO reheat-treated transformation reject cores. Preliminary measurements indicate that special closure problems and resultant failures may be due to the warp proneness of this material.

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Thirty columns of enriched I & E elements, identified as to varying bond quality, were charged to evaluate the effect of braze voids hot spot corrosion. A previous test utilizing solid elements showed no correlation.

During January the first shipment of dingot metal was received. Certain variations from standard were noted and corrective measures regarding heat treatment have been initiated with the vendors.

A study is underway concerning methods for the casting of aluminum jackets directly onto uranium cores. If such a process is feasible and can be developed, it should result in substantial savings in components.

Four off-site coextrusion runs of uranium-zirconium have been scheduled. Material procurement, billet design, and preliminary fabrication is underway to assure completion on schedule. This work provides for continuation of process development and standardization pending the completion of the coextrusion pilot plant at HAPO.

Several customers from outside the Department requested assistance in their non-destructive testing problems. Some of the programs initiated for their aid include: (1) development of nondestructive methods of testing plutonium specimens for porosity and internal defects, (2) measurement of resin levels at the interfaces of CPD liquid columns, and (3) development of ultrasonic vibration method for liquid aluminum melts. Nondestructive studies in support of the 4000 program continue to show promising results. Completion of the first phases of the broad band eddy current and the ultrasonic lamb wave studies indicate that: results of the former will lead to a better solution for I & E internal testing; results of the latter can be applied to unbond detection and bond strength measurements.

FINANCIAL OPERATION

Initial procedures for an integrated ledger system are substantially complete and drafts were forwarded to Data Processing for review. A Data Processing representative is to be assigned next month to begin actual programing. Work to date is on schedule.

Productivity Report for calendar year 1958 was issued this month. Compared with 1957, productivity increased 37% due principally to yield improvement and cost reduction programs.

Major changes in financial reporting were implemented this month which incorporated the Company-wide practice of responsibility reporting; i.e., only costs which a component directly incurred were reported to that component. Functional cost reports (production, maintenance, power, etc.), of course, include total costs regardless of where or by whom incurred.

Requests for information required for the revision of the FY-60 budget and for preparation of the FY-61 budget, were made early in January. Data furnished level 3 Operations included actual costs for the first six months of FY-59.

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MAINTENANCE & POWER OPERATION

Addressographing of mail on distribution lists is now being done by the Duplicating and Mail facility, with no additional manpower being required. This move results in expediting delivery of mail of this type by twenty-four hours.

A micro spark source unit was completed for use by the Analytical Laboratory Operation. This instrument is capable of analyzing areas of 2 to 5 microns and will be used to study fuel element inclusions.

The injection rate of the filming amine in export steam to the lab area has been held at the initial 5 ppm.

On January 20 swing shift contractor personnel working in the PRTR construction area discarded burning, smoking material which landed on a pile of concrete curing pads and canvas tarps. The fire was located sixty feet down on the inside of the vessel and was just extending to the wood forms and shoring when discovered.

PERSONNEL STATISTICS

Number of employees December 31, 1958 753
Number of employees January 31, 1959 750

<u>OPERATION</u>	<u>EXEMPT</u>	<u>NON-EXEMPT</u>	<u>TOTAL</u>
General	1	1	2
Manufacturing	54	276	330
Engineering	50	25	75
Financial	15	16	31
Maintenance & Power	38	255	293
Employee Relations	10	9	19
TOTAL	168	582	750



GENERAL MANAGER
FUELS PREPARATION DEPARTMENT

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MANUFACTURING OPERATION

January, 1959

I. CURRENT OPERATIONS

A. Production and Productivity

1. Statistics

	NORMAL					6" Water Mix	ENRICHED			6" Solid Total	
	8" Solid	8" I & E		Rev.			6" I & E				
	C	K	K	O		C	K	O			
<u>Current Month's Production</u>											
Acceptable Fuel Elements Produced (Tons)	29.8	38.4	141.3	38.1	180.3	7.1	47.7	-	16.3	9.4	508.4
As % of Forecast Production	44	110	149	85	103	-	120	-	102	-	108
As % of Past 3 Month's Production Average	88	148	95	-	81	237	126	-	136	-	105
As % of Past 12 Month's Production Average	13	46	174	-	196	710	145	-	272	117	94
% of Forecast Achieved-Last Fiscal Quarter	158	79	89	-	116	75	106	-	119	-	103
% of Forecast Achieved-Last 4 Fiscal Quarters	113	87	110	-	103	117	100	-	104	85	105
<u>Operating Efficiency</u>											
Current Month (%)											93.8
Forecast (%)											93.0
Previous Month (%)											93.7
<u>Manufacturing Yield</u>											
Current Month (%)	87	82	81	81	85	74	88	-	82	78	
Forecast (%)	83	79	79	79	79	70	79	-	79	83	
Previous Month (%)	78	65	81	-	83	64	86	-	70	-	
Bare Uranium in Storage (Tons)	222	45	195	112	197	9	32	17	9	4	842
Finished Products in Storage (Tons)	102	69	189	38	140	7	65	-	23	9	642
Special Products Finished (Pieces) Poison Uranium Utilization											13,780
											95.2

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2. Activities

a. Production

January fuel element production was five hundred eight (508) tons, or 108 percent of forecast (HW-58066). Extra production resulting from higher manufacturing yields and operating efficiency enabled the curtailment of six canning line-shifts during the month. The released manpower was profitably utilized to operate the salt bath heat treat facility thereby reducing accumulated transformation test reject material. Except for this brief curtailment, the plant operated eight canning lines each day, four canning lines per shift.

A milestone for fuel element production was reached during the week of January 5 when the one-millionth eight-inch I & E piece was sent to finished storage. In the short period of two years, a transition has been made from the production of solid fuel elements to an essentially 100 percent production of I & E. As a measure of the advances made during this period of change to the processing of the more complex I & E fuel elements, productivity measured in finished pieces per operator-month has increased about 23 percent. The output measured in finished tons of uranium per operator-month has increased more than 11 percent in the same period.

b. Yield Control

	<u>December Yield</u>	<u>January Yield</u>
8" I & E	81.9%	82.6%
8" Solid	78.1%	86.5%
6" I & E	84.6%	86.2%
6" Solid		78.7%

This was the fifth consecutive month of yield improvement for eight-inch I & E pieces from a low of 73.3 percent in September 1958. Yield gains were realized through improved braze porosity, component cleanliness, and surface quality of finished fuel elements. These gains were partially offset by a small rise in the thin wall reject rate.

Braze porosity was reduced as a result of improvements in control of canning vibrators. The amplitude and frequency of vibration was increased through replacement of worn vibrators and adoption of an improved preventive maintenance program for the vibration assembly. Also, a higher proportion of the uranium cores had been heat treated by National Lead in chloride salt. These contained less hydrogen than cores heat treated in carbonate salt, and thus minimized undesirable outgassing effects on braze porosity.

The surface reject rate dropped to a new low of 0.3 percent compared to the 1958 average of 1.8 percent. This consistent gain can be attributed to better control of cleanliness at component preparation and final etch.

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b. Yield Control - continued

The yield for six-inch enriched I & E fuel elements was 86.2 percent compared to 84.6 percent in December. Significant improvements were made in reducing braze metal contamination and weld rejects largely through control of cleanliness at component preparation.

No autoclave failure occurred in January. These failures have been a problem generally throughout 1958. January improvement is attributed to the adoption of the spire etch process that promotes better cap wetting by effectively removing oxides from the bonding surfaces.

c. Other Activities

Seven and one tenth (7.1) tons of six-inch water mix pieces were transferred to finished storage. All of this material was canned in December but held in process until the arrival of water mixing spools. It is estimated that a one-month supply of these pieces now exists in 300 - 100 finished storage.

Eight thousand seven hundred ninety-seven (8,797) pb-cd (lead poison) pieces were assembled, and thirteen thousand seven hundred eighty (13,780) pieces transferred to finished storage this month.

About five thousand six hundred (5,600) eight-inch I & E canned pieces originally rejected for minor weld bead defects were reclaimed by machining off the original weld and successfully rewelding.

Bare uranium pieces available for canning continued at about a one-month supply although a wide variation in specific product supplies exists. Bare inventory of eight-inch solid pieces is particularly high at about a three-month supply while old pile and "C" pile eight-inch I & E bare pieces are down to about a three-fourth month supply. Planning and scheduling discussions are continuing with the National Lead Company to improve the inventory balance.

Finished uranium inventories in combined 300 - 100 area storage were adequate during January. However, finished supplies of eight-inch old pile I & E pieces were at a minimum at month end. Consumption of this product has exceeded expectations somewhat since it is being charged further into reactor fringe areas than originally forecast. The short supply of bare old pile I & E pieces has prevented a build up of finished inventory.

Higher manufacturing yields currently being achieved have enabled Fuel Recovery to keep the quantity of reject fuel elements awaiting recovery to a minimum, even though some outage time due to equipment difficulties was experienced. At month end 4,000 pieces were backlogged awaiting recovery. This is less than two days run.

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c. Other Activities - continued

The following pieces were processed through the Fuel Recovery Operation.

	<u>Pieces</u>
8" Solid	727
8" I & E "O"	12,240
8" I & E "C"	4,061
8" I & E "K"	9,880
8" I & E "KR"	2,106
Water Mix	<u>84</u>
	29,098

Two scrap shipments containing 137,573 pounds of normal and 3,655 pounds of enriched uranium scrap were returned to National Lead Company during the month along with 900 empty fuel core boxes and three barrels of uranium oxide from Hanford Laboratories Operation.

A shipment of 160 barrels of depleted uranium scrap was received from Rocky Flats, Colorado on January 29, 1959 and was buried in the Hanford Laboratories North Burial Grounds.

B. Plant Problems and Incidents

1. General

Operating efficiency was 94 percent as compared to 94.8 percent in December and a forecast of 93 percent. Outages were split almost evenly between operational and equipment causes.

2. CG-713 Assistance

Manufacturing Maintenance labor has been applied to Program CG-713 as requested with functional guidance provided by the project engineers. Two new canning quench machines were installed and are operating satisfactorily. CG-713 work is being given top priority so that equipment trial runs can proceed. Postponement of other committed manufacturing maintenance work has resulted.

3. Component Quality

Purchasing agreements probably will soon be established with all aluminum component vendors where the vendor will certify the dimensional and visual quality of the component shipments. Historically these have been sampled and analyzed at HAPO to assure that the material met specified quality levels. If these levels were not met, the material has been sorted at our expense. In an effort to induce the vendor to improve control of component quality, quality levels will be written into the purchasing agreements. If materials fail to meet these requirements, the shipment will be returned to the vendor or sorted locally at his expense. These

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3. Component Quality - continued

agreements have been successfully negotiated with the Harvey Aluminum Company and the Hunter Douglas Corporation and the procedure has been established on a six months trial basis with Alcoa, the principal supplier. These vendors are now perfecting in-plant procedures to duplicate HAPO measurement techniques and to refine their in-process quality control systems.

Recently it was determined that slight dimensional distortions of the canning sleeves would result in disturbance of braze metal flow characteristics and excessive loss of cladding thickness. To effect immediate quality gains the use of all sleeves was reduced to 25 cycles when supplies permitted. The 25 cycle limit is probably "safe" for most sleeves but optimum cycle life seems to vary between vendors, lots from the same vendor, and product type. A need exists to develop measurement methods to determine when sleeves should be removed from service and efforts are under way to correlate various sleeve measurements to special fuel element yield and quality measurements.

4. Core Quality

Additional studies have been made of the core transformation salt bath operation at HAPO. These studies have been directed toward reducing core warp and preventing core absorption of hydrogen. The studies have shown that a vertical quench in quiescent water will not prevent warp. Apparently the steam pockets formed around the core immediately after immersion prevented even cooling. As a result the quench procedure has been changed to require lateral movement of the core in the water to sweep these steam pockets away from the uranium. It has also been demonstrated that water pickup by chloride salt will result in increased braze porosity and methods for controlling water pickup are being evaluated. In conjunction with these investigations it has been shown that cores originally transformed in blank form in chloride salt are less prone to warp from additional heat treating than cores originally transformed in rod form in carbonate salt.

Investigation of the present sampling plan for the receiving inspection of virgin uranium cores had indicated that a reduction in sampling and measuring effort of about 60 percent can be made through the use of a new sampling plan that incorporates reduced inspection levels when a condition of sustained high quality level is being experienced. This plan involves no change in acceptable quality levels and will be tried on a test basis beginning in February.

5. Non-Destructive Testing

Recently pile failures due to water penetration into the I & E fuel element bore have increased. Also, an increase in severity of exposure to this surface has been predicted. As a result investigations have been initiated for improving the quality assurance of the internal bore of the I & E fuel element by non-destructive testing.

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5. Non-Destructive Testing - continued

Historically all I & E fuel elements have been processed through the internal penetration tester which was designed to reject fuel elements with insufficient cladding thickness in the internal bore. However, this test has been extremely sensitive to any bumps, wrinkles or voids. As a result the test has not been used as a final determination of acceptable cladding thickness but has been used to supplement destructive test measurements and process controls for determining acceptability.

Acceptability for braze porosity has been determined by processing all fuel elements through an internal bond tester calibrated to reject any fuel element with a single void greater than 0.75 cm. measured in a circumferential direction. Examination of these voids has often shown that the longitudinal dimension is greater than the circumferential. However, it has not been possible to apply the memory count test to the internal surface because of spurious counts induced by electronic and mechanical difficulties. Also, as previously pointed out the voids interfere with utilizing the internal penetration tester for acceptance of cladding thickness.

In conjunction with Testing Methods a program has been developed to determine if the outgoing quality level can be improved and both internal testers used as acceptance tests. The program includes evaluation of the quality and yield effects from tightening the internal bond test standard from 0.75 cm. to 0.5 cm. It is felt that this change should reduce the number of long narrow voids accepted and may subtract some of these from the internal penetration test category. Also, supplementary electronic equipment for reducing the sensitivity of the internal penetration test to bumps and wrinkles is being evaluated.

6. Dingot Material

About sixty tons of fuel elements obtained from dingot material extruded to ingot size before rolling were received. The shipment marked the first of this material scheduled to be received at about fifty tons per month. Evaluation of the initial shipment revealed a lack of uniformity in grain size, grain orientation and a hydrogen content ranging up to 6.5 ppm instead of the specified 5 ppm upper limit. The Pilot Plant runs were being made at month end to assess the effects of these conditions on braze porosity and core stability. Meanwhile, our suppliers have been advised not to ship more dingot material until satisfactory process methods have been established.

C. Operating Plans

1. Reactor Requirements and Production Schedules

The following comments based on a review of reactor requirements and production schedules made on January 20 were issued in HW-58930-RD:

"Due to a relaxation of restrictions in the operating conditions established by the Advisory Committee for Reactor Safeguards, some planned reductions in exposure levels for normal uranium I & E fuel elements will not be as great as previously forecast.

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1. Reactor Requirements and Production Schedules - continued

"Consequently, for the remainder of FY 1959, reactor requirements for normal uranium will be about 11 percent below those contained in the previous forecast. During this same period, however, exposure levels were forecast to be reduced for the enriched I & E fuel elements. This, plus a decision to increase residual reactivity in the reactors, increases reactor requirements for enriched uranium by 22 percent over the previous schedule for the remainder of FY 1959.

"Finished production of normal fuel elements will decrease only 6 percent from the previous schedule for the balance of FY 1959, enabling an increase in the finished inventory level. Production of enriched fuel will increase 26 percent to correspond with the higher reactor requirements.

"The operating plan for the current schedule requires continuous operation of eight canning lines daily on a two-shift five-day week basis. Because of the increased production of enriched fuel elements, four overtime days are planned during the 2nd Quarter and three overtime days in the 3rd Quarter, FY 1960. A total of 16 overtime days is forecast for FY 1961. Operating efficiency of the canning lines is forecast at 93 percent throughout the period."

2. Bumper and Self-Supported Fuel Elements

This program is being initiated in an effort to reduce the frequency of the hot-spot type rupture in the reactors. Since the initial charges of this type material are currently in the preparation stage, future program scope is rather nebulous at this time. The minor scale tests scheduled to be charged in the next few months will utilize material produced on a development basis by the Engineering Operation. It is understood that a new welding machine is now being procured by Engineering. It was estimated for budget purposes that this machine and another similar one would be available for production use by the 3rd Quarter FY 1960. These machines would be utilized to produce the material required to carry out larger scale tests and should enable up to 15 percent of the total production of fuel elements to be supplied with bumpers or supports.

3. Enriched Shipment by Truck

During January, National Lead made the first shipment of enriched uranium to HAPO by truck. This is the initial phase in a program to reduce the high shipping costs presently being incurred on enriched uranium. In the past, a major part of enriched uranium receipts was sent by express at a cost of more than \$13 per hundred pounds. Truck rates will be about \$4.50 per hundred which is a reduction of almost two-thirds from express costs. The decision is based upon a series of criticality studies conducted by Mr. Callahan at Oak Ridge National Laboratory in which he was unable to cause twelve tons of .94 enriched uranium to go critical regardless of the geometrical array even when submersed in water.

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4. 306 Pilot Plant

Equipment modifications and new arrangements were made in the 306 canning line facilities so that they will more exactly correspond to conditions existing in the 313 Building. Canning jacks, thermocouple and other furnace accessories were involved. It is expected that test results may now be more accurately compared to existing 313 Building process conditions.

The welder used to attach aluminum spools to water mixing pieces was removed from the 306 Pilot Plant to the 313 Building weld laboratory. This move is one phase of an over-all program to release approximately one-third of the present floor space for co-extrusion development.

5. Manpower Requirements

The adoption of several new programs and activities since mid-year budget review time has made it necessary to retain manpower, and in some cases to step up hiring plans. Specifically: (1) four operators were retained to handle the spire etch operation which has proven very successful in improving I & E cap wetting; (2) reducing the cycle life of steel sleeves to approximately 25 has created a need for one additional operator at the sleeve preparation station; (3) Hanford Laboratories' stepped-up development programs in the 306 Building has created a need for Manufacturing Maintenance assistance earlier than expected. Consequently four men formerly scheduled in the 4th Quarter will be hired in the 3rd and three men scheduled for hire in the first Quarter of FY 1960 will be hired in the 4th Quarter FY 1959; (4) adoption of a cooperative quality assurance program involving IPD and FPD personnel may make it necessary to hire about five individuals before the end of this fiscal year for the Quality Control Operation.

6. Security Measures, Uranium

On January 2, arrangements were completed by the Materials Operation for the discontinuance of a patrol escort for enriched uranium shipments to the 100 Areas. Concurrence was obtained to adopt this proposal from both General Electric and AEC Security. Also, the procedure of placing metal seals on uranium storage bins and buildings in the 303 Area for security purposes, was discontinued on January 2. In the future seals will be used for accountability purposes, whenever appropriate.

D. Employee Relations

1. Safety Performance

Members of the Operation were treated for 14 medical treatment injuries for a frequency of 2.50.

During the month, a lost-time injury was incurred when an operator in Fuel Recovery was splashed in the eye with sodium hydroxide from one of the recovery tanks. There was no permanent injury to the eye and the operator has returned to work.

2. Radiation Control

	<u>December 1958</u>	<u>January 1959</u>
Greater than 300 mrad	1 badge	No badges
Combined Manufacturing Operation exposures	3,203 mrad	5,301 mrad

2. Radiation Control - continued

Radiation exposure for Manufacturing Operation personnel, as measured by film badge results, remained within control limits.

3. Security Violations

No security violations were reported in January.

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 January 1959.

B. Meetings

Members of the Operation attended 19 staff meetings, 14 safety and security meetings and 11 informational meetings.

C. Visits and Visitors

D. G. Kern visited Mr. C. H. Wright, Cliff Manufacturing Company, Wickliffe, Ohio on January 13 to discuss problems associated with manufacture of aluminum components.

On January 14 Messrs. K. V. Stave and D. G. Kern visited with Mr. W. W. Spencer, Manufacturing Services, New York City to discuss Quality Control matters, and on January 15 and 16 they visited Mr. A. R. VanVorst, Alcoa in Edgewater, New Jersey to discuss problems associated with the manufacture of aluminum components.

W. G. Tews attended a meeting of the AEC Metallographic Group held at Armour Research Foundation of Illinois Institute of Technology in Chicago, Illinois on January 14 and 15.

W. M. Mathis visited with Mr. C. Harrington, Mallinckrodt Chemical Company, St. Louis; Mr. P. Loewenstein, Nuclear Metals in Boston, and G.E. Services in Schenectady to discuss fuel element technology, fabrication and manufacturing techniques.

K. V. Stave visited in Seattle, Washington to recruit BS/MS candidates in engineering and science at the University of Washington and Seattle University on January 26, 27 and 28.

D. Significant Reports Issued

1. Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-54646-RD	Monthly Reports, Finishing & Special Products Operation, January 1, 1958 through December 31, 1958	HC Money	1-2-59

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HW-591.07

1. Routine Reports Issued - continued

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-58720	General Analytical Program I	GB Hansen	1-2-59
HW-58727	Monthly Report Quality Control Operation, FPD, December 1958	KV Stave	1-2-59
HW-58736	Uranium Quality Analytical Results	GB Hansen	1-5-59
HW-58995	Uranium Quality Analytical Results	GB Hansen	1-23-59

2. Non-Routine

HW-58887	Etched I & E Spire Wafers	DD Stone	1-14-59
HW-58957-RD	Production Assumptions and Operating Plans Fuels Preparation Department, January 1959 through June 1964.	HE Berg	1-22-59

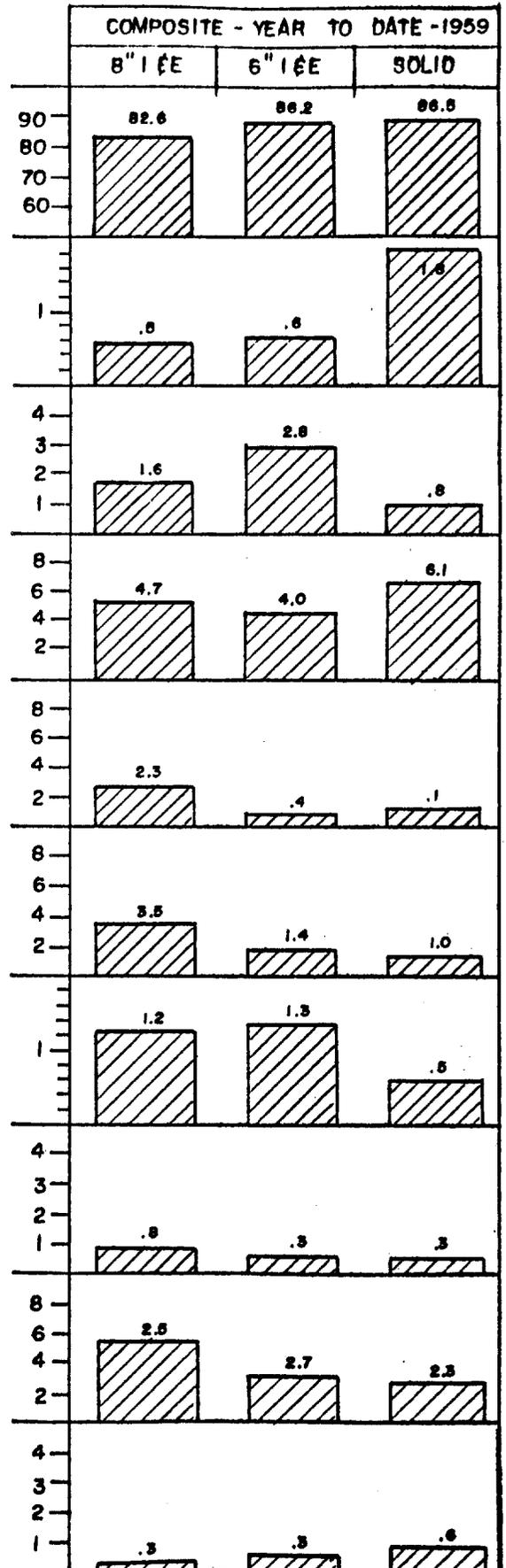
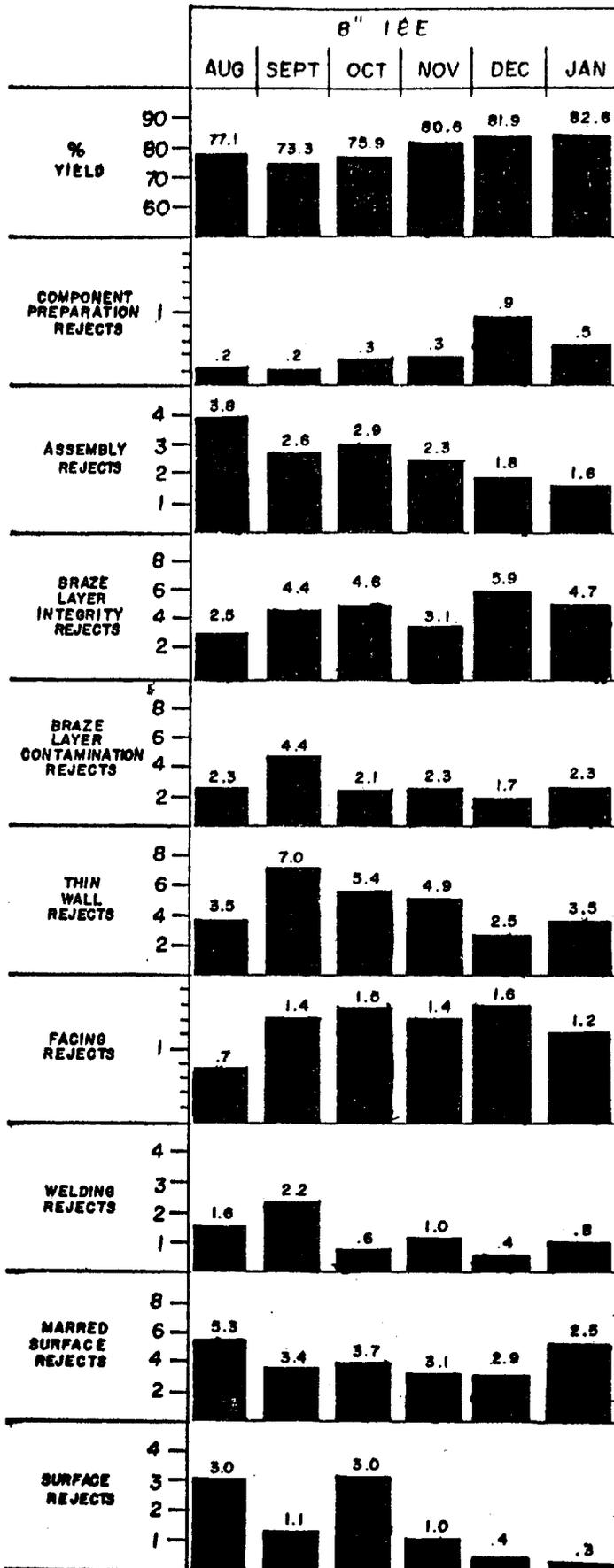
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Manager - Manufacturing

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YIELD STATISTICS

1958-59



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ENGINEERING OPERATION

January, 1959

VISITORS

<u>Name</u>	<u>Company</u>	<u>Contact</u>	<u>Date</u>	<u>Reason</u>
WH Hannah J Wessel	Puget Sound Naval Shipyard Bremerton, Wash.	RS Paul HL Libby	1-19	Discuss eddy current methods of nondestructively testing pipe and tubing
CW Polson JA Fellows CE Bussert R Legasse	National Lead Mallinckrodt National Lead OROO	JT Stringer " " "	1-29 1-28/29 1-29 1-29	Discuss uranium technology " "

TRIPS

	<u>Company Visited</u>			
JT Stringer JE Bergman	Savannah River, Ga.	TC Evans	1-13/15 1-13/14	Attend Working Committee of the FEDC
JE Bergman	Alcoa, Edgewater, N.J.	AR VanVorst	1-15/16	Component procurement
AE Guay	Armour Research Foundation, Chicago, Ill.	RJ VanThyme	1-14/15	Attend 13th Annual Meeting of the AEC Metallography Group
TW Gore	Bumstead & Woolford Seattle, Wash.		1-15/16	Consultation on Project CG-759
HF Zuhr JW Talbott	Mallinckrodt Chemical Works	C Harrington	1-19	Discuss uranium fabri- cation
	GE-Refrig. Dept. Louisville, Ky.	H Disco	1-20	Discuss metal fabrication
	Nuclear Metals, Inc. Concord, Mass.	P Loewenstein	1-21	Discuss cladding tech- nology
	GE-Gen. Eng'g. Lab. Schenectady, N.Y.	ZD Sheldon	1-22	Discuss fuel element technology
HF Zuhr	GE-Research Lab. Schenectady, N.Y.	DW Lillie	1-23	" "
	National Lead, Co., Albany, N.Y.	A Stewart	1-23	Discuss uranium fabri- cation

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TRIPS (cont'd.)

<u>Name</u>	<u>Company Visited</u>	<u>Contact</u>	<u>Date</u>	<u>Reason</u>
HF Zuhr	duPont Wilmington, Del.	J Woodhouse	1-26	Discuss fuel element technology
	duPont Augusta, Ga.	AA Johnson MH Wahl	1-27/28	" " "

PERSONNEL

<u>Name</u>	<u>Title</u>	<u>Operation</u>	<u>Nature of Change</u>	<u>Date</u>
TB Correy	Engineer	4440	Transferred from 4430	1-19
KH McQueen	Draftsman	4480	Terminated	1-2

PROCESS ENGINEERING

Regular Production Rupture Experience

Four normal uranium (1 solid and 3 I & E) fuel element failures occurred in the reactors during January. In addition, two I & E depleted uranium failures were sustained. A summary of the ruptures is outlined below:

<u>Fuel Element Type</u>	<u>Reactor</u>	<u>Exposure MWD/T</u>	<u>Rupture Classification</u>	<u>Jacket Alloy</u>
Solid Normal	F	722	Unclassified	C-64
I & E Normal	KW	809	Internal	C-64
	KW	566	Internal	X-8001
	KW	686	Unclassified	X-8001
I & E Depleted	C	688	Internal	1245
	C	729	Internal	1245

A continued favorable trend in rupture frequency is attributed to lower reactor operating temperatures, reduced variable goal exposures for enriched material, and probable effects of tighter bond test standards and process changes to minimize brittle bonding on fuel element integrity. The major failure category for I & E continues to be internal ruptures, which presumably results from non-wets and porosity in the cap closure. One-half (5) of the I & E normal uranium I & E internal failures have involved HAPO reheat-treated transformation reject cores. Based on preliminary measurement data, this material is more prone to warp and may tend to aggravate the closure problem.

IPD Liaison

The ACRS limits, restricting reactor power levels to the maximum attained previously, were relaxed during the month. Steps have already been taken by IPD to raise power levels in the order of 5-10 per cent, anticipating that all reactors will be operating on 93 C bulk limits by summer.

A rough draft of the CY 1959 Category I production testing schedule, prepared in cooperation with IPD and HLO representatives, is circulating for review prior to issuance.

Dimensional stability problems were experienced on "O" size I & E fuel elements during the month. One out of seven stuck charges has been measured to date, showing a maximum warp of 60 mils. In order to facilitate a review of the fabrication history of this material, caps will be removed to obtain ingot numbers stamped on the ends of the cores.

IPD has outlined a proposed program for bumpers and self-supported I & E fuel elements, based on ability to modify charging facilities and replace existing process tubes with ribless zircaloy tubes.

Target material has been received for cladding development and the preparation of 1,000 acceptable pieces for a proposed demonstration loading.

I & E Program

An unexplained incidence of stuck charges has occurred recently, involving "O" size I & E normal uranium fuel elements. To date eight charges (4 in H, 3 in DR and 1 in B) have required abnormal discharge pressure. Examination of the first stuck charge has been completed in C Basin, and one fuel element (#6 position from upstream end) which warped a maximum of 60 mils had bumps 4-6 mils in height on the surface. This fuel element is scheduled to be examined in the Radiometallurgy Laboratory to determine if anomalies in uranium core structure may have contributed to instability and bumping. Examination of the other stuck columns will be completed early next month in C Basin. Ingot numbers will be obtained from the ends of the cores showing maximum warp to facilitate investigation of fabrication history.

Thirty columns of enriched I & E fuel elements, characterized by bond quality, were charged in C reactor to further evaluate the effect of braze voids on the incidence of hot-spot corrosion during irradiation. A previous test on solid fuel elements showed no correlation between braze voids and hot-spots.

Depleted Failures

Two I & E depleted failures sustained this month increased the total experienced on a test to produce high Pu-240 product to thirteen. Because of the rupture proneness of this material, all of the remaining test pieces have been discharged from C reactor except eight replacement charges prepared using a caustic etchant on the caps. It is planned to irradiate this material for a prolonged period to probe the effect of the cap etchant on closure integrity.

Uranium Technology

During January, the first shipment of dingot metal was received under HAPO's current agreement to accept up to 50 tons per month with 5 ppm hydrogen or less heat treated in chloride-blank form.

On metallographic examination of samples of the material, considerably larger than normal grain sizes were observed. In addition, considerably larger variations in grain size were noted within pieces and between pieces. Thorough examination of about 120 samples revealed that the variations did not appear to be dingot related, but appeared to be possibly related to processing variations at FMPC.

In addition to the grain size variations, unusual and larger than normal variations were observed in the X-ray diffraction preferred orientation data. Also, the uniformity as indicated by the experimental Sonic Orientation Resonance Tester was measurably less than for standard material.

The hydrogen content of the material, although specified as 5 ppm or less, was anticipated to be fairly uniformly distributed over the specification range. However, actual analyses revealed the distribution to be as follows:

<u>PPM</u>	<u>%</u>
1 - 1.9	0
2 - 2.9	4
3 - 3.9	21
4 - 4.9	50
5 - 5.9	17
6 - 6.5	4

Initial beta reheat treating tests with the dingot material was considerably more prone to warping than standard material. Heat treating tests conducted to date in the high alpha temperature range have not revealed the same proneness to warping as did the beta temperature range heat treating. Further heat treating tests are being run in addition to measurement of warp under actual canning conditions.

In view of the emphasis on dimensional stability of fuel cores and its relationship to grain structure, the advisability of unqualified use of this material was questioned. The suppliers of the material were informed of our concern over its use and questioned as to possible causes for the observed variations. To permit complete review of our findings and discussion of possible corrective measures which could be taken to provide uniformity of product, a meeting was scheduled at HAPO with representatives of MCW and FMPC. Although the data presented and the discussions held did not permit positive identification of the influencing variables, it was agreed that determination of the effects of the heat treating variables possibly offered the most expeditious solution to the problem. Therefore, it was further agreed that each site would conduct studies of the heat treating variables and their influence on the stated problem. On

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April 1 a meeting will be held to coordinate the findings of the three sites. To determine interim action, discussions will be held with IPD to determine a charging program for dingot material.

Sonotesting of the initial lots of material chloride-blank heat treated with a 43 second transfer time indicates grain size control comparable to that experienced with carbonate-rod heat treating has been established. Further receipts of this material will be necessary to determine the full range of variability in Sonotest rejection rates which can be expected under full production use of this material.

Study of the possible causes and means for correction of the large increase in rejection of recovered cores first experienced in October 1958 is being concentrated in the following areas:

1. What process changes may have been made at FMPC to influence such a change in rejection rates.
2. What influence did the change in lead bath conditions at HAPO have on the uncovering of striations in the cores.
3. What are the comparative strengths of cores with varying degrees of striations.
4. Are the present visual inspection standards reasonable and are they compatible with current fuel core quality requirements.

Process Technology

Horizontal preheat and agitation in the duplex bath appears to give the most uniform internal and external bonds yet produced. It is planned to use one duplex furnace in the 313 Building with a horizontal duplex basket and to compare pieces canned by this method with regular production for several months.

Temperature profiles at canning jack positions in the canning furnace were different for each furnace tap setting and for six and eight-inch can-sleeve assemblies. This temperature profile appears to be a method of optimizing tap settings vs. can-sleeve size if profiles are made for each canning furnace.

Complete cap-spire wetting has been obtained by preheating uncleaned cap-spices in a molten alkaline halide flux followed by a short dip in the canning bath. A larger flux furnace is needed, however, to further evaluate this method for eliminating cap-spire non-wetting.

Process Engineering has assumed the responsibility from HLO of fabricating self-supported fuel elements for IP-84A in B reactor. This test requires four tubes of self-supported per month starting in mid-February. Two hundred self-supported down stream dummies were welded for this production test for ten additional tubes.

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There have been no autoclave failures since spire etching was started on December 2, 1958. The average for the first eleven months of 1958 was two per month.

The first production run on the new 8" "K" size fuel element was made during January.

The inclusion reject rate has been below 1 per cent for the past three months. Because of this low reject rate, no further work in this field by Process Engineering is planned.

The water mixer welding equipment was moved from 306 to the Weld Lab. in 313 Building. Five or six thousand water mixer fuel elements are scheduled to be welded before the end of the program in July.

The first three production radiograph model trays, fabricated off site, have been received. Before they can be installed for production use, however, they must be piped, wired and adjusted. Also, one radiograph machine must be converted to handle the new trays.

A prototype system utilizing carts and a mechanical dumper to collect the aluminum lathe turnings and dump them into the recovery furnace has been tested and approved. A study is under way to improve present handling methods for scrap which is wet, dirty or oily.

In order to eliminate discrepancies which sometimes appear between pilot plant test results and 313 production experience, the canning equipment in 306 was re-arranged and equipped for 4-man line, to match the 313 lines.

Pilot Plant Activities

About 5240 uranium cores were canned in the Pilot Plant for process development purposes and 120 I & E aluminum dummies were dip canned for off-site machining studies. In addition, about 2600 watermix spools were welded to six inch normal uranium I & E fuel elements. The major items of process development were:

1. Component cleaning improvement tests to reduce the aluminum non-wet problem:
 - a. Etching caps and cans in caustic (Aluminux) with and without ultrasonics in the diversey 514 deoxidizer.
 - b. Amount of can wall etched off in Aluminux on can wall wetting in AlSi.
2. A test to improve the bonding of six inch I & E enriched cores by using a horizontal duplex basket.
3. Improved can preheating tests to reduce the bottom freeze out problem:
 - a. Using a 45 second cycle with 9 per cent silicon in the canning bath with two stationary baskets for additional can-sleeve preheating

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- positions which gives an 80 second preheat and a 35 second submerge and assembly time.
- b. Using a single canning method which uses a stationary basket for obtaining 80 seconds preheat and 35 seconds submerge and assembly time.
4. Cans with various can base recess I.D.'s were canned to determine the effect of spire-to-can-recess annuli on internal porosity and tube wrinkling.
 5. Wetting tests on empty cans to:
 - a. Determine effect of nickel-aluminum alloy (X-8001) on wetting.
 - b. Determine method of measuring relative wettability of cleaned cans by varying preheat and submerge times, bath temperatures, and silicon content of AlSi.
 6. Normal canning of fuel elements for:
 - a. Control pieces for bumper fuel element production test in K reactors.
 - b. Pilot run of new size I & E fuel elements (KLIIN).
 - c. Pilot run of large grained dingot OIIN to determine amount of porosity and warp.

MATERIALS ENGINEERING

Coextrusion of Uranium and Zircaloy-2

Off-Site Extrusions

Extrusion Run #1 - (NPR-KER Rod) - The scheduled starting date of 3-3-59 has been selected. Due to delays by uranium suppliers the schedule is tight. Assuming the use of overtime in 306 shops to do uranium machining, the date can be met. Sixteen billets is the target number. If additional billets can be made they will be used to produce .593 rod for use in development programs sponsored by Fuels Fabrication Development Operation.

Extrusion Run #2 - (Small Tube) - A work order was issued to initiate fabrication by shops. The scheduled shop completion date is 3-15-59. The recommended extrusion target date is 4-22-59.

Extrusion Run #3 - (NPR Outer Tube) - Billet design is complete. Recommend discussion with BBC by 2-25-59. Extrusion is scheduled for May, 1959.

Extrusion Run #4 - (NPR Rod) - Design calculations to be complete by 2-15-59. During January, NMI had fair success extruding KER tubes using the integral die cone system on their press. Design of tooling for Run #2 has been changed to use this tooling. Rod extrusions during Run #4 will be set up to use this die design in direct comparison to the die-cone method.

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Zircaloy Cladding Materials - The first shipment of zircaloy-2 tubing for the small rod extrusion has been delivered and is being machined to billet component dimensions.

Copper Jacketing Materials - The copper jacketing components for off-site extrusion run #1 have been machined, and the assembly operations of cleaning, welding, and outgassing are now in progress.

Post Extrusion Examination - A report outlining the quality testing of the rod product from the first off-site coextrusion (March) has been prepared. The tests will be performed on the product in the as-coextruded, as-swaged, as-beta heat treated, and alpha-annealed conditions. The report points out that the most difficult problem to overcome is that of beta-heat treating and maintaining straightness. By analogous experience with Category I fuel elements, the control of warp during the quenching operation must be achieved.

Cold Coextrusion - A series of ten zircaloy-2 clad uranium billets were cold extruded at Hunter Douglas Division of Bridgeport Brass Company to hollow clad tubes and returned to HAPO for evaluation. Of these ten, six were welded mechanical assemblies and four were fabricated by vacuum casting a uranium core into preformed zircaloy-2 components.

As the cold extrusion process does not readily promote bonding the cladding to the core, a technique for fabricating extrusion billets initially bonded would be extremely useful. To exploit this possibility, HLO was requested to prepare several billets using vacuum casting techniques to produce a bonded assembly. Four billets were fabricated in this way and sealed by an electron beam welding process. The other six billets were simple welded mechanical assemblies.

Cursory examination showed one electron beam weld on a cast billet had parted slightly. This particular weld was the one experiencing maximum tension. Sectioning revealed the outer zircaloy-2-uranium interfaces were virtually unbonded; however, it is very doubtful if they were bonded during casting. The extrusion does not appear to have broken many, if any, bonded areas. The inner tube appeared bonded. HLO feels that with a little more development, a reliable bond casting technique can be perfected.

The mechanical assemblies all appeared sound but with a somewhat wrinkled inner clad. Sectioning revealed an annular break in the inner clad at the rear terminus of the core - most were ruptured completely around, leaving a definite gap in the inner tube. The cause for these failures is under investigation.

Surface condition was variable, ranging from fair to poor - the worst occurring on the cast billets. Hunter Douglas reports surfaces could be improved by altering extrusion conditions.

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Extrusion - Pilot Plant

Chemical Processing

Surface Preparation - Cleaning

Chemical - Design criteria for all phases of chemical surface cleaning and preparation have been submitted to Design & Projects Operation for coextrusion pilot plant facilities. These criteria were based on all available data on-site and off-site and included the recent report of HNO_3HF etch specifications by the Coatings and Corrosion Operation, HLO. Design criteria were issued, under separate cover, for the copper removal facility. These criteria were based on copper removal from the extrusion in rod form. Handling equipment was also specified.

Mechanical - Specifications for the vapor hone machine have been reviewed and comments submitted to Design & Projects. A letter was written regarding alternate processes to vapor honing of fuel segments to remove heat treat scale and oxides. The alternates proposed were: 1) Brushing, grinding, and polishing, 2) Copper removal after heat treating. Investigation in these areas is presently being made. It was recommended to Design & Projects Operation that procurement of the vapor hone equipment be delayed as long as possible in order to evaluate these alternates.

Recovery

As a result of recent communication between FPD and HLO on chemical research and development supporting coextrusion recovery processes, a program has been formulated and agreed upon by the parties involved. Funding in the amount of \$10,000 is being provided HLO by IPD in support of this program.

Equipment

Design criteria and recommendations for the equipment required to preheat billets, tools, and cut-off blocks for Project CGF-810 were submitted to the Design & Projects Operation. The preheating equipment recommended is compatible with several handling systems now being considered. However, additional detailed information about the billet and tool handling features of the extrusion press is required before the handling equipment can be completely specified and designed.

KER Test Loop Fuel Elements

One charge of dip-canned depleted fuel elements with detachable supports and two thermocouple "doe" elements were delivered to IPD. All test fuel element fabrications ordered for future charging by IPD have been completed.

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Aluminum Cast Blanks

Sample cast blanks typical of those to be used in producing 10,000 sets of "C" size X-8001 I & E components have arrived. cursory examination shows them to be of acceptable quality; however, further analytical work is under way. Scheduled delivery for the 10,000 component sets is 3-1-59.

TESTING METHODS

Process Fuel Element Testing

Internal Penetration Test

Additional experiments with the Bump Discriminator were made with K size I & E elements. Some reduction in false reject rates is obtained by using the Bump Discriminator probes and these will be continued in use on all process testers. Retesting the "rejects" with the Bump Discriminator electronics also effects a reasonable separation of those rejected because of tester sensitivity to surface irregularities. However, even when using the complete Bump Discriminator, the test cannot be run at 0.020" sensitivity without unduly high reject rates due to large surface bumps and braze layer voids. Therefore, recommendations were made that the Internal Pen test be continued on all production at the 0.012" thin wall sensitivity level. Gross defects are thus placed in the "reject" category which is statistically sampled by destructive caustic penetration for assurance (at a high confidence level) that the internal cladding thickness exceeds 0.020". This favors the detection of true thin walls by the statistical test, but does not provide 100 per cent protection against the release of one.

One hundred per cent protection against the release of internal thin walls less than 0.012" can be obtained for the cost of retesting the "rejects" with the BD and classifying the rejects from this test as true rejects. This is being considered.

Development efforts are being concentrated on attempts to improve the basic signal-to-noise ratio of the internal pen tester so that it can be used on production at nearer the goal 0.020" level. If this can be achieved, it may be advantageous to use the Bump Discriminator circuits also on a 100 per cent basis.

External Penetration Test

Further comparisons of the probe-servo and tape-head sensing systems continued to show that the tape system has an advantage in lower reject rates (1.9% vs. 2.5 for approximately 45,000 elements tested on each). This is due to less sensitivity to surface defects and higher signal-to-noise ratio. The tape system has been very reliable except for tape breakage. A new type Rulon tape has been ordered to replace the present Teflon tape with delivery expected in early February. If the Rulon tape is as superior as the specifications predict, the new type tape-head system will have a clear-cut advantage for full production use.

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Internal Bond Test

Work is in progress towards applying more restrictive standards. Comparison tests on K-8 material using a 0.5 cm standard and the regular 0.75 cm standard gave inconclusive results. Preparation of 0.5 cm standards for other size products is under way.

External Bond Test

Several hours of tester downtime were caused by faulty transducers. This has been corrected by converting to Curtiss-Wright crystals pending the delivery of lithium-sulphate crystals which were ordered for evaluation.

Modifications to the amplifier circuits aimed at removing some of the bandwidth limitations are being studied.

Transformation Test

Installation of the new fixed crystal mounts on the 313 testers has been delayed due to maintenance problems. The 12 "standards" fabricated by HLO to have small untransformed areas were not satisfactory. They either had no untransformed regions or untransformed areas many times the desired size. Further work is being done by HLO to control the heat treatment in such a way as to produce the needed "standards".

A barium-titanate crystal installed on the 306 tester in 6-58 operated with no maintenance until 1-30-59 when it developed a loose ground wire. This is a much better performance record than that obtained with the quartz crystals used in the 313 building. Barium-titanate is used on the new Bare Core Test being developed for 313.

Pilot Plant Bond-Penetration Tester

The new electronic console (313 model) was delivered 1-30-59 and should be installed during early February.

NPR and Category II Development

Preliminary laboratory experiments indicate that internal defects in uranium ingots for coextrusion of NPR type fuel are detectable with an ultrasonic test operating at a frequency of one megacycle per second.

Zircaloy cladding integrity testing by eddy current methods at 250 kc detects air filled notches which come within 0.010" of the surface of a 0.020" thick cladding. Further tests will be made at higher frequencies where increased sensitivity is expected. Ultrasonic methods have also been successful in detecting the same defects, but separation of the desired signal from surface noise appears more difficult.

Seventeen 0.5" diameter coextruded rods were bondtested. No unbonds were detected.

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New Methods Development

Cap Core Bondtest

Additional studies were completed on the development of an ultrasonic cap-core bond test. Angled beam techniques using the refraction of both longitudinal and shear waves failed to give a practical means for bond-testing the central regions of the cap-core annulus. The direct beam test of the cap area beneath the weld gave further successful results despite irregularities in the surface of the weld bead. Five of 100 elements tested had detectable unbonds. These were not visible after breaking the cap, but the unbond signals were so strong that it is believed a fractured bond existed. It is of interest that four of the five indicated unbonds under the weld bead overlap, suggesting that the bond may have fractured as a result of thermal shock during welding. Equipment is being assembled to set up a cap-core bondtest in the 313 building. This will be used to evaluate the method for Quality Control or process use and as a tool to aid current process improvement studies.

Sonic Orientation Resonance Test

Five hundred gamma extruded dingot uranium cores were tested. These showed more than usual variations in frequency readings. Three cores which had very low torsional resonant frequencies were found to have an internal crack the full length of the core.

Five cores with a range of frequency readings were shipped to P. M. Morris of the National Lead Company. He will examine them for stringer concentration, chemical composition, fabrication history and grain orientation by X-ray diffraction.

Several improvements were made to the prototype SORT equipment.

Bare Core Test

Ultrasonic attenuation tests were made on samples of gamma extruded dingot metal to obtain quantitative measurements of minimum and average grain size. Oscillograms were also taken with an image storage oscilloscope (Hughes Memoscope) to show the variations in grain size within a given core. These data gave a good demonstration of the potential usefulness of this test for establishing an upper limit of grain size and grain size nonuniformities, and for quantitatively categorizing grain size quality.

If present circuit development work continues to give successful results, both the attenuation test and surface test functions of the Bare Core Tester will be fully transistorized. Satisfactory pulser, receiver, and gating circuits have been developed. Some further improvement is needed in the alarm circuits. The circuit designs are being planned to permit fabrication as plug-in circuit boards to simplify maintenance. Wherever possible, comparable circuit functions for the attenuation and surface testers have been designed to use the same circuit board construction with but minor changes in component values. It is hoped that this can lead to economical fabrication by a commercial firm.

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The prototype test tank and conveyor has been delivered to the laboratory. Installations of electrical and plumbing services, photocell controls, and transducer mounting for the attenuation test have been completed. The major current problem with the unit is the elimination of air bubbles in the water. Use of steam condensate is being investigated as a possible solution.

Planning for the data recording system continued. At least one vendor has been found who can supply a translator unit which can convert the readout signals from the test channels into inputs for a commercial paper tape puncher. The system will log in digital form the test parameters for each core tested. IBM computers can be used to process the tape and obtain frequency distributions, means, and standard deviations for each "lot" of tested material. Another machine can be provided to read the punched tape and transcribe the logged data into a printed record for immediate manual analysis by Engineering or Quality Control. This type of serial system is much less expensive than a parallel system having simultaneous data logging with punched tape and digital printing, because it can use a low-speed low-cost printer.

Aluminum Can Test

Earlier work with the prototype equipment showed that it is necessary to clean the cans before testing to avoid excessive false rejects from dirt build-up on the probe. Another 1600 cans were cleaned and tested with a final reject rate of 7.5%. These rejects are being sectioned to look for seams. A total of 13,000 cans have now been tested and one seam has been found. The tester has not passed any seams that have been detected after etching. Consideration is now being given to the economics of continuing the test on the remaining 110,000 suspect cans, in light of the added cost of cleaning, the demand for 8" solids, and the evident low incidence of seams.

Residual Can Wall Tester

Work continued on the program to develop an instrument for measuring the absolute can wall thickness of AlSi canned fuel elements. This is intended for use by Quality Control as a nondestructive supplement, and possible eventual replacement, for the destructive caustic penetration test. The developmental approach being investigated uses the eddy current method in an absolute sense rather than in the differential sense as used in the process penetration testers. This requires especially stable and low noise signal generators, balance circuits, and amplifiers. Detailed analyses are also being made of the effects of coil design and the effects of unbonded areas beneath the cladding.

Hanford Test Reactor

Metal testing continued routinely. Several special tests were conducted including additional graphite measurements for the Babcock and Wilcox Co. The "F" size graphite standards were recalibrated and rechecked against each other to obtain

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new factors which will normalize graphite test results to the old 3S standards. The "F" size graphite purity coefficient was also remeasured. Small changes over previous values were obtained as a result of the new control rod calibration and density inhour coefficient. All graphite test results since 1953 can be converted to the inhour values that would be measured now. Tests prior to 1953 cannot be converted because of uncertainties in the density corrections.

The test reactor manual, including the latest graphite test data, is being typed in final rough draft form. It should be published in about a month.

Customer Work

105-C Basin Bondtest

Assistance was provided for adjustments and maintenance. Two new Model 1B Bondtesters (313 model) are being fabricated to replace the existing equipment which was assembled from early Testing Method's prototypes.

HLO Bondtester

A Bondtester is being set up for E. A. Smith of the Fuels Fabrication Development Operation using one of the old Bondtester units removed from the 313 building.

Plutonium Tensile Specimen Tests

The HLO Plutonium Metallurgy Research Operation has requested assistance in the development of nondestructive methods for testing Pu specimens for porosity and small internal cracks. Initial investigations are aimed at determining the feasibility of ultrasonic transmission tests on these size specimens and for these type defects. Later it may be advisable to consider eddy current and sonic vibration methods also. In all cases, some new experimental problems are imposed by the requirements for remote operation. It is expected that the initial studies can be done by adapting existing laboratory equipment and with about 4-6 man weeks of engineering assistance from Testing Methods.

HLO Resin Level Detector

At the request of C. L. Pleasance of the HLO Chemical Development Operation, a prototype instrument was developed for measuring the level of a resin interface in a CFD liquid column. This instrument measures the transit time of ultrasonic energy from a fixed transducer at the top of the column, to the resin, and back. The ultrasonic frequency is selected to optimize reflection from the resin interface. Special circuits were devised to obtain a signal proportional to the resin level. Favorable results have been obtained by Pleasance in testing the equipment in a ten foot column under simulated operating conditions.

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Ultrasonic Vibration

Assistance is being given the HLO Corrosion and Coatings Operation in their programs related to ultrasonic vibration of liquid aluminum melts.

Washington Designated Nondestructive Testing Program

Ultrasonic Lamb Wave Studies

Attention has been given to the development of analytical equations for calculating the component particle displacement (in a thin plate) as a function of particle position, and for the various vibrational modes which have been experimentally observed in thin plates. It is hoped that this analysis will yield an explanation for the observed anomalous behaviours, but the results so far have not been successful.

Broadband Electromagnetic Testing Studies

Calculations of the response of the equivalent circuit representing an electromagnetic test were made for 5 kc sinusoidal, step function, and impulse function driving functions. The impedance of the approximate equivalent network for the 5 kc sinusoidal driving function was calculated for a range of resistance values from zero ohms to open-circuit for two cases. The first case represented a thin metal of various conductivities and the second a thicker metal. The time domain responses of the network to step and impulse function inputs were calculated for $R=10$ and $R=20$ ohms. These showed that the impulse response is proportional to the square of the network resistance (metal resistivity) whereas the step function response is directly proportional to the resistance. Measurements confirm this result. This may have useful applications and its significance will be further examined.

A physical equivalent circuit was completed and measurements of its response were made using a 5 kc phasorcope (Vectorscope). Reasonable agreement with the calculated values was obtained.

Arrangements were made with HLO to have additional network response information calculated on the analogue computer.

A draft of the first report on this phase of the program was written, including data on calculated and measured response of the equivalent circuit. The response of actual test probes of the probe type and encircling cylindrical type are also shown for various metals for comparison with that of the approximate equivalent circuit.

Work has been started on the second phase of this study to determine whether or not the specific variations of the values of the network shunt resistances can be determined from the observed changes in the input impedance of the network. This will be a combined analytical and experimental approach as a direct analytical attack presents great difficulties. It is this phase of the work which is expected to show the practicality of the broadband approach in securing more information from a test than is available from the single frequency method.

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Assuming that this study will progress as anticipated, a favorable demonstration of the broadband approach may lead to application on the internal penetration test for I & E elements. The presence of acceptable structural variations in the fuel element causes signals which exceed the reject setting resulting in false rejects. The Bump Discriminator operating at 1 mc has helped this situation, but further gains are believed possible by use of an integrated instrument using a broadband or multiple frequency method.

DESIGN & PROJECTS

CG-713 - Conversion to I & E Lead-Dip Fuel Elements

The welder-buffer system is in operation, but is being utilized only intermittently while minor bugs are worked out. Most clean-up work has been completed and the project as a whole is more than serving its intended purpose.

CG-759 - Additional Steam Generating Facilities

The boiler is producing steam, and actual firing operations are under way. The building is now completely enclosed.

Arrangements were made with the Chemical Processing Department to provide an operator experienced with this type of boiler to instruct our personnel in the operational characteristics of the new boiler and related equipment.

CA-774 - 300 Area Water System Modifications

Contract work is complete except for restoration and testing. Hydrant work by Minor Construction forces is being held up pending favorable weather conditions.

The 225,000 gallon reservoir failed on January 11, 1959. There is evidence which indicates leakage in the area of the sump caused the failure, but the evidence is not conclusive, and there is no way of determining positively what started the leak. Methods of repairing the tank are being investigated.

Basically, the repairs will consist of pressure grouting to stabilize the sub-grade, and positive sealing of the cracks. The contractor has contacted a specialist in the grouting field for a proposal on this phase of the work.

CG-787 - Sprinkler System - 313 Building

Installation of the sprinkler system was completed on January 14. Inspection by a representative of the Washington Rating Bureau is scheduled for February 10, 1959.

CAF-792 - Warehouse Space - Manufacturing

Work by the contractor is complete except for asphalt installation which has been held up by unfavorable weather.

Arrangements are being made to move the sprinkler pipe which extends across the doorways out of the area of the doorway. Inspection of the sprinkler system by the Washington Rating Bureau representative is scheduled for February 10, 1959.

CG-810 - Pilot Plant Expansion

The helium leak detector has been set up and checked out. The welder for copper assembly has also been set up and some copper welding has been done. Relocation of equipment and duct work is under way.

Arrangements have been made with the Hanford Laboratories Operation to request completion of the press area in time to install the press.

All quotations on the extrusion press were rejected, and a new request for quotations was issued. New quotes were received on January 21. These quotes were evaluated and recommendations forwarded to Purchasing. The package is currently awaiting approval by the AEC.

CGF-820 - Revision 1 - Warehouse Space - Engineering

Authorization to proceed with the design has been received.

DRAFTING & FILES

Major Jobs in Drafting

306 Building:	Electron Beam Welder CGF-810 - Billet Assembly and various details CGF-810 - Billet Etch Basket
313 Building:	Automatic I & E Stamper Quality Control Reporting System - Console Board Connections Duplex Loader Neutral Salts Crucible Misc. equipment as-builts Misc. building layout as-builts Tape Head
Miscellaneous:	300 Area Maps - Steam, Sewers, Air as-builts 3713 Fire Alarm
Drawings Produced:	New 51 Revised 69 Large Charts 0 Small Charts 44 Miscellaneous 59

DECLASSIFIED

HW-59107

ADVANCED ENGINEERING

Palm Olive Program

A proposal that the Fuels Preparation Department construct a production facility for fabricating and canning palm target elements was prepared. The building would consist of approximately 4500 ft² and the high spot estimate total is \$1,500,000.

Hanford Production Capability Study

The original study was reviewed to determine what changes would occur if the second NPR was in operation by 1963 and required aluminum clad fuel elements. Results were that capital requirement for production facilities in FPD would be needed in 1961 instead of 1964 for the second NPR and operating costs remained the same as in previous studies on aluminum clad NPR fuel elements.

Casting Aluminum Jackets on Uranium Cores

A review is under way of casting aluminum jackets directly on uranium cores. If such a process is feasible and can be developed, it should result in substantial savings in component costs.

Nickel Plating of Fuel Elements

Efforts were confined largely to preparation, examination, and selection of the four charges (two chemical-plate and two electro-plate) for the in-reactor Production Test IP-207-A-3-PP. The chemical-plate was more consistent in quality, and superior to the electroplate with respect to continuity, uniformity of thickness, and adherence. However, the quality of the electroplate can be considerably improved with further development of equipment and procedures; likewise, the chemical plate exhibited discontinuities and thickness variations due to equipment and process deficiencies which can be readily rectified.

The plating on the elements selected for reactor charging will not give maximum corrosion protection, since some discontinuities are present. However, these elements should satisfactorily fulfill the primary objective of the test which is to provide data on reactor effluent contamination; in addition, some useful corrosion information will be obtained. The possible phenomena of accelerated aluminum corrosion at the site of discontinuities in the nickel plate, has thus far not been observed on electroplated fuel elements tested in reactor water, both in ex-reactor flow tubes and by irradiation to high-goal exposure. Thus the risk of a fuel element rupture due to discontinuities in the plating appears small. Further information will be provided shortly by ex-reactor corrosion tests which are being carried out at present by the HLO Coolant Systems Development Operation. These include flow tube tests in 50 C and 120 C reactor coolant, and 300 C deionized water.

The six charges (including two controls) of PT fuel elements were shipped to 105-C for charging in an outage in early February. However, tubes had not been made available, and thus charging will be delayed until mid or latter February.

1248547


C-18

DECLASSIFIED

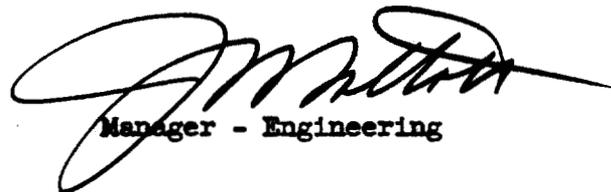
HW-59107

Preliminary tests for porosity were carried out comparing 0.5 mil thick and 0.2 mil thick chemical plate, using C-64 alloy cans plated by Kanigen. Results were encouraging in that while the 0.2 mil thick plate was porous, the porous area was confined to about 1/2 to 2/3 of the can surface, and the remainder was pore-free. These results suggest that handling and cleaning procedures and/or equipment might have caused the localized porosity, and that a pore-free 0.2 mil thick plate might be produced with feasible process improvements and controls. Further testing of nominal 0.2 mil thick and preliminary testing of 0.05 mil thick plate will be carried out shortly.

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 January, 1959 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.

NONE


Manager - Engineering

JW Talbott:mbs

1248548

FINANCIAL OPERATION
JANUARY, 1959

AUDITS AND PROCEDURES

Auditing - Internal auditing activities during the month largely consisted of investigation of or consultation on the following subjects:

1. Uniform reporting of suggestion plan statistics
2. Changes on One Trip Material Pass Control procedures
3. Conducting of government property searches to reduce misappropriations
4. Appropriateness of FPD property management practices
5. Implementation of protective clothing control procedures
6. Maintenance of insurance claim processing and status records

Office Procedures - A detailed study was made of present employee records maintained by Personnel Accounting, Salary and Wage Administration and Personnel Practices. In support of the uniform goal to consolidate these and eventually other personnel records in the Department, recommendations were prepared and agreements largely completed as to the filing system, procedures for combining records, and retention or disposition of specific documents.

Considerable time was devoted to activities of the Integrated Procedure Council. This work included a report on the first four month's accomplishments of the Council, study and investigation of several new projects, follow-up on status of a number of earlier projects, and dissemination of source information applicable to current studies by the Council members.

A number of electronic data processing considerations were reviewed and appropriate replies or proposals made. These subjects included suggested major revisions of the Personnel Source File, changes in payroll check format and preparation, proportionate amount of service work performed for FPD, improvement of the accounting coding structure, and orientation on the features of the IBM 709 Computer.

Other significant procedures work involved participation in the FPD Work Simplification Course and processing of a number of new and revised forms, most of which were further modified and improved.

GENERAL ACCOUNTING OPERATION

Under the new "bookless bookkeeping" method of accounting for cash advances, total time spent processing travel data is approximately 25% less than under the old method. Time previously required for ledger posting is being effectively utilized in connection with the development of the integrated ledger system.

The Department Reduction of Force Policy was rewritten to include a displacement procedure for exempt employees. The new policy sets forth principal criteria to be used in evaluating excess exempt employees to identify possible displacement candidates.

GENERAL ACCOUNTING OPERATION (continued)

The Travel, Living and Moving Expenses Guide was revised to incorporate several changes. A paragraph was added to provide for the General Manager's approval on travel East and/or return via Seattle or Portland when fare via these points is more expensive than direct routing. A section was changed to state that Federal Income Tax will no longer be withheld from allowances and reimbursement to newly hired employees for expenses incurred in relocating their family and/or personnel effects. The guide points out, however, that employees are still responsible for reporting payments as income on their individual tax return. The new convenience provided by General Accounting Operation for one-stop service in the 300 Area for picking up cash, checks, and tickets was also incorporated.

Comments regarding suggested changes in HAPO OPGs were submitted to Contract Accounting. Suggested changes included: (1) More specific identification of purpose as to Instruction, Policy, Announcement, or Organization; (2) that a HAPO guide regarding political activities be published to facilitate consistent HAPO-wide practice in this respect; and (3) changes in nomenclature, additions, and deletions to Appendix A of HAPO OPG 8.1 Assignment of Property.

In regard to the integrated ledger system, preliminary design is complete on all general ledger accounts except Inventories and Operating Cost. The over-all plan has been reviewed with Data Processing and found to be both feasible and proper. Procedure outlines are now being drafted on each account to provide instructions for Programming. Data Processing Representative has stated that by February 16 a Programmer will be available to start actual programming. The goal at this time is to have all General Accounting Operations accounts ready at that time and to follow-up as rapidly as possible with Operation Cost. Inventories will be considered as time permits.

Property Management Operation, Relations and Utilities Operation informally approved proposed catalog descriptions covering Buildings and Building Service Systems. Changes will be incorporated into the installed property catalog and submitted to HOO-AEC for formal approval during February.

Samples of identification tags for installed equipment are currently being appraised. So far, the most desirable is a flexible aluminum tag which can be affixed to equipment through use of a plastic cement. The Manufacturing Maintenance Operation is currently conducting a final review of the proposed equipment numbering system.

A review of plant and equipment composite depreciation rates was completed during the month. Except for a few minor changes, rates currently in use are adequate. Changes will be reflected in accruals for the last six months of FY 1959.

Semi-annual listings of uninstalled equipment are currently being distributed to FPD property custodians to insure that charges to custodians by Plant and Property Accounting are correct. Listings can be verified with custodian's property control cards and physical inventory will not be required. Periodic checks will assist in the continuing accuracy of uninstalled equipment records.

GENERAL ACCOUNTING OPERATION (continued)

The following equipment budgets for FY 1960 and FY 1961 were compiled and submitted to Contract Accounting in January.

1. Automotive & Heavy Mobile Equipment
2. Office
3. Photographic
4. Radio and Audio Visual

A total of 35 days were spent in travel status during January. A comparison of travel expense reported amounted to \$7,729.

MEASUREMENTS

The study of the Maintenance and Power business data booklet was completed. Results indicate the booklet can be a useful management tool.

Data and charts covering FPD activities were developed for the General Manager for his use during the February visit of GE Vice Presidents LaPierre and Fink.

The Department Measurement Report was brought up to date by substituting actual CY 1958 performance data for the 10 months actual and two months estimate originally used.

New Department performance charts covering CY 1959 have been prepared.

In future measurements and analyses of fuel element production, quantities will be entirely on a piece basis rather than a weight basis.

PERSONNEL ACCOUNTING OPERATION

In accordance with previous arrangements, Relations and Utilities Operation assumed responsibility for certain clerical and mechanical Personnel Accounting functions for FPD. One month's experience indicates these arrangements will prove to be satisfactory.

Except for Employee Pension Contribution Record Cards, all year-end Benefit Plans reports and tax returns have been submitted. All deductions from employees' pay accounts have been balanced. Employee Pension Contribution Record Cards were delayed pending receipt of additional information from Company and Employee Trusts Accounting.

The December, 1958 Consumer Price Index published on January 23, 1959 by the U. S. Bureau of Labor Statistics reported at 123.7, is the same as the Index for June and September, 1958; therefore, no change was made in the cost-of-living allowance to nonexempt employees. This is the second consecutive calendar quarter since March, 1956 that nonexempt salaries were not increased by a raise in the Index.

Plans are being formulated for physically combining records of Personnel Accounting, Salary and Wage Administration, and Personnel Practices.

PRODUCT COST OPERATION (continued)

Meetings continued throughout the month to discuss detailed mechanics of Responsibility Reporting and Fixed Price Work Order procedures with all levels of management.

Fiscal year-to-date costs and the Midyear Budget were recast through December 29, 1958, the effective date of the new procedure.

A meeting was held with Power Operations to discuss steam cost distribution. In the past, steam metered to the 313 Building was distributed to the Landlord account on the basis of degree days and remaining costs were considered process steam. Consequently, fluctuations in process steam costs have resulted. It has been resolved that a standard amount should be charged to process steam on the basis of production and the balance charged to the landlord account.

At the request of the Manager-Manufacturing Operation, FY 1959 budget estimates were reviewed and consideration given to data not available during the Midyear Budget Review. Indications are that Manufacturing Operation costs for the year may overrun the budget by \$32,000 or $\frac{1}{2}\%$, and production costs (2000 Program - Preparation of Fuel Elements) may overrun by \$43,000 or $\frac{1}{2}\%$. The increases in fund requirements are attributed to: (1) additional salary and related costs due to personnel increases and adding employees in advance of budgeted dates; (2) increased consumption of steel sleeves; (3) product evaluation programs; and (4) changes in product mix.

A budget instruction letter to all level 3 managers was issued January 12, 1959. Instructions covered detail information required by Financial and established due dates required to meet commitments to Contract Accounting. Forms for personnel requirements and overtime hours estimates were distributed on January 14, 1959. Forms distributed on January 23, to be used for other costs forecasts included actual cost for the first six months of FY 1959 for each item required. We anticipate no delay in meeting due date commitments.

A study was prepared to summarize results of the Department's CY 1958 cost reduction activities by level 3 operation. Total savings aggregated approximately \$941,000. In CY 1959 reports will be issued quarterly comparing actual cost reductions with CY 1959 goals.

Productivity reports for the fourth quarter and CY 1958 were completed and issued the last week of January.

Comparison of CY 1958 results with CY 1957 and CY 1958 goals reveals productivity gains of 37% and 9%, respectively. Principal factors contributing to productivity gains were yield improvements for all products and cost reduction programs conducted during CY 1958.

Estimated requirements were made for selected and controlled materials covering the second, third, and fourth quarters of 1959 and the first quarter of 1960. Materials included were chemicals, gases, and metals, i.e., bismuth, nickel, steel, copper, aluminum and nickel alloys.

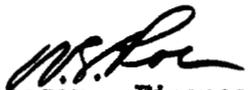
PRODUCT COST OPERATION (continued)

The Department's Process Material unit price liquidation schedule for the third quarter FY 1959 was computed and distributed.

A number of months supply on hand as presented on the Process Material Inventory Report will be computed on the basis of Production Document HW-58957 until further notice.

Current essential material transactions included a charge to the reserve account for first cost less salvage value of 172,000 R-1 Aluminum Cans considered obsolete. Balance of reserve account after charge - \$83,597.

Current transactions in Special Materials included a charge to cost for 168.9# of Zirconium (\$1,373) in connection with PR fuel element studies.


Manager - Finance

WS Roe:mh

MAINTENANCE AND POWER OPERATION

JANUARY 1959

GENERAL

There was one Cost Reduction completed, representing an annual saving of \$9,210. This is 12 per cent of the Annual Budget.

Periodic Information Meetings with nonexempt employees were initiated. These meetings are held by the Level 3 Manager. The purpose of these meetings is to improve the two-way communication between management and employees.

All office filing cabinets in the Department were anchored. This is the result of a recent safety survey urging that this be done.

AREA MAINTENANCE

<u>Duplicating</u>	<u>Process</u>	<u>No. of Impressions</u>
	Multilith	528,161
	Verifax	3,500
	Ozalid	1,112

The Addressograph machine and Graphotype were installed in the mail room. The Addressograph plates for exempt employees' plant addresses were moved to the 300 Area. Addressographing of plant mail is now being done by the Duplicating and Mail facility. This work is being performed with no additional manpower.

General Maintenance

One hundred and sixty 200-hole fuel element pallets were reconditioned and converted for use in poison element pallets.

Four air conditioning outlets were installed over the cap and can machine in the 313 Building.

A burst test shelter shed was installed on the west wall of the 314 Building. This shed will house two burst test units for use in research programs.

Several types of sodium "bombs" were built for experimental purposes. These units are being installed in a remote location across the highway from the 300 Area. These bombs are being used to determine the inherent dangers in the use of sodium in the various processes.

A stainless steel exhaust box, 36" x 12', was fabricated for use in filling aluminum tubes with uranium powder. The use of this box prevents the excessive spread of uranium contamination.

The second high pressure loop for KER was completed. The fabrication of the loop and installation of pumps in the loop was accomplished in the 326 Maintenance Shop. The electric control panel was fabricated by Instrument & Electrical Maintenance Operation.

INSTRUMENT & ELECTRICAL MAINTENANCE

The Portable Shop repaired a total of 1,021 radiation detection instruments. The average time per instrument was 1.06 manhours.

Water meters in the Richland distribution system were converted from U.S. gallons to cubic feet.

The high temperature alarm was designed and installed in the Thermal Test Reactor in the 305-B Building. This device will alert operating personnel in the event that effluent cooling water reaches 50° C.

Two manometers were installed in the PRTR test loop in the 314 Building to measure the amount of leakage from the fuel element tube.

A Republic differential pressure transmitter was modified as a remote weight transmitter for use in the 321 Building. This device was calibrated to read from zero to 12 lbs. It is being used to determine the dissolving rate of fuel elements in the Niflex process.

The gamma ray photometer was assembled for use by the Ceramic Fuels Operation, 325 Building. It is being used to measure the density of ceramic fuel elements. Cobalt 60 is being used as the gamma source. Use of this device permits 100 per cent nondestructive testing of the fuel elements. Previous methods required destructive testing on a statistical basis.

The 256 Channel Analyzer in the 329 Building was modified for use by the Analytical Chemistry Operation. The latest improvement, the third made, consists of a method of shifting data from half of the memory core to the other half. On low activity samples, the background count must be subtracted from the sample count. Before the modification, the background was taken after each sample count and subtracted. The modification permits the background to be taken once a day and stored in half of the memory core. After each sample count, it is shifted to the other half, subtracted and shifted back into storage. The modification doubles the sample counting time of the instrument.

A micro spark source unit was completed for use by the Analytical Laboratory Operation. This instrument is capable of analyzing areas of 2 to 5 microns and will be used to study fuel element inclusions. It was designed by the Chemical Research Operation.

POWER

<u>Statistics</u>	<u>January</u>	<u>December</u>
Average steam generated (M lbs/hr)	71.8	66.3
Maximum steam generated (M lbs/hr)	112.0	82.0
Total steam generated (M lbs)	53,418	49,337
Coal consumed (tons)	3,676.64	3,270.72
Evaporation rate (steam/#coal)	7.26	7.54
Efficiency - Actual	59.4	62.8
Efficiency - Theoretical	67.3	66.7
No. of Boilers on: 3 5 3 4 5 4 3 4 3		
Date of Change : 1 2 8 20 22 23 25 27 28		
Sanitary water from 3000 Area (Million Gallons)	78.9	68.8
Total water from 3000 Area (Average Rate gpm)	1,767	1,542
Total water from #3 and #4 wells (Million Gallons)	11.9	11.7
Total water from #2 well (M Gallons)	.30	.30
Peak water consumption for 24 hours (Million Gallons)	3.0	2.7

The actual plant efficiency rate was low compared to theoretical efficiency and came as a result of the frequent boiler changes necessitated by the construction work in the building. These changes were required to permit construction forces to make equipment tie-ins to existing equipment.

The injection rate of the filming amine has been held at the initial 5 ppm. This is to be continued until all evidence of the detergent action of the amine is eliminated. To date, no measurable amount of amine has been found in the boiler feed water indicating no carry-over to the boiler from the deaerator.

On January 11, 1959 a large leak was detected in the new ground storage tank. The leak appeared to be between the wall and foundation in the northeast quadrant. Indications are that the floor at this location parted from the wall of the tank. This appears to have resulted from undermining of the floor due to a leak in the drain sump. No action has been taken to date by the contractor to correct this condition.

Steam was provided to the 308 Building (PFPP) contractor on January 23, 1959. This was provided through a 1" bypass line around the locked 6" supply valve. A record of estimated steam consumption by the contractor is being maintained to allow subsequent billing.

PLANT ENGINEERING

There were 26 training classes held for crafts of HLO and FPD, representing 280 manhours of craft training.

FIRE PROTECTION, PREVENTION AND CIVIL DEFENSE

Fire Responses

	<u>No.</u>	<u>Loss</u>
HAPO	5	None
Construction	3	\$287.32
Private	0	---
Outer Area	0	--

Fire Prevention Activities

Investigations	8
Property Damage Incidents	0
Fire Inspections	29
Hazard Recommendations	5
Fire Surveys, Pre-Fire Planning	2

Significant Fires

On January 20, 1959 swing shift contractor personnel working the PRTR construction area discarded burning, smoking material that landed on a pile of concrete curing pads and canvas tarps. Then at 12:50 a.m., smoke was observed rising from the PRTR containment vessel by a patrolman who summoned Fire Protection personnel. The fire was located 60' down on the inside of the vessel and was just extending to the wood forms and shoring when discovered. It was extinguished with essentially no loss to the Government.

On January 27, 1959 construction contractor personnel working in the 384 Building Addition allowed hot slag from an acetylene cutting torch to drop on unprotected cardboard cartons of pipe insulation. The fire was extinguished with no loss to the Government.

SAFETY, SECURITY AND RADIATION EXPERIENCE

Medical Treatment Injuries	20
Frequency Rate	3.99
Disabling Injuries	0
Near Serious Accidents	0

There were no Security Violations reported.

There were no Radiation Occurrences reported.

INVENTIONS

A possible invention has been made by H. V. Herndon, Instrument & Electrical Maintenance Operation. This device is a Creep Gauge for in-pile measurement of materials. An Invention Report is being prepared.

MEETINGS

Round Table-Staff	26
Safety and Security	31
Information	13

Manager
Maintenance and Power Operation



E. Hilgeman:JPF:mkm

EMPLOYEE RELATIONS OPERATION

January, 1959

SALARY AND WAGE ADMINISTRATION

Appraisals resulting from the mass annual schedule are being reviewed as received. In one case the description of performance did not support the appraisal number assigned and this fact was brought to the attention of the appraiser. He agreed to this analysis and revised the appraisal description.

An instruction OPG on appraisal and salary review procedure was drafted. It is being further screened before issuance.

The Salary Plan Booklet was sent to one person new to G.E. and three other persons new to FPD were sent offers to discuss salary and appraisal plan questions.

Data is being accumulated for four salary data and statistic studies as follows: (a) First Line Supervisor Differential, (b) Employee Compensation Service Report No. 32--Company Exempt Salary Data, (c) ECS Report Nos. 502 and 507--Company Data on Technical College Graduate Compensation, and (d) Appraisal and Salary Zone Match-Up. All studies should be completed and results reported by early February.

Although work loads of other departments affected scheduling, another internal reconciliation meeting was held January 16, 1959 with the four concerned departments (FPD, CPD, IPD & R&U) represented. Six FPD positions were internally reconciled and one position was judged to be unreconcilable on the high side. This information will be recorded and passed on to the concerned Level 3 Manager for appropriate further action.

The Savings & Security Program increase of 2.5%, effective January 15, 1959 has been recorded on the Employee Record cards of all participating Non-Bargaining Unit Employees.

Instructions covering nonexempt job description preparation were issued. A few descriptions have been received and scored. A matrix of 42 HAPO benchmark jobs has been formulated for Plant-wide evaluation to validate the proposed new salary structure and the job evaluation plan. Meanwhile study of alternative administrative guides is in progress.

All year end data reports, charts, etc. were issued on or before established deadlines. Included were: Salary Distribution Data, Exempt Measurement Report, Supervisory and Exempt Ratio Report, Organization Directory and Organizational Polar Charts.

PERSONNEL DEVELOPMENT

Seven personnel development programs were initiated, in progress or concluded during the month.

1. Sixteen employees began PEM-I.
2. Three employees completed PMS&L through R&U Operation.
3. Six employees continued the Creative Approach Seminars.
4. Eight employees continued the Interviewing and Counseling course.
5. Six employees continued the refresher course in Solid State Physics.

6. Eighteen employees continued the Work Simplification course.
7. One exempt and three nonexempt Financial employees started the Business Training Course Spring semester.

The Professional Supervisors Study Program, a long-range supervisory training program, was presented in outline form to the Manager-Maintenance and Power. Plans were laid for initiating one portion of this program for Area Maintenance supervisors during March.

Announcement of Spring personnel development courses to be offered in the Department was distributed to all Fuels exempt personnel. In addition, detailed plans for personnel development activities through midyear were scoped.

Schedule for completion of all Exempt Personnel Development Review forms was communicated to each level 3 component.

None of the six tech grad rotational assignments in Fuels were occupied during January. This was due primarily to the reduced number of tech grads available in the program.

COMMUNICATION

Draft of the 1958 FPD Report to Employees, a booklet scheduled to be mailed to employees' homes in March, was completed and appropriate approvals obtained.

The General Manager conducted two information meetings with nonexempt employees and one with exempt employees during the month. A program of monthly meetings with nonexempt employees was initiated by the Manager-Maintenance and Power.

During the month five Management News Bulletins, two FPD Newsletters and one priority message were distributed. Other communication activities included preparation of the Safety Topic and distribution of two reading rack booklets.

GE News coverage of FPD activities and employees totaled 239 inches during January. Of this number, all but 11 inches were devoted to planned communication programs. The weekly average totaled approximately three-quarters of a GE News page per issue.

One speech was presented by a Department member on January 13 before the Milton-Freewater Rotary Club, and a group of Moxie, Washington, science students toured the 305 Test Reactor.

Movement of the boiler from the 200 Area to the 300 Area is receiving international attention. A request for pictures and additional information was received from a freelance writer in Great Britain.

HEALTH AND SAFETY

	<u>January</u>	<u>December</u>
Disabling Injuries	1	0
Serious Accidents	1	0
Medical Treatment Cases	36	47
Medical Treatment Frequency Rate	2.83	3.73
Employee Hours of Exposure	127,056	125,840
Orientation Presentations	2	1
Attendance	9	7
Inspections	32	27
Suggestions Evaluated	6	12

In January 1959, Department performance resulted in 1 Disabling Injury, 1 Serious Accident and 36 Medical Treatment Injuries. Total exposure hours accumulated at the time of injury amounted to 3,447,897 over a span of 857 days. The resulting frequency rate from September 1, 1956 through January 6, 1959 was 0.29, and the severity rate for the same period was 1.45.

Program

In January the Medical Treatment Frequency dropped to 2.83. There were 36 injuries reported of which 47% were sustained to the hands. Forty-seven percent of the hand injuries may have been prevented by proper use of gloves.

The regular monthly safety meeting for office employees was held on January 21. F. A. Leach conducted the meeting and presented an excellent demonstration on eye safety, entitled, "Let's Pretend."

First Aid classes sponsored by the Program Council, to be conducted off the job, have been started with an initial response of approximately 33 participants. The course is the industrial first aid instruction of the State Department of Labor and Industries.

Safety awards were distributed to Department personnel on January 20 for the President's Award, achieved on November 21, 1958.

Organization has been completed for the annual spring housekeeping and safety campaign, again titled "Operation New Broom." S. G. Forbes will serve as General Chairman.

Thirty-two facility inspections were conducted during January.

Activities

Job contacts with Manufacturing, Maintenance & Power, and Engineering personnel during January included the following: Accident investigations, icing conditions, eye protection equipment and zoned areas, hoisting apparatus, barricades, artificial resuscitation, materials handling, storage, safety rules and Job Hazard Breakdowns, housekeeping, pedestrian safety, equipment installation, safety standards, ventilation, guarding, publicity, lighting, chemicals, solvents, safety meetings, compressed gas systems, walks and roads, awards, medical schedules, automotive equipment, cranes, ladders, power equipment, electrical hazards, railroad right of ways, first aid, protective clothing, construction, control equipment, suggestions, explosives, air supply, high work, steam, staging and scaffolds, explosion proof equipment, and painting.

Technical Personnel Placement

	<u>January</u>	<u>FY 58</u>
Openings referred to FPD	14	329
FPD candidates offered	4	33
PhD candidates referred to FPD	10	19
Other candidates referred to FPD	4	43
Active transfer cases of FPD people	1	1
Permanent assignment from Rotational Program	0	4

General

Security Violations in the Department this month: 0

UNION RELATIONS

On January 16, 1959 the Company received an arbitration demand on the FPD R. W. Walters grievance (Instrument Worker situation). The Council has been requested to submit additional information before a decision is made to arbitrate the case.

Union Relations Information Meetings principally for level 4 and 5 management of bargaining unit personnel were inaugurated on January 22.

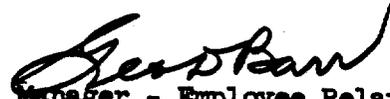
Grievance Statistics

Received this month	12
Received since 1/1/59	12
Step I	
Answer satisfactory	0
Answer unsatisfactory	12
Pending time limit to close	10
Settled this month	1
Step II	
Discussed this month	6
Pending time limit to close	7
Settled this month	2
Pending arbitration	4

Grievance Statistics (Continued)

Subject of January Grievances
(Total 12)

	<u>Mfg.</u> <u>Oper.</u>	<u>Eng.</u> <u>Oper.</u>	<u>Maint. &</u> <u>Power Oper.</u>	<u>Emp.</u> <u>Oper.</u>	<u>Fin.</u> <u>Oper.</u>
Vacation	1				
Jurisdiction	2		7		
Transfer	1				
Responsibility	1				


Manager - Employee Relations